DEVIL'S RACETRACK STREAM AND WETLAND MITIGATION SITE
Johnston County, NC
DENR Contract 003989
NCEEP Project Number 95021

Baseline Monitoring Document and As-Built Baseline Report
FINAL

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EXECUTIVE SUMMARY

Wildlands Engineering (Wildlands) restored and enhanced a total of 19,128 linear feet (LF) of stream and restoring 63.3 acres of wetlands on a full delivery mitigation site in Johnston County, NC. The project streams consist of five unnamed tributaries (UTs) to the Neuse River (Figures 2a and 2b). The largest of these streams, Devil's Racetrack Creek (East and West), drains directly to the Neuse River. The other four streams are small headwater tributaries to Devil's Racetrack Creek (Southwest Branch, Middle Branch, Southeast Branch, and North Branch). The project will provide 18,688 stream mitigation units (SMUs) and 62.1 wetland restoration units (WMUs).

The Devil's Racetrack Mitigation Site (Site) is located near the town of Four Oaks in Eastern Johnston County, NC. The site is located in the Neuse River Basin; eight digit Cataloging Unit (CU) 03020201 and the 14-digit Hydrologic Unit Code (HUC) 03020201140010 (Figure 1). The adjacent land to the streams and wetlands is primarily agricultural lands and forestry. The project will contribute to meeting the restoration goals for the Targeted Local Watershed described in the *Neuse River Basin Restoration Priorities* (RBRP). The RBRP identified the following goals for the watershed:

- Wetland restoration and enhancement that contribute to the improvement of water quality downstream in the estuary; and
- Implementation of buffer and stream projects in headwaters.

The project goals established in the mitigation plan (Wildlands, 2013) were completed with careful consideration of goals and objectives that were described in the RBRP and to meet the North Carolina Ecosystem Enhancement Program's (NCEEP) mitigation needs while maximizing the ecological and water quality uplift within the watershed. The following project goals established include:

- Restore a large wetland complex to a naturally occurring community to improve riparian habitat and water quality;
- Restore a network of badly degraded stream channels, including multiple headwaters streams, to create aquatic habitat and further improve water quality to receiving waters; and
- Restore riparian buffers along stream corridors for additional habitat and water quality benefits.

Secondary project goals established in the mitigation plan were to restore fish passage from the Neuse River to Devil's Racetrack Creek. This is a secondary goal because success will not be measured during monitoring.

The Site construction and as-built surveys were completed between August 2013 and April 2014. Minimal adjustments were made during construction, where needed, based on field evaluation. Several constructed riffles were added or substituted for brush shallows along Southeast branch during construction. Specific changes are detailed in Section 5.1. Baseline (MY-0) profiles and cross-section dimensions closely match the design parameters. Some locations along the as-built profiles are not consistent in slope due to the sandbed nature of the stream. These sorts of bed changes do not constitute a problem or indicate a need for remedial actions. The Site appears to have been built as designed and is on tract to meeting the upcoming monitoring year's success criteria.

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1.0 Project Goals, Background and Attributes

1.1 Project Location and Setting

The proposed stream and wetland mitigation site is located in central Johnston County along Devil's Racetrack Road just east of its intersection with U.S. Highway 701 and approximately one mile east of Interstate 95 (Figure 1). The Site is located on two tracts owned by Nell Howell Revocable Trust (PIN 168100-48-4293 and PIN 168100-28-6055). A conservation easement was recorded on 96.065 acres with the two parcels (Deed Book 4221, Page 419-433). To access the site, drive east along Devil's Racetrack Road approximately 1.2 miles from the Highway 701 intersection. Both portions of the site can be accessed on either side of Devil's Racetrack Road.

The Site is located in the western portion of the Inner Coastal Plain Physiographic Province (USGS, 1998). The project watershed consists primarily of agricultural lands and forest. The only significant development in the watershed is a campground adjacent to Devil's Racetrack Creek on the western portion of the project site, a middle school in the upper portion of the watershed, a low-density subdivision with single family homes, and a small section of I-95. The drainage area for the project site is 831.4 acres at the lower end of Devil's Racetrack Creek (east).

Located within the North Carolina Division of Water Resources (NCDWR) subbasin 03-04-02, none of the tributaries on the Site, including Devil's Racetrack Creek, are classified by NCDWR. Therefore they all are, by default, required to meet the standards for Class C waters which are waters protected for secondary recreation, fishing, wildlife and aquatic life, maintenance of biotic integrity, and agriculture. Devil's Racetrack Creek discharges into a section of the Neuse River (NCDWR AU# 27-(41.7)) that is classified as Class WS-V; NSW. Class WS-V waters are water supplies which are generally upstream and draining to Class WS-IV waters or waters used by industry to supply their employees with drinking water or waters that were formerly used as water supply. These waters are also protected for Class C uses. The Nutrient Sensitive Waters (NSW) classification is a supplemental classification for waters needing additional nutrient management due to excessive growth of microscopic or macroscopic vegetation (NCDWQ, 2011). This section of the Neuse River, which extends from the City of Smithfield water supply intake to a point 1.7 miles upstream of the confluence of Bawdy Creek, is listed as impaired for aquatic life on the North Carolina 303(d) list (NCDWQ, 2009).

The Site is located in the eight-digit Cataloging Unit (CU) 03020201, in the Neuse River Basin, otherwise known as the Neuse 01 CU. The 14-digit hydrologic unit, or "Targeted Local Watershed," within the 03020201 CU that includes the project site is Neuse River Basin Hydrologic Unit Code (HUC) 03020201140010. Restoration goals for the Targeted Local Watershed in the 2010 Neuse River Basin Restoration Priorities (RBRP) document (http://www.nceep.net/services/restplans/FINAL%20RBRP%20Neuse%2020111207%20CORRECTED.pdf) include the following:

- Wetlands restoration and enhancement that contribute to the improvement of water quality downstream in the estuary; and
- Implementation of buffer and stream projects in headwaters.

Prior to construction activities, the streams had been relocated and channelized and the surrounding wetland complex had been drained for agricultural purposes. Stream valleys and other low areas were filled to raise wet areas and even out the fields. At the same time the streams were straightened,

riparian vegetation was also removed. The project area west of Devil's Racetrack Road was used for row crop agriculture and the eastern portion was used for timber production.

The channelization of streams on the Site resulted in severely over-enlarged channels that were extremely deep in many locations. The alterations of the Site to promote farming resulted in complete elimination of the ecological function of this small stream/wetland complex. Specifically, functional losses at the Site include degraded aquatic habitat, altered hydrology (related to loss of floodplain connection and lowered water table), and reduction of quality and amount of riparian wetland habitats and related water quality benefits. Ongoing bank erosion was also occurring at some locations due to high, overly steep banks and lack of bank vegetation. Table 4 in Appendix 1 and Tables 5a-e in Appendix 2 present the pre-restoration conditions in detail.

1.2 Project Goals and Objectives

The mitigation project is intended to provide numerous ecological benefits within the Neuse River Basin. While many of these benefits are limited to the Devils Racetrack Creek Site project area, others, such as pollutant removal and improved aquatic and terrestrial habitat, have more far-reaching effects. Expected improvements to water quality and ecological processes are outlined below as project goals and objectives. These project goals established were completed with careful consideration of goals and objectives that were described in the RBRP and to meet the North Carolina Ecosystem Enhancement Program's (NCEEP) mitigation needs while maximizing the ecological and water quality uplift within the watershed.

The following project specific goals established in the mitigation plan (Wildlands, 2013) include:

- Restore a large wetland complex to a naturally occurring community to improve riparian habitat and water quality;
- Restore a network of badly degraded stream channels, including multiple headwaters streams, to create aquatic habitat and further improve water quality to receiving waters; and
- Restore riparian buffers along stream corridors for additional habitat and water quality benefits.

Secondary project goals established in the mitigation plan were to restore fish passage from the Neuse River to Devil's Racetrack Creek. This is a secondary goal because success will not be measured during monitoring.

The primary project goals were addressed through the following project objectives:

- Promote wetland hydrology by raising channelized stream beds and filling drainage ditches;
- Plant wetland areas with native tree species to restore a Coastal Plain Small Stream Swamp – Blackwater Subtype community;
- Reconstruct stream channels to have the appropriate slope, planform, and cross-sectional geometry for the region of the Coastal Plain in which the project is located;
- Size reconstructed stream channels to flood floodplains and wetlands frequently;
- Stabilize stream banks using bioengineering, natural channel design techniques, and grading to reduce bank angles and bank height;

- Install in-stream structures and woody debris to promote aeration of water, create habitat, and influence the creation of bed forms commonly found in sand bed channels;
- Restore riparian buffer areas with native tree species to stabilize channels, filter flood flows and runoff, and supplement wetland plantings; and
- Remove project area from agricultural production further improving water quality.

These objectives were achieved through restoring and enhancing a total of 19,016 LF of stream and restoring 63.3 acres of wetlands. The riparian and wetland areas were also planted with native vegetation to improve habitat and protect water quality.

1.3 Project Structure, Restoration Type and Approach

The design streams were restored to the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions and trajectory. Specially, the site design was developed to restore a large stream/wetland complex directly adjacent to the Neuse River to a naturally occurring community to create riparian and wetland habitat and improve water quality. Other key factors addressed in the design were to create stable habitats, improve riparian buffers, and restore the natural migration patterns for anadromous and other fish for spawning. Figure 2 and Table 1 in Appendix 1 present the stream and wetland mitigation components for the Devils Racetrack Creek Mitigation Site.

The final mitigation plan was submitted and accepted by the NCEEP in January of 2013. Construction activities were completed by Fluvial Solutions and Land Mechanic Design, Inc in February 2014. The planting was completed by Bruton Natural Systems, Inc. in January/February 2014. The baseline as-built survey was completed by Turner Land Surveying, PLLC on the west side and Stewart Proctor Engineering and Surveying, PLLC on the east side between September 2013 and March 2014. There were no significant deviations reported in the as-built project elements compared to the design plans. A few structures were either added, eliminated, or adjusted slightly based on field conditions. Field adjustments made during construction are described in detail in section 5.1. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

1.3.1 Project Structure

The project will provide 18,687 stream mitigation units (SMUs) and 62.1 wetland restoration units (WMUs). Please refer to Figures 2a and 2b for the project component/asset map for the stream restoration feature exhibits and Table 1 for the project component and mitigation credit information for the Devil's Racetrack Mitigation Site.

1.3.2 Restoration Type and Approach

The design streams and wetlands were restored to the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with thorough consideration to existing watershed conditions and trajectory. The project includes stream restoration and enhancement as well as wetland restoration. The specific proposed stream and wetland types are described below.

The stream restoration portion of this project includes six reaches:

- Southwest Branch from its headwaters to the confluence with Devil's Racetrack Creek;
- Middle Branch from its headwaters to the confluence with Devil's Racetrack Creek;
- Southeast Branch from its headwaters to the confluence with Devil's Racetrack Creek;
- North Branch from the northeast corner of the property to its confluence with Devil's Racetrack Creek;
- Devil's Racetrack Creek (west) from U.S. Highway 701 to Devil's Racetrack Road; and
- Devil's Racetrack Creek (east) from Devil's Racetrack Road to its confluence with the Neuse River.

The upper 530 LF of Middle Branch was designed as a headwater wetland feature. Stream restoration credit was generated by construction of this feature and was calculated as valley length through the feature. The project also includes one stream Enhancement II reach and one Enhancement I reach. The Enhancement II reach consists of the upper 131 LF of Southwest Branch along with 23 LF of a channel connecting the spring head to Southwest Branch. The Southwest Branch design includes 75 LF of Enhancement I in the transition between Enhancement II and restoration.

The project design was developed based on similar reference conditions representing small inner Coastal Plain stream and wetland complexes with low gradient, meandering streams and straighter, higher-gradient zero- to first-order tributaries. The streams on the site are all sand bed channels and the designs incorporated abundant woody structures that will drive scour pool formation and provide aquatic habitat. While the larger meandering streams will also have some pool formation in the bends, the bed profile of the steeper streams are completely controlled by the woody structures.

1.4 Project History, Contacts and Attribute Data

The Site was restored by Wildlands Engineering, Inc. (Wildlands) through a full delivery contract with NCEEP. Tables 2, 3, and 4 in Appendix 1 provide detailed information regarding the Project Activity and Reporting History, Project Contacts, and Project Baseline Information and Attributes.

2.0 Success Criteria

The stream restoration success criteria for the Site were established in the approved mitigation plan and followed approved performance criteria presented in the in the NCEEP Mitigation Plan Template (version 2.1, 09/01/2011), the NCEEP Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (11/7/2011), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWR. Annual monitoring and bi-annual site visits will be conducted to assess the condition of the finished project. The stream and wetland restoration and enhancement sections of the project were assigned specific performance criteria components for hydrology, vegetation, and morphology (streams only). Performance criteria will be evaluated throughout the seven year post-construction monitoring. If all performance criteria have been successfully met and two bankfull events have occurred during separate years, Wildlands may propose to terminate stream and/or vegetation monitoring. These success criteria are covered in detail in the following paragraphs.

2.1 Streams

2.1.1 Dimension

Shallow section cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio and width-to-depth ratio. Shallow cross-sections should fall within the parameters defined for channels of the appropriate Rosgen stream type (when applicable). If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg or eroding channel banks. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability. It is important to note that in sand bed channels pools and bed forms (ripples, dunes, etc.) may migrate over time as a natural function of the channel hydraulics. These sorts of bed changes do not constitute a problem or indicate a need for remedial actions.

2.1.2 Pattern and Profile

Longitudinal profile surveys will not be conducted during the seven year monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability. As mentioned above, migration of pools and bed forms are expected and do not require remedial action. Stream pattern and profile will be assessed visually as described below.

2.1.3 Substrate

Pebble count procedures will not be conducted for this project due to the sand bed nature of the streams.

2.1.4 Photo Documentation

Photographs should illustrate the site's vegetation and morphological stability on an annual basis. Cross-section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent bars within the channel or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected. Reference photos will also be taken for each of the vegetation plots.

2.1.5 Bankfull Documentation

Two bankfull flow events must be documented on the restoration and enhancement reaches within the seven-year monitoring period. The two bankfull events must occur in separate years. Stream monitoring will continue until success criteria in the form of two bankfull events in separate years have been documented. Consistent flow must be documented in the smaller drainage area streams on the project site including Southwest Branch, Middle Branch, and Southeast Branch. Under normal circumstances stream flow must be documented to occur every year for at least 30 consecutive days during the seven year monitoring period. Stream flow must also be documented to occur intermittently in all months other than July through September of each monitoring year.

2.2 Vegetation

The final vegetative success criteria will be the survival of 210 planted stems per acre in the riparian corridor along restored and enhanced reaches and within the wetland restoration areas at the end of

the required monitoring period (year seven). The interim measure of vegetative success for the site will be the survival of at least 320 planted stems per acre at the end of the third monitoring year and at least 260 stems per acre at the end of the fifth year of monitoring. Planted vegetation must average 10 feet in height in each plot at the end of the seventh year of monitoring. If this performance standard is met by year five and stem density is trending towards success (i.e., no less than 260 five year old stems/acre), monitoring of vegetation on the site may be terminated provided written approval is provided by the USACE in consultation with the NC Interagency Review Team. The extent of invasive species coverage will also be monitored and controlled as necessary throughout the required monitoring period.

It is expected that vegetation in the power line easements will be controlled by the power company. Therefore, vegetation in these areas is not expected to meet performance criteria. As shown in Table 1, mitigation credits for these areas will be reduced by 75% due to the expectation of maintenance by the power company.

2.3 Wetlands

The final performance standard for wetland hydrology will be a free groundwater surface within 12 inches of the ground surface for 8.5 percent of the growing season, which is measured on consecutive days under typical precipitation conditions. This performance standard was determined through model simulations of post restoration conditions and comparison to reference wetland systems. If a particular gauge does not meet the performance standard for a given monitoring year, rainfall patterns will be analyzed and the hydrograph will be compared to that of the reference wetlands to assess whether atypical weather conditions occurred during the monitoring period.

2.4 Schedule and Reporting

Monitoring reports will be prepared in the fall of each year of monitoring and submitted to NCEEP. Based on the NCEEP Monitoring Report Template (version 1.3, 01/15/2010), the monitoring reports will include the following:

- Project background which includes project objectives, project structure, restoration type and approach, location and setting, history and background;
- As-built topographic plans of major project elements including such items as grade control structures, vegetation plots, permanent cross-sections, crest gages, and pressure transducers;
- Photographs showing views of the restored Stream Site taken from fixed point stations;
- Assessment of the stability of the Stream Site based on the cross-sections and longitudinal profile, where applicable;
- Vegetative data as described above including the identification of any invasion by undesirable plant species;
- Groundwater gauge attainment;
- A description of damage by animals or vandalism;
- Maintenance issues and recommended remediation measures will be detailed and documented; and
- Wildlife observations.

3.0 Monitoring Plan

Monitoring will consist of collecting morphological, vegetative, and hydrological data to assess the project success based on the restoration goals and objectives on an annual basis or until success criteria is met. The success of the project will be assessed using measurements of the stream channel's dimension, pattern, profile, substrate composition, permanent photographs, vegetation, surface water hydrology, and groundwater hydrology. Any areas with identified high priority problems, such as streambank instability, aggradation/degradation, insufficient groundwater hydroperiod, or lack of vegetation establishment will be evaluated on a case-by-case basis. The problem areas will be visually noted and remedial actions will be discussed with NCEEP staff to determine a plan of action. A remedial action plan will be submitted if maintenance is required. In addition to the above annual monitoring, benthic macroinvertebrate sampling will be conducted during the winter following monitoring years 2, 4, and 7.

3.1 Stream

Geomorphic assessments follow guidelines outlined in the Stream Channel Reference Sites: An Illustrated Guide to Field Techniques (Harrelson et al., 1994), methodologies utilized in the Rosgen stream assessment and classification document (Rosgen, 1994 and 1996), and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al, 2003). Please refer to Figure 2a and b and Appendix 4 for monitoring locations discussed below.

3.1.1 Dimension

A total of 37 cross-sections were installed along the stream restoration and Enhancement I reaches. Two cross-sections were installed per 1,000 linear feet of stream restoration work, with riffle and pool sections in proportion to NCEEP guidance. Each cross-section was permanently marked with pins to establish its location. Annual cross-section survey will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. Photographs will be taken annually of the cross-section looking upstream and downstream.

3.1.2 Pattern and Profile

Longitudinal profile surveys will not be conducted during the seven year monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability. Stream pattern and profile will be assessed visually as described below.

3.1.3 Substrate

Pebble count procedures will not be conducted for this project due to the sand bed nature of the streams.

3.1.4 Photo Reference Points

A total of 94 permanent photograph reference points were established within the project area after construction. Photographs will be taken once a year to visually document stability for five years following construction. Permanent markers were established so that the same locations and view directions on the site are monitored each year. Photographs will be used to monitor stream restoration and enhancement reaches. The photographer will make every effort to maintain the

same view in each photo over time. The representative digital photo(s) will be taken on the same day(s) the surveys are conducted.

3.1.5 Bankfull Documentation

Six crest gages and three pressure transducers were installed on the site (Appendix 4). The gages and transducers were installed onsite in a surveyed riffle cross-section of the restored channels at a central site location and will be checked during each site visit to determine if a bankfull event has occurred since the last visit. Photographs will be used to document the occurrence of debris lines and sediment deposition as evidence of bankfull events. Additionally, the pressure transducer data will be plotted and included in the annual monitoring reports.

3.1.6 Visual Assessment

Visual assessments will be conducted along all reaches each year to obtain qualitative geomorphic data. Each visual assessment evaluation after the baseline survey will include re-evaluation along the same profile.

3.2 Vegetation

Planted woody vegetation will be monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2006) to monitor and assess the planted woody vegetation. A total of 51 vegetation plots were established within the project easement area. The majority of the plots were established as standard 10 meter by 10 meters with one plot established as a 5 meter by 20 meter plot.

Vegetation plots were randomly established within the planted corridor of the restoration areas to capture the heterogeneity of the designed vegetative communities. The vegetation plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs at the origin looking diagonally across the plot to the opposite corner were taken during the baseline monitoring in February 2014. Subsequent annual assessments following baseline survey will capture the same reference photograph locations. Species composition, density and survival rates will be evaluated on an annual basis by plot and for the entire site. Individual plot data will be provided and will include diameter, height, density, vigor, damage (if any), and percent survival. Planted woody stems will be marked annually as needed based off of a known origin so they can be found in succeeding monitoring years. Mortality will be determined from the difference between the baseline year's living planted stems and the current year's living planted stems.

4.0 Maintenance and Contingency Plans

Any identified high priority problem areas, such as streambank instability, aggradation/degradation, lack of vegetation establishment, or failure to meet groundwater hydrology success criteria will be evaluated on a case-by-case basis. The problem areas will be visually noted and remedial actions will be discussed with NCEEP staff to determine a plan of action. A remedial action plan will be submitted if maintenance is required.

4.1 Stream

Stream problem areas will be mapped and included in the Current Condition Plan View (CCPV) as part of the annual stream assessment. Stream problems areas may include bank erosion, structure failure,

beaver dams, aggradation/degradation, etc. Appropriate remedial actions will be determined with NCEEP correspondence. A proposal of work will be submitted if remediation of an area is required.

4.2 Vegetation

Vegetative problem areas will be mapped and included in the CCPV as part of the annual vegetation assessment. Vegetation problems areas may include planted vegetation not meeting success criteria, persistent invasive species, barren areas with little to no herbaceous cover, or grass suffocation/crowding of planted stems. Appropriate remedial actions will be determined with NCEEP correspondence. A proposal of work will be submitted if remediation of an area is required.

4.3 Wetlands

Wetland problem areas will be mapped and included in the CCPV as part of the annual wetland assessment. Wetland problems areas may include planted vegetation not meeting success criteria, persistent invasive species, barren areas with little to no herbaceous cover, grass suffocation/crowding of planted stems, or wetland hydrology not meeting success criteria. Appropriate remedial actions will be determined with NCEEP correspondence. A proposal of work will be submitted if remediation of an area is required.

5.0 As-Built Condition (Baseline)

The Site construction and as-built surveys were completed between August 2013 and April 2014. The survey included developing an as-built topographic surface, locating the channel boundaries, structures, and cross-sections. For comparison purposes, the baseline monitoring divided the reach assessments in the same way they were established for design parameters: Devil's Racetrack (East and West), North Branch, Southwest Branch, Middle Branch, and Southeast Branch.

5.1 As-Built/Record Drawings

A half size baseline plan is located in Appendix 4 with the post-construction locations and alignments for the project. A record drawing has also been provided to NCEEP as a separate document that redlines any significant field adjustments made during construction that were different from the design plans. Minimal adjustments were made during construction, where needed, based on field evaluation. Several constructed riffles were added or substituted for brush shallows along Southeast branch due to damage from flashy flows during construction. Specific changes are detailed below:

5.1.1 Devils Racetrack (West)

- General Note – some pools have filled in between construction and as-built primarily due to runoff from adjacent agricultural fields prior to buffer establishment;
- Station 00+50 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 03+85 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 06+60 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 09+60 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 11+10 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 12+10 native sod mat was substituted for rootwads due to available sod from test plots;

- Station 18+75 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 20+80 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 00+50 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 25+10 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 26+75 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 30+10 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 30+75 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 31+40 native sod mat was substituted for brush toe due to available sod from test plots;
- Station 37+90 native sod mat was substituted for brush toe due to available sod from test plots; and
- Station 38+75 native sod mat was substituted for brush toe due to available sod from test plots.

5.1.2 Devils Racetrack (East)

- Station 55+00 native stone and brush added to constructed riffle;
- Station 66+70 a log j-hook was shifted upstream to Station 66+50 to encourage scour in the pool;
- Station 69+90 a log j-hook was shifted upstream to Station 69+70 to encourage scour in the pool;
- Station 70+80 the 12" CMP floodplain culverts were replace with 24" CMP due to maintenance concerns with smaller pipe sizes;
- Station 73+70 a log vane was removed and the log was used to construct a log sill at Station 73+60 to provide additional grade control;
- Station 76+20 rootwads were substituted for brush toe due to material availability;
- Station 80+60 rootwads were substituted for brush toe due to material availability;
- Station 88+25 the 12" CMP floodplain culverts were replace with 24" CMP due to maintenance concerns with smaller pipe sizes;
- Station 88+75 brush drop not installed due to low slope conditions;
- Station 91+00 brush toe was substituted for brush mattress due to the timing of installation;
- Station 93+70 brush toe was substituted for rootwads due to material availability;
- Station 97+60 brush toe was substituted for rootwads due to material availability;
- Station 100+40 brush toe was substituted for rootwads due to material availability; and
- Station 107+75 boulder toe was substituted for brush toe and log vanes on the left bank due to scour concerns.

5.1.3 North Branch

- Station 400+00 a constructed riffle was added upstream of Station 400+00 to ensure adequate grade control; and
- Station 400+00 – 403+80 structures were installed as designed but several were not located in the as built survey due to sediment deposition which was the intended purpose of these structures.

5.1.3 Middle Branch

- Station 204+10 the pond bottom was graded more irregularly than designed to create more diversity in water depth and habitat availability.

5.1.4 Southeast Branch

- Station 301+25 a constructed riffle was added for additional grade control;
- Station 301+90 a brush riffle was added for additional habitat;
- Station 304+55 a constructed riffle was added for additional grade control;
- Station 305+05 a constructed riffle was substituted for a brush drop due to observed stability problems with brush drops on steep slopes during construction;
- Station 305+35 a constructed riffle was added for additional grade control;
- Station 306+40 a constructed riffle was added for additional grade control;
- Station 306+60 a constructed riffle was added for additional grade control;
- Station 306+45 a log sill was added and cover log removed for additional grade control;
- Station 306+80 a constructed riffle was added for additional grade control;
- Station 306+95 a constructed riffle was substituted for a brush drop for additional grade control;
- Station 307+25 a constructed riffle was added for additional grade control;
- Station 307+90 a constructed riffle was added for additional grade control;
- Station 307+95 a constructed riffle was added for additional grade control;
- Station 308+10 a constructed riffle was added for additional grade control;
- Station 308+25 a constructed riffle was added for additional grade control;
- Station 308+65 a constructed riffle was added for additional grade control;
- Station 309+00 a constructed riffle was added for additional grade control;
- Station 309+10 a constructed riffle was added for additional grade control;
- Station 309+60 a constructed riffle was added for additional grade control;
- Station 310+50 a constructed riffle was added for additional grade control;
- Station 310+60 a constructed riffle was added for additional grade control;

- Station 310+90 a constructed riffle was added for additional grade control;
- Station 310+20 a constructed riffle was substituted for a brush drop due to observed stability problems with brush drops on steep slopes during construction;
- Station 311+70 a constructed riffle was substituted for a brush drop due to observed stability problems with brush drops on steep slopes during construction;
- Station 312+30 a constructed riffle was added for additional grade control; and
- Sod mats were not installed in several locations due to lack of availability.

5.1.5 Southwest Branch

- Station 502+60 a constructed riffle was added for additional grade control;
- Station 503+70 a constructed riffle was substituted for brush shallow for additional grade control;
- Station 504+20 a constructed riffle was substituted for brush shallow for additional grade control;
- Station 503+55 a constructed riffle was substituted for a brush drop for additional grade control; and
- Sod mats were not installed in several locations due to lack of availability.

5.2 Baseline Data Assessment

Baseline monitoring (MY-0) was conducted between December 2013 and April 2014. The first annual monitoring assessment (MY-1) will be completed in the fall of 2014. The streams and wetlands will be monitored for a total of seven years, with the final monitoring activities conducted in 2020. The close-out for the Devil's Racetrack Mitigation Site will be conducted in 2021 given the success criteria is met. As part of the closeout process, NCEEP will evaluate the site at the end of the fourth year monitoring period to determine whether or not the site is eligible to closeout following monitoring year five. If the Site is meeting success criteria, NCEEP will propose to the interagency review team (IRT) to proceed with the closeout process. If the Site is not meeting success criteria, then an additional two years of monitoring will be conducted by Wildlands.

5.2.1 Morphological State of the Channel

Morphological data for the as-built profile was collected in December 2013 and February 2014. Please refer to Appendix 2 for summary data tables, morphological plots, and stream photographs.

Profile

The baseline (MY-0) profiles closely match the profile design parameters. On the design profiles, riffles were depicted as straight lines with consistent slopes. However, at some locations the as-built survey riffle profiles are not consistent in slope due to the sandbed nature of the stream. As noted in the mitigation plan section 13.1, sand bed channels pools and bed forms (ripples, dunes, etc.) may migrate over time as a natural function of the channel hydraulics. These sorts of bed changes do not constitute a problem or indicate a need for remedial actions and will be assessed visually during the CCPV site walks.

Dimension

The baseline (MY-0) dimension numbers closely match the design parameters with minor variations in all reaches. These variations are primarily due to constructed riffles or brush shallows in the riffle sections and brush toe in the pool sections. Installation of these structures results in irregularity of the surface which is reflected in the cross sections. Summary data and cross-section plots of each project reach can be found in Appendix 2.

Pattern

The baseline (MY-0) pattern metrics fell within the design parameters for all six reaches. No major design changes were made to alignments during construction. Pattern data will be evaluated in monitoring year five if there are any indicators through the profile or dimensions that significant geomorphic adjustments have occurred.

Sediment Transport

Due to the sandbed nature of the streams within the Site, sediment transport analyses were not performed along the stream reaches for the as-built conditions. Prior to construction, a HEC-RAS sediment capacity analysis was conducted along representative project reaches to compare existing and proposed conditions. Please refer to section 10.5 of the mitigation plan for more detail. Results from this pre-construction analysis indicated that the transport capacity of the proposed streams was equal to or slightly more than that of the existing channels, although in a few cases it was slightly less. These results indicated that the proposed channels have the capacity to move at least as much sediment at the design bankfull discharge as the existing channels.

Although a stream capacity analysis was not conducted using the as-built conditions in HEC-RAS, it is assumed that the as-built streams have the capacity to move the same amount sediment as the design bankfull discharge. The as-built stream dimension and profile for the streams are similar to design parameters and should reduce the risk of further erosion along all restoration reaches. The as-built condition for each of the project reaches is summarized in Tables 5a – 5f.

5.2.2 Vegetation

The baseline (MY-0) planted density is 702 stems/acre, which exceeds the MY-5 density requirement. Summary data and photographs of each plot can be found in Appendix 3.

5.2.4 Hydrology

Several bankfull events have been observed following completion of construction. Bankfull events recorded will be included in the year 1 monitoring report.

6.0 References

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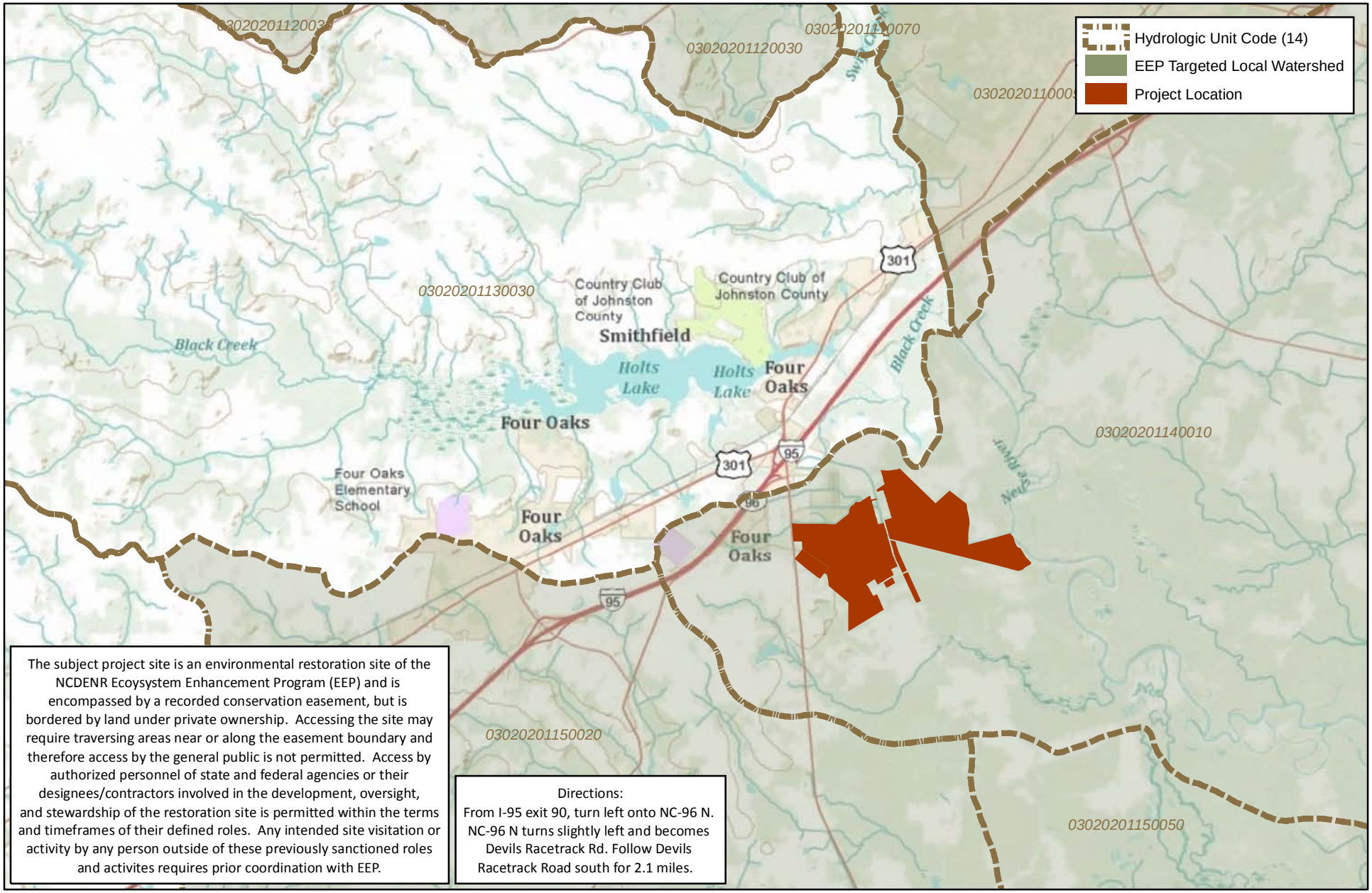
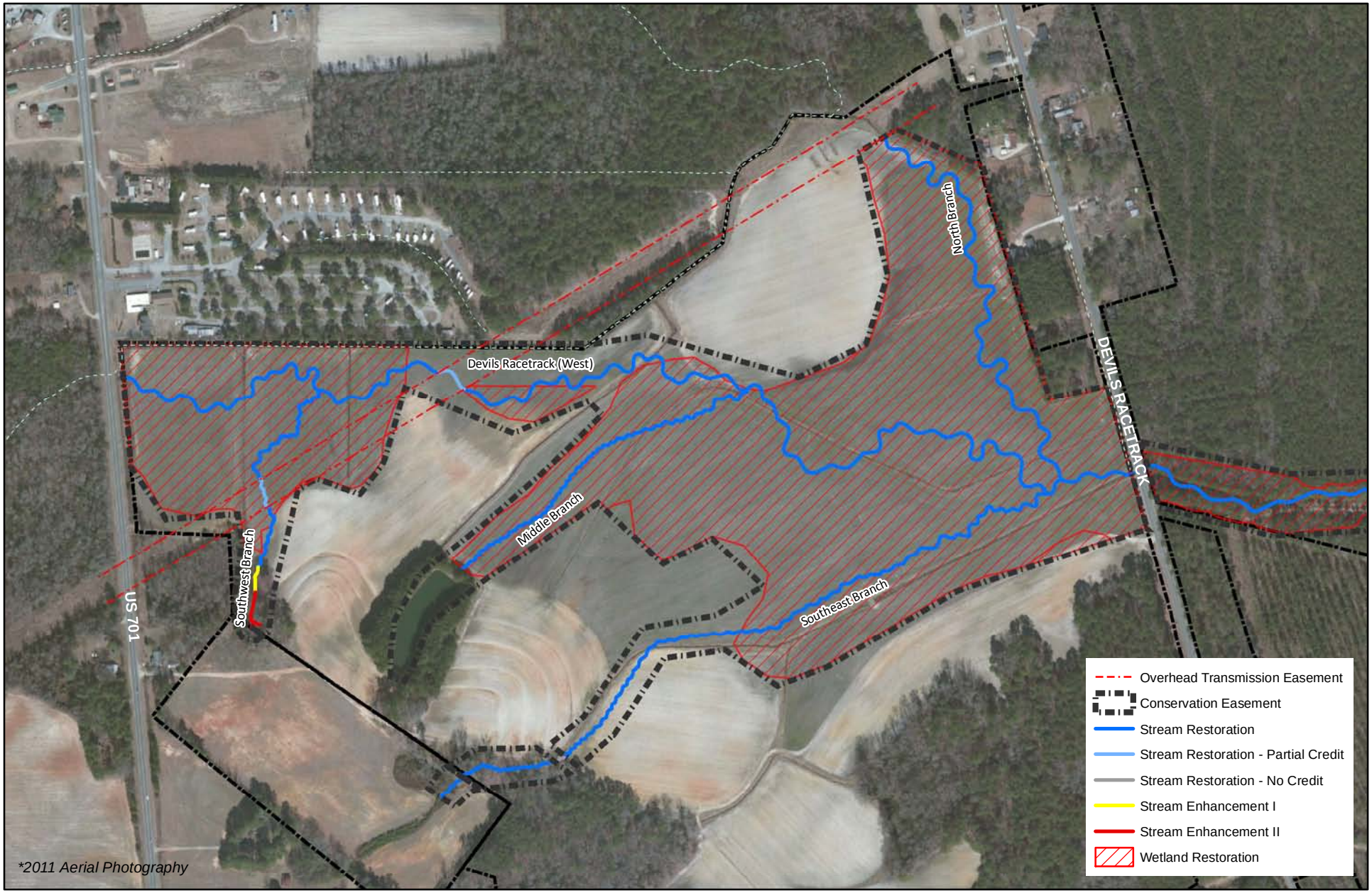
APPENDIX 1. General Tables and Figures



WILDLANDS ENGINEERING

Ecosystem Enhancement Program

Figure 1. Project Vicinity Map
Devils Racetrack Mitigation Site
EEP Project No. 95021
Monitoring Year 0
Johnston County, NC



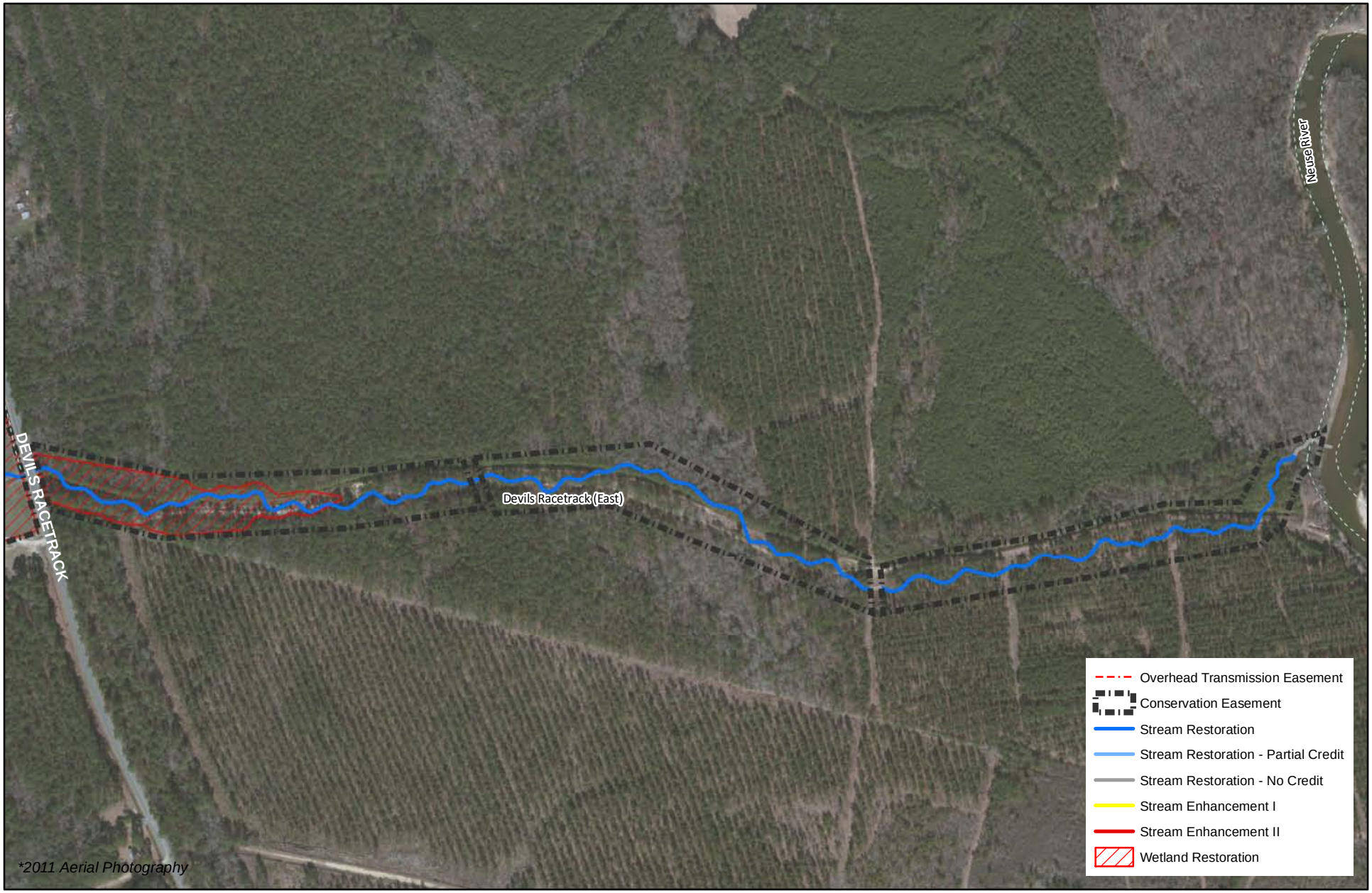
WILDLANDS ENGINEERING

Ecosystem Enhancement Program

0 250 500 Feet

N

Figure 2a. Project Component/Asset Map
Devils Racetrack Mitigation Site
EEP Project No.95021
Monitoring Year 0
Johnston County, NC



WILDLANDS ENGINEERING

Ecosystem Enhancement Program

0 250 500 Feet

N

Figure 2b. Project Component/Asset Map
Devils Racetrack Mitigation Site
EEP Project No.95021
Monitoring Year 0
Johnston County, NC

Table 1. Project Components and Mitigation Credits
Devils Racetrack Mitigation Site (NCEEP Project No.95021)
Monitoring Year 0

Mitigation Credits									
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	18,688	0	62.1	0	N/A	N/A	N/A	N/A	N/A

Project Components							
Reach ID	As-Built Stationing/ Location	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage/ Acreage	Mitigation Ratio[1]	Credits (SMU/ WMU)[2]
Streams							
Devil's Racetrack Creek (West) (DOT ROW)	0+00-0+20	20 LF	P1	Restoration (No Credit)	20	N/A	N/A
Devil's Racetrack Creek (West)	0+20-16+26 & 17+50-52+05	4,755 LF	P1	Restoration	5,061	1:1	5061.00
Devil's Racetrack Creek (West) (Power Line Easement)	16+26-17+50	196 LF	P1	Restoration (Partial Credit)	124	4:1[1]	31.00
Devil's Racetrack Creek (West) (DOT ROW)	52+05-52+11	5 LF	P1	Restoration (No Credit)	6	N/A	N/A
Devil's Racetrack (East) (DOT ROW)	52+59-52+65	5 LF	P1	Restoration (No Credit)	6	N/A	N/A
Devil's Racetrack (East)	52+65-70+68 & 71+08-87+97 & 88+37-106+85	4,778 LF	P1/2	Restoration	5,461	1:1	5461.00
Devil's Racetrack (East) (Easement Break)	70+68-71+08	30 LF	P1/2	Restoration (No Credit)	40	N/A	N/A
Devil's Racetrack (East) (Easement Break)	87+97 to 88+37	31 LF	P1/2	Restoration (No Credit)	40	N/A	N/A
Devil's Racetrack (East)	106+85-107+97	0 LF	P1/2	Restoration (No Credit)	0	N/A	N/A
Southwest Branch	500+00-501+31	154 LF	EII	Enhancement	154	2.5:1	61.60
Southwest Branch	501+31-502+07	75 LF	EI	Enhancement	76	1.5:1	50.67
Southwest Branch	502+07-511+32	740 LF	P1/2	Restoration	811	1:1	811.00
Southwest Branch (Power Line Easement)	504+85-505+99	111 LF	P1/2	Restoration (Partial Credit)	114	4:1	28.50
Middle Branch	200+00-204+00	410 LF	Headwater Wetland		400	1:1	400.00
Middle Branch	204+00-219+06	1,326 LF	P1/2	Restoration	1,506	1:1	1506.00
Southeast Branch	300+00-328+92	2,946 LF	P1	Restoration	2,848	1:1	2848.00
Southeast Branch (Easement Break)	304+97-305+40	30 LF	P1	Restoration (Partial Credit)	43	4:1	10.75
North Branch	400+00-424+18	---	P1	Restoration	2,418	1:1	2418.00
Wetlands							
Riparian Wetlands (West)	N/A	0.0 ac	N/A	Restoration	57.9	1:1	57.90
Riparian Wetlands (West) (Power Line Easement)	N/A	0.0 ac	N/A	Restoration (Partial Credit)	1.6	4:1	0.40
Riparian Wetlands (East)	N/A	0.0 ac	N/A	Restoration	3.8	1:1	3.80

Component Summation						
Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	18,786	63.3	-	-	-	-
Enhancement		-	-	-	-	-
Enhancement I	76					
Enhancement II	154					
Creation		-	-	-		
Preservation	-	-	-	-		-
High Quality Preservation	-	-	-	-		-

N/A: not applicable

1. Ratio of 4:1 based on an expected 75% reduction in credits for stream restoration with shrub buffer zone in power line easements.

2. Wetland restoration acreage and credits are higher than what was reported in the Final Mitigation Plan approved by the IRT in January 2013 due to an Autocad error that resulted in an under reporting of wetland acreage.

Table 2. Project Activity and Reporting History
Devils Racetrack Mitigation Site (NCEEP Project No.95021)
Monitoring Year 0

Activity or Report	Date Collection	Completion or Scheduled
Mitigation Plan	September 2011-March 2012	January 2013
Final Design - Construction Plans	September 2011-March 2012	August 2013
Construction	December 2013-January 2014	February 2014
Temporary S&E mix applied to entire project area [1]	January 2014	January 2014
Permanent seed mix applied to reach/segments	January 2014	January 2014
Bare root and live stake plantings for reach/segments	January 2014	January 2014
Baseline Monitoring Document (Year 0)	December 2013-February 2014	May 2014
Year 1 Monitoring	2014	December 2014
Year 2 Monitoring	2015	December 2015
Year 3 Monitoring	2016	December 2016
Year 4 Monitoring	2017	December 2017
Year 5 Monitoring	2018	December 2018
Year 6 Monitoring	2019	December 2019
Year 7 Monitoring	2020	December 2020

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table
Devils Racetrack Creek Mitigation Site (NCEEP Project No.95021)
Monitoring Year 0

Designer	**Wildlands Engineering, Inc.**
Jeff Keaton, PE	312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor (East Side)	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Construction Contractor (West Side)	**Fluvial Solutions** P.O. Box 28749 Raleigh, NC 27611
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seed Mix Sources	**Green Resource, LLC**
Nursery Stock Suppliers	
Bare Roots	**Dykes and Son Nursery and NC Forest Service (Claridge Nursery)**
Live Stakes	**Bruton Natural Systems, Inc**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Kirsten Gimbert 704.332.7754, ext. 110

Table 4. Project Information and Attributes
Devils Racetrack Mitigation Site (NCEEP Project No.95021)
Monitoring Year 0

Project Information								
Project Name	Devils Racetrack Mitigation Site							
County	Johnston County							
Project Area (acres)	96							
Project Coordinates (latitude and longitude)	35° 27'01.58" N, 78° 23' 18.08" W							
Project Watershed Summary Information								
Physiographic Province	Upper Coastal Plain							
River Basin	Neuse							
USGS Hydrologic Unit 8-digit	03020201							
USGS Hydrologic Unit 14-digit	03020201140010							
DWR Sub-basin	03-04-02							
Project Drainiage Area (acres)	831.4 ac							
Project Drainage Area Percentage of Impervious Area	<1%							
CGIA Land Use Classification	62% forest/wetland, 34% farm land, 4% developed							
Reach Summary Information								
Parameters	**Southwest Branch**	**Middle Branch**	**Southeast Branch**	**North Branch**	**Devil's Racetrack Creek (west)**	**Devil's Racetrack Creek (east)**		
Length of reach (linear feet) - Post-Restoration	927	1,906	2,892	2,418	5,061	5,461		
Drainage area (acres)	20.6	10.8	69.9	49.9	493.5	831.4		
NCDWR stream identification score	34.5 - 37	30	29 - 30.75	32	38	37.5		
NCDWR Water Quality Classification	C/NSW							
Morphological Desription (stream type)	P	P	P/I	P	P	P		
Evolutionary trend (Simon's Model) - Pre- Restoration	---	---	---	---	---	---		
Underlying mapped soils	Altavista fine sandy loam, Bibb sandy loam, Cecil loam, Goldsboro sandy loam, Leaf silt loam, Lynchburg sandy loam, Nason silt loam, Norfolk loamy sand, and Rains sandy loam.							
Drainage class	---	---	---	---	---	---	---	---
Soil Hydric status	---	---	---	---	---	---	---	---
Slope	---	---	---	---	---	---	---	---
FEMA classification	None							
Native vegetation community	Coastal Plain bottomland riparian forest							
Percent composition exotic invasive vegetation -Post-Restoration	0%							

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States - Section 404	X	X	USACE Nationwide Permit No.27 and DWQ 401 Water Quality Certification No. 3885.
Waters of the United States - Section 401	X	X	
Division of Land Quality (Dam Safety)	N/A	N/A	N/A
Endangered Species Act	X	X	Devils Racetrack Mitigation Plan; Wildlands determined "no effect" on Johnston County listed endangered species.
Historic Preservation Act	X	X	No historic resources were found to be impacted (letter from SHPO dated 7/20/2011).
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A
FEMA Floodplain Compliance	N/A	N/A	The project streams do not have an associated regulatory flooplaing; however the downstream end of Devil's Racetrack Creek is located within the floodwasy and flood fringe of the Neuse River (FEAM Zone AE, FIRM panel 1680).
Essential Fisheries Habitat	N/A	N/A	N/A

APPENDIX 2. Morphological Summary and Data Plots

Table 5a. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

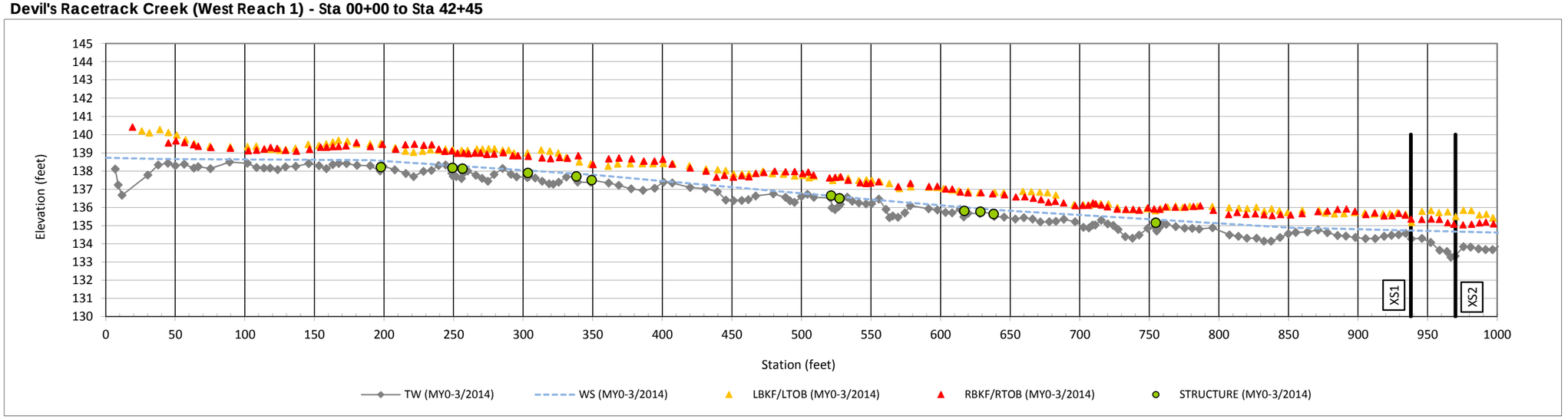
Devils Racetrack- West

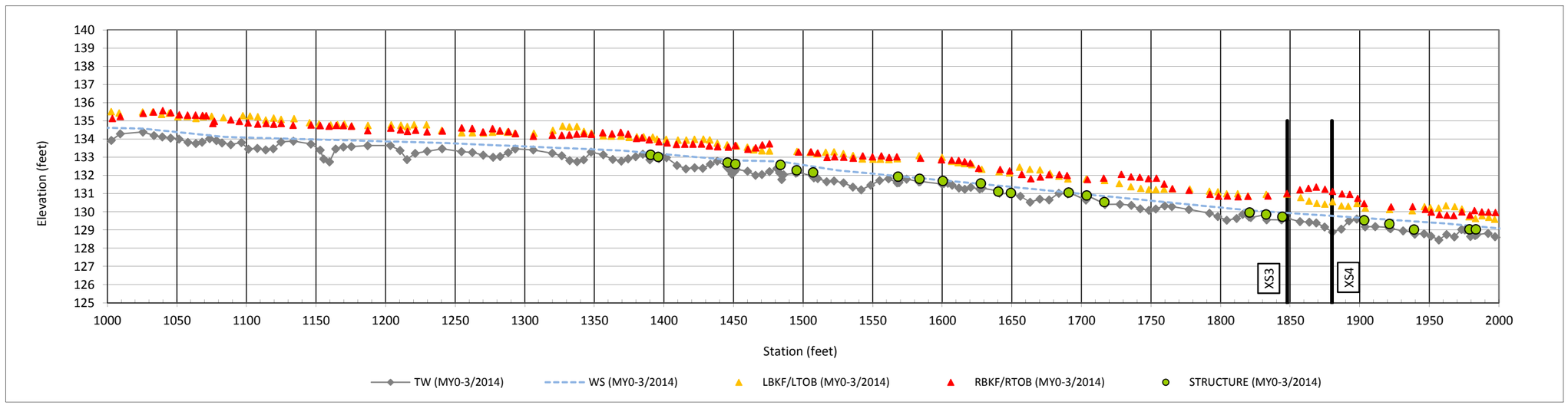
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design				As-Built/Baseline			
		Devil's Racetrack - West		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		Devil's Racetrack - West (Reach 1)		Devil's Racetrack - West (Reach 2)		Devil's Racetrack - West (Reach 1)		Devil's Racetrack - West (Reach 2)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																					
Bankfull Width (ft)	N/A	4.8	8.0	2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		9.0		11.5		4.7	9.6	7.7	
Floodprone Width (ft)		7.8	18.0	>20		>50		>50		>75		>150		100	300	100	300	>200		>200	
Bankfull Mean Depth		0.8	1.2	0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		0.6		0.8		0.4	0.9	0.5	
Bankfull Max Depth		1.3	1.6	0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		0.9	1.1	1.1	1.5	1.1	1.4	0.7	
Bankfull Cross-sectional Area (ft^2)		5.7	6.3	1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		5.8		9.5		2.1	8.5	4.0	
Width/Depth Ratio		4.0	10.5	5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		14.0	14.5	14.0		10.6	14.8	14.5	
Entrenchment Ratio		1.6	2.2	>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	11.1	33.3	8.7	26.1	>20.9	>42.5	>26.1	
Bank Height Ratio		1.9	4.5	1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	1.1	1.0		1.0	
D50 (mm)		0.464																N/A		N/A	
Profile																					
Shallow Length (ft)	N/A			---		---		---		---		---		---		---		3.7	86.8	7.4	54.2
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0036	0.0277	0.0023	0.0072	0.0013	0.0593	0.0008	0.0195
Pool Length (ft)				---		---		---		---		---		---		---		5.5	63.1	18.7	72.9
Pool Max Depth (ft)		1.2		0.6		N/A		1.7	1.9	1.5		3.1		0.9	2.1	1.1	2.5	1.1	2.9	1.4	1.9
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	14	63	18	81	9	132	38	104
Pool Volume (ft^3)																					
Pattern																					
Channel Beltwidth (ft)	N/A	---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	12.0	72.0	15.0	92.0	13.0	53.0	16.0	73.0
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	14.0	43.0	17.0	55.0	12.0	40.0	17.0	35.0
Rc:Bankfull Width (ft/ft)		---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.5	4.8	1.5	4.8	2.6	4.2	2.2	4.5
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		27	153	35	196	52	133	70	137
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	8.0	1.3	8.0	2.8	5.5	2.1	9.5
Substrate, Bed and Transport Parameters																					
Ri%/Ru%/P%/G%/S%	N/A																				
SC%/Sa%/G%/C%/B%/Be%																					
d16/d35/d50/d84/d95/d100		0.168/0.33/0.464/1.23/2.0/9.6		---		---		---		---		---						N/A		N/A	
Reach Shear Stress (Competency) lb/ft^2		0.18	0.23											---		---		N/A		N/A	
Max part size (mm) mobilized at bankfull																					
Stream Power (Capacity) W/m^2																					
Additional Reach Parameters																					
Drainage Area (SM)	N/A	0.77		0.06		0.67		0.34		0.90		1.27		0.60		0.70		0.60		0.70	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%	
Rosgen Classification		Gc5		E/C5b		E5		E5		E5/C5		E6		E/C5		E/C5		E/C5		C	
Bankfull Velocity (fps)		1.5	1.8	1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		1.7		1.2		1.2	4.8	3.3	
Bankfull Discharge (cfs)		9.2	10.6	2.6		17.5		6.4		14.0		11.0		10.0		13.0		10.0		13.0	
Q-NFF regression		---																			
Q-USGS extrapolation		---																			
Q-Mannings		---																			
Valley Length (ft)		---		---		---		---		---		---		---		---					
Channel Thalweg Length (ft)		4,976		---		---		---		---		---		4,245		966		4,239		962	
Sinuosity		1.0		1.1		1.2		1.2		1.2		1.4		1.2	1.6	1.2	1.6	1.2		1.4	
Water Surface Slope $(ft/ft)^2$		---		---		---		---		---		---		---		---		0.0054		0.0015	
Bankfull Slope (ft/ft)		0.0041		0.0260		0.0170		0.0040		0.0022		0.0040		0.0025	0.0087	0.0016	0.0022	0.0053	0.0054	0.0017	0.0023

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

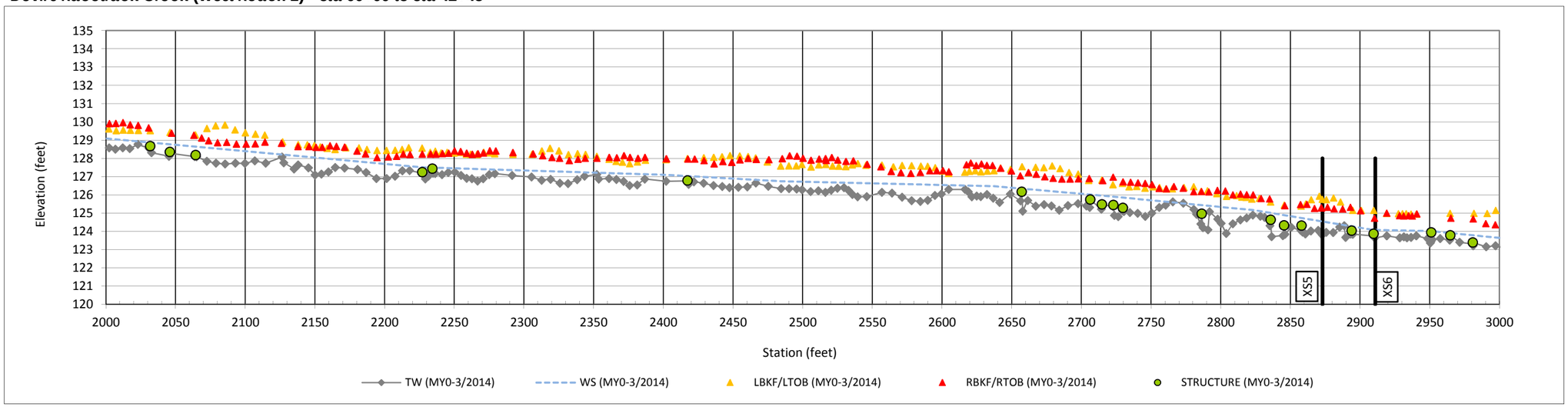
Devil's Racetrack Creek (West Reach 1) - Sta 00+00 to Sta 42+45

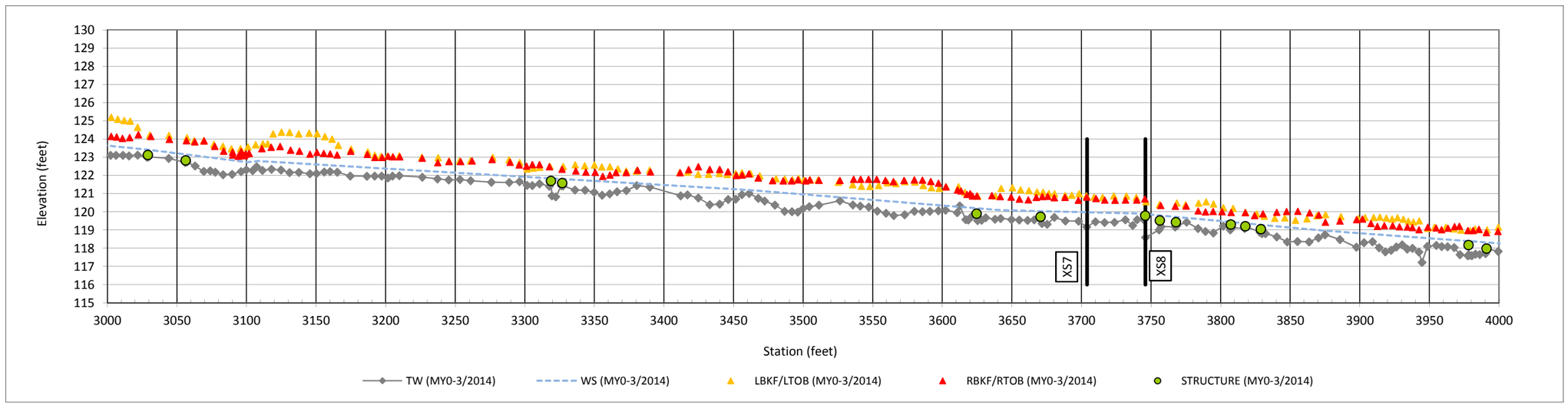




Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

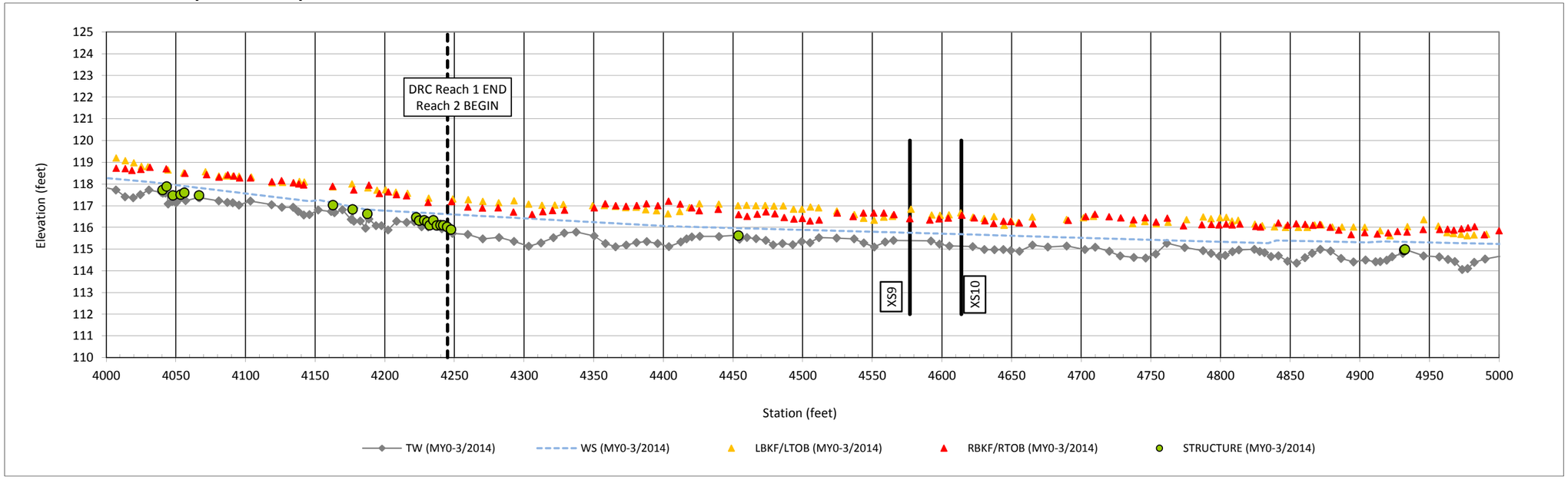
Devil's Racetrack Creek (West Reach 1) - Sta 00+00 to Sta 42+45





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Devil's Racetrack Creek (West Reach 1) - Sta 00+00 to Sta 42+45
Devil's Racetrack Creek (West Reach 2) - Sta Sta 42+45 to 52+11



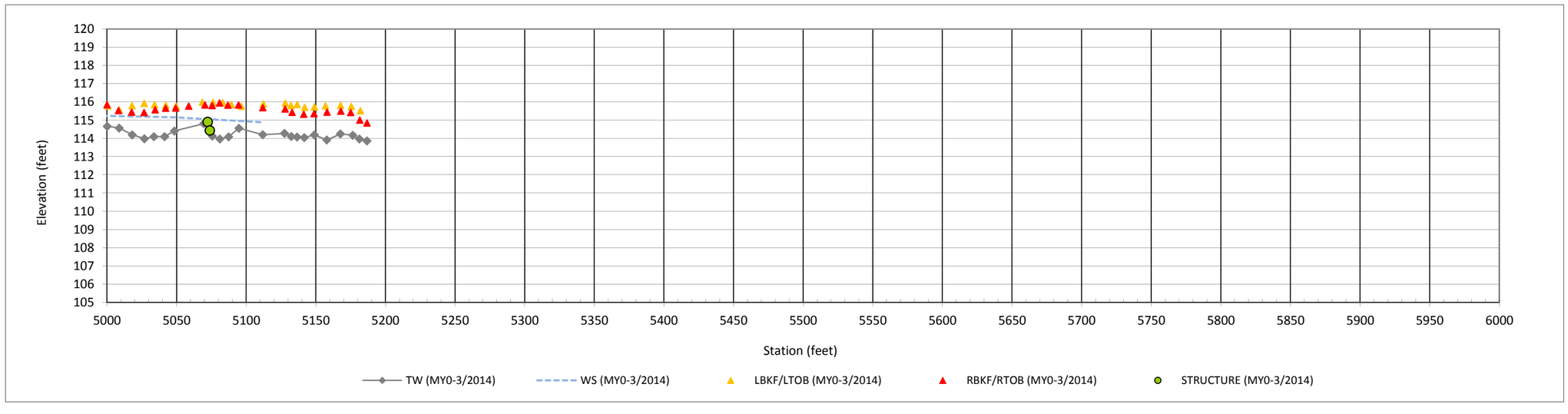


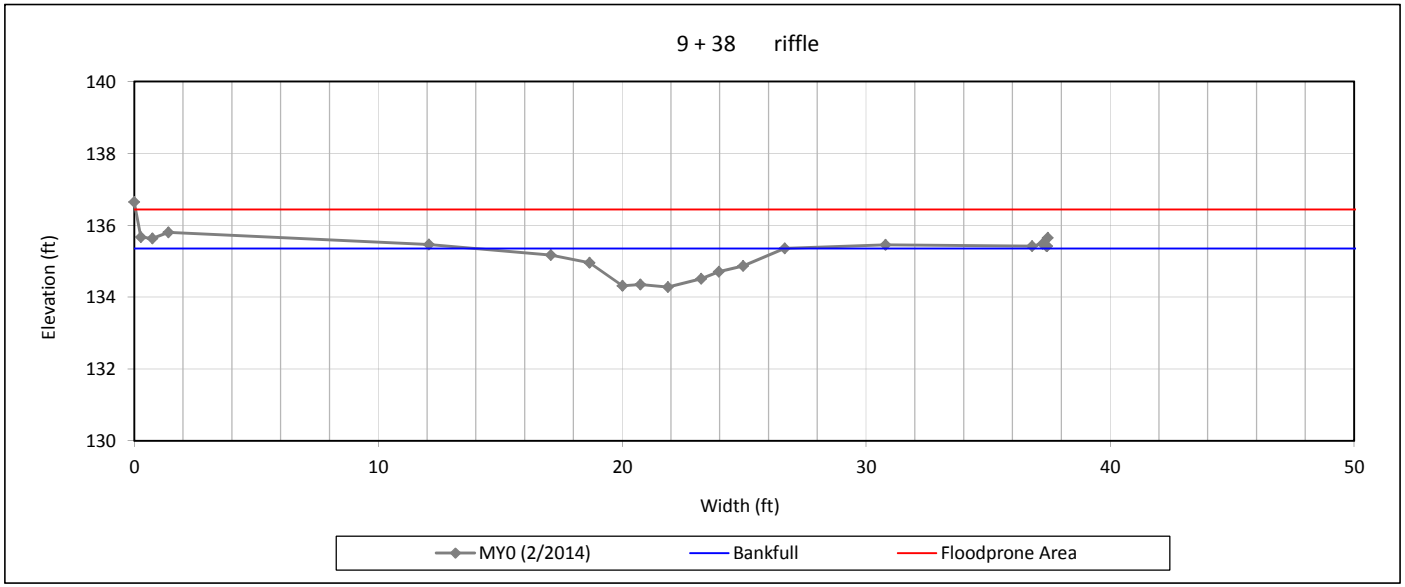
Table 6a. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Devil's Racetrack (West)

	Cross-Section 1 (Riffle)						Cross-Section 2 (Pool)						Cross-Section 3 (Riffle)						Cross-Section 4 (Pool)					
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**
based on fixed bankfull elevation	135.4						135.1						131.0						130.6					
Bankfull Width (ft)	9.6						10.7						9.5						11.1					
Floodprone Width (ft)	>200						N/A						>200						N/A					
Bankfull Mean Depth (ft)	0.6						0.7						0.9						1.0					
Bankfull Max Depth (ft)	1.1						1.7						1.4						1.7					
Bankfull Cross-Sectional Area (ft^2)	6.2						7.8						8.5						10.7					
Bankfull Width/Depth Ratio	14.8						14.6						10.6						11.4					
Bankfull Entrenchment Ratio	>20.9						N/A						>21.1						N/A					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					
	Cross-Section 5 (Pool)						**Cross-Section 6 (Riffle)**						**Cross-Section 7 (Pool)**						**Cross-Section 8 (Riffle)**					
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**
based on fixed bankfull elevation	125.3						124.7						120.8						119.9					
Bankfull Width (ft)	8.9						8.7						9.5						4.7					
Floodprone Width (ft)	N/A						>200						N/A						>200					
Bankfull Mean Depth (ft)	0.8						0.7						0.8						0.4					
Bankfull Max Depth (ft)	1.5						1.1						1.6						1.3					
Bankfull Cross-Sectional Area (ft^2)	7.5						6.0						7.6						2.1					
Bankfull Width/Depth Ratio	10.7						12.6						11.7						10.6					
Bankfull Entrenchment Ratio	N/A						>23.0						N/A						>42.5					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					
	Cross-Section 9 (Riffle)						**Cross-Section 10 (Pool)**																	
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**												
based on fixed bankfull elevation	116.4						116.1																	
Bankfull Width (ft)	7.7						6.8																	
Floodprone Width (ft)	>200						N/A																	
Bankfull Mean Depth (ft)	0.5						0.6																	
Bankfull Max Depth (ft)	0.7						0.9																	
Bankfull Cross-Sectional Area (ft^2)	4.0						4.4																	
Bankfull Width/Depth Ratio	14.5						10.6																	
Bankfull Entrenchment Ratio	>26.1						N/A																	
Bankfull Bank Height Ratio	1.0						1.0																	

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 1-DRC West



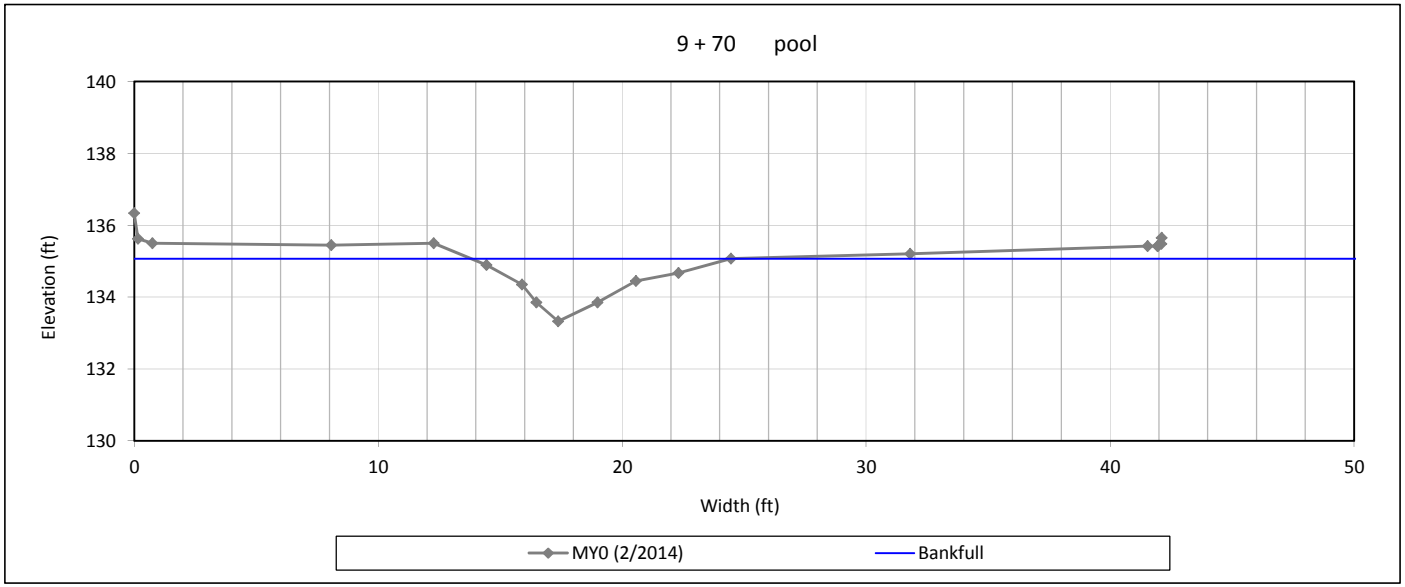
Bankfull Dimensions	
6.2	x-section area (ft.sq.)
9.6	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
9.9	wetted parimeter (ft)
0.6	hyd radi (ft)
14.8	width-depth ratio
200.0	W flood prone area (ft)
0.0	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 2-DRC West



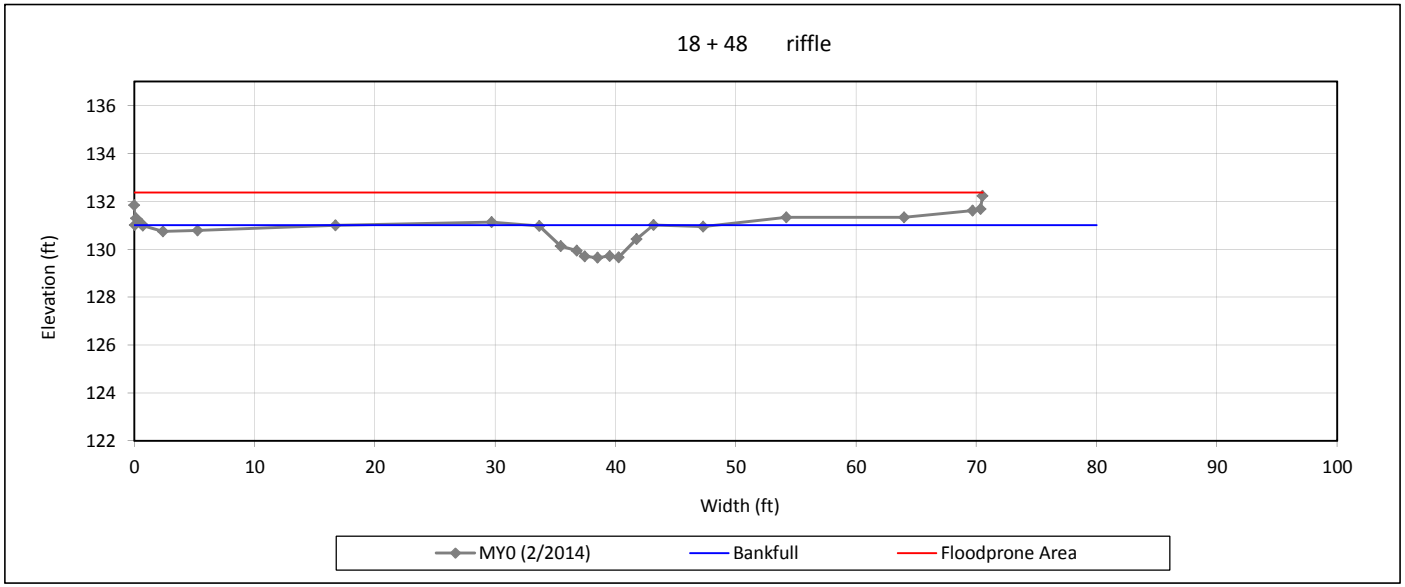
Bankfull Dimensions	
7.8	x-section area (ft.sq.)
10.7	width (ft)
0.7	mean depth (ft)
1.7	max depth (ft)
11.3	wetted parimeter (ft)
0.7	hyd radi (ft)
14.6	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 3-DRC West



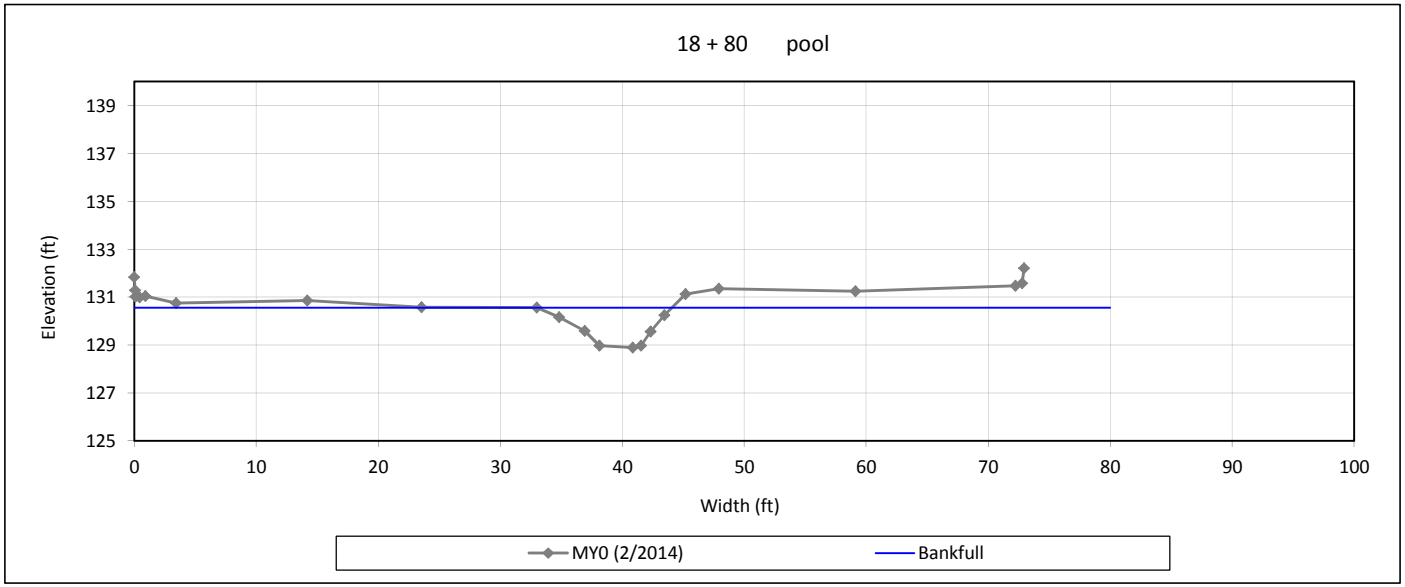
Bankfull Dimensions	
8.5	x-section area (ft.sq.)
9.5	width (ft)
0.9	mean depth (ft)
1.4	max depth (ft)
10.1	wetted parimeter (ft)
0.8	hyd radi (ft)
10.6	width-depth ratio
200.0	W flood prone area (ft)
21.1	enchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 4-DRC West



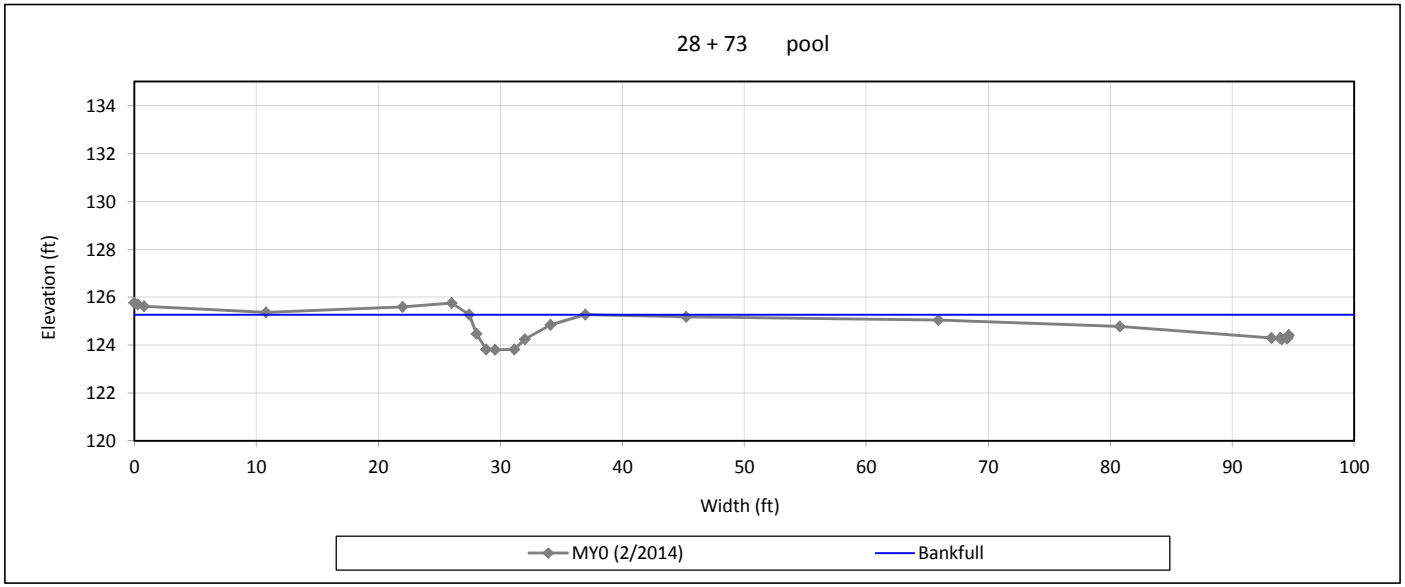
Bankfull Dimensions	
10.7	x-section area (ft.sq.)
11.1	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
11.8	wetted parimeter (ft)
0.9	hyd radi (ft)
11.4	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 5-DRC West



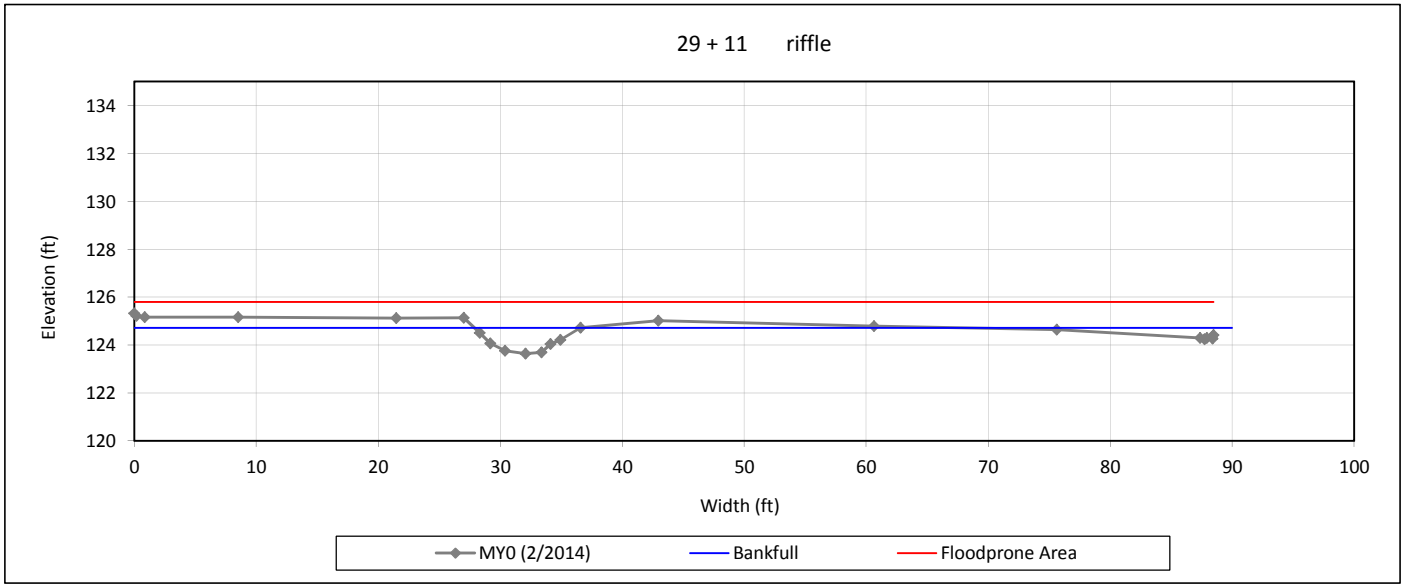
Bankfull Dimensions	
7.5	x-section area (ft.sq.)
8.9	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
9.4	wetted parimeter (ft)
0.8	hyd radi (ft)
10.7	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 6-DRC West



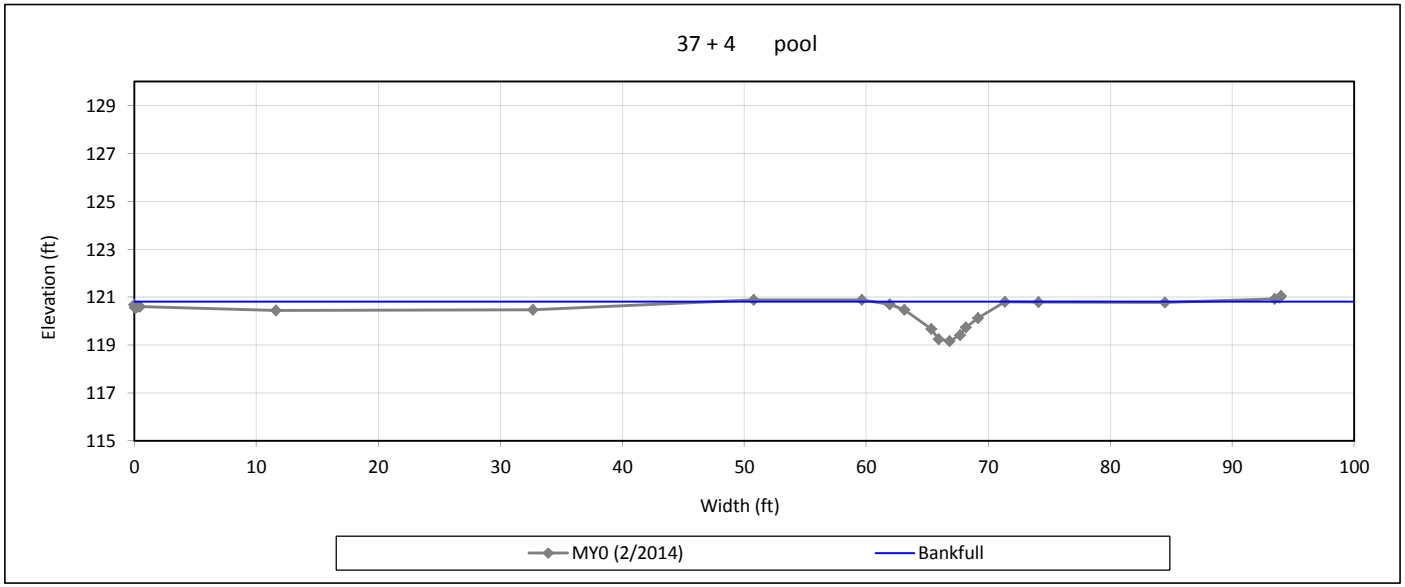
Bankfull Dimensions	
6.0	x-section area (ft.sq.)
8.7	width (ft)
0.7	mean depth (ft)
1.1	max depth (ft)
9.1	wetted parimeter (ft)
0.7	hyd radi (ft)
12.6	width-depth ratio
200.0	W flood prone area (ft)
23.0	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 7-DRC West



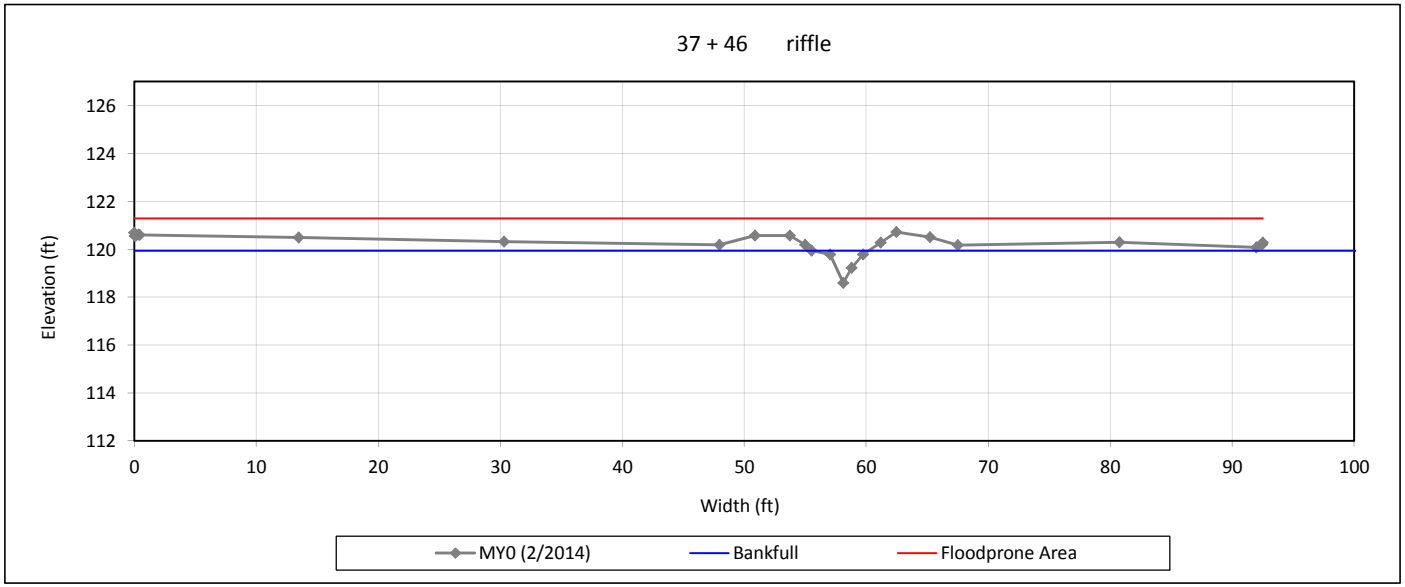
Bankfull Dimensions	
7.6	x-section area (ft.sq.)
9.5	width (ft)
0.8	mean depth (ft)
1.6	max depth (ft)
10.1	wetted parimeter (ft)
0.8	hyd radi (ft)
11.7	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 8-DRC West



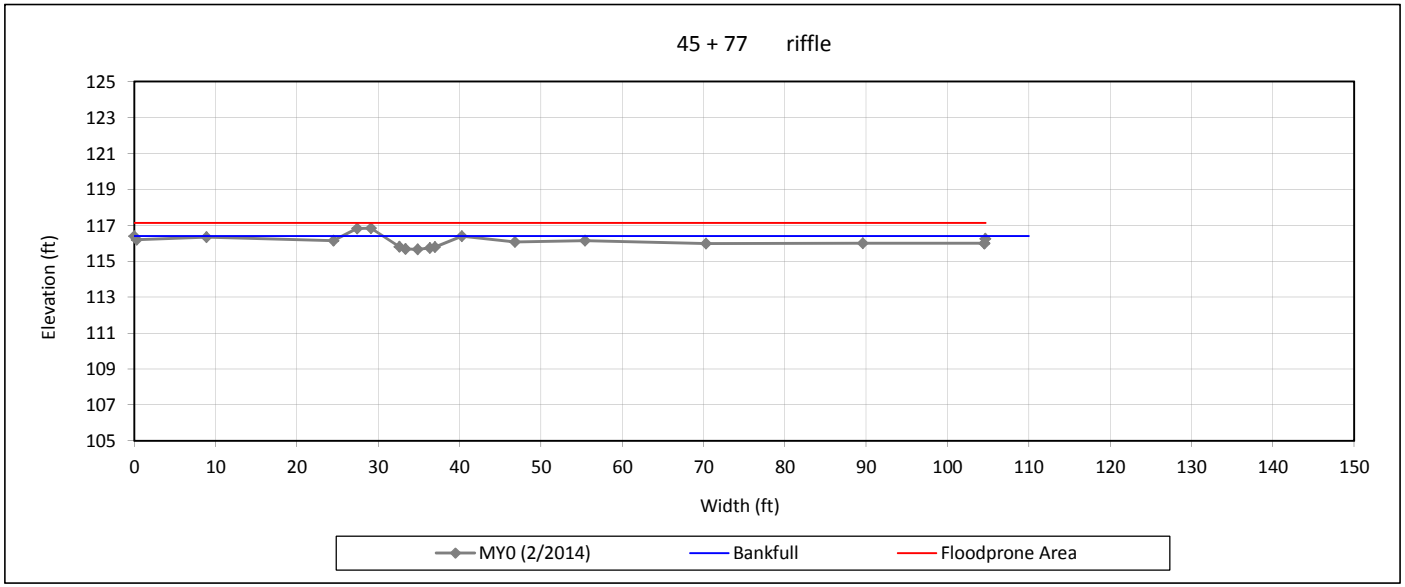
Bankfull Dimensions	
2.1	x-section area (ft.sq.)
4.7	width (ft)
0.4	mean depth (ft)
1.3	max depth (ft)
5.7	wetted parimeter (ft)
0.4	hyd radi (ft)
10.6	width-depth ratio
200.0	W flood prone area (ft)
42.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 9-DRC West



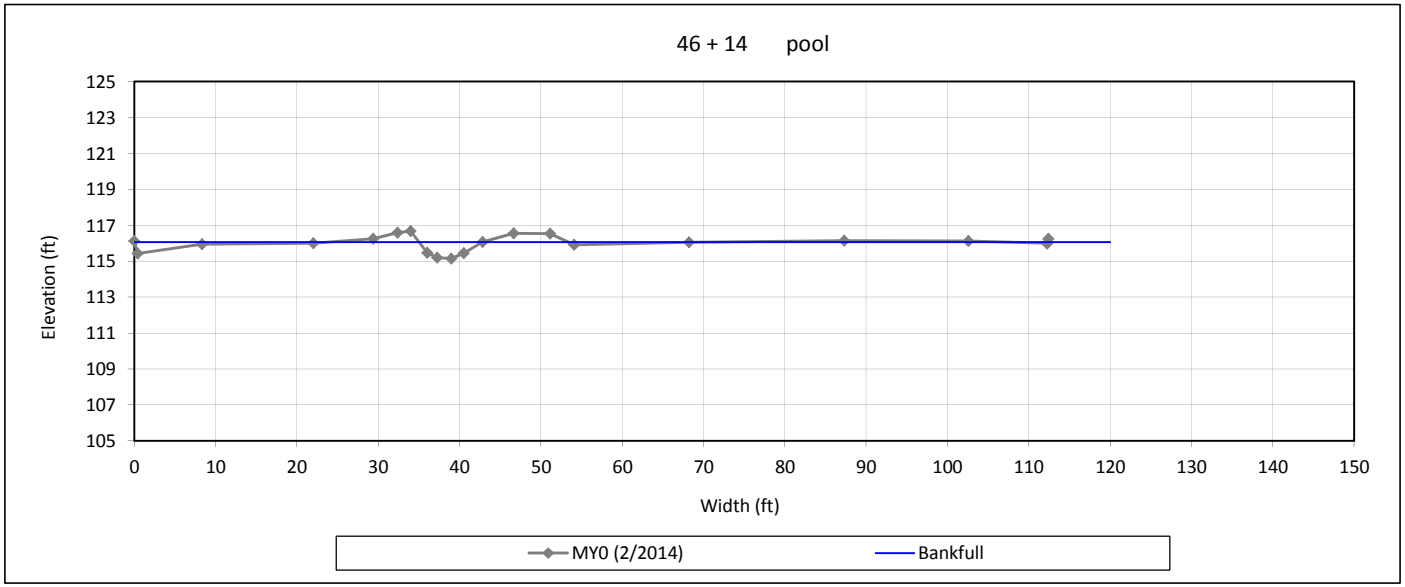
Bankfull Dimensions	
4.0	x-section area (ft.sq.)
7.7	width (ft)
0.5	mean depth (ft)
0.7	max depth (ft)
7.7	wetted parimeter (ft)
0.5	hyd radi (ft)
14.5	width-depth ratio
200.0	W flood prone area (ft)
26.1	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 10-DRC West



Bankfull Dimensions	
4.4	x-section area (ft.sq.)
6.8	width (ft)
0.6	mean depth (ft)
0.9	max depth (ft)
7.0	wetted parimeter (ft)
0.6	hyd radi (ft)
10.6	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—Devils Racetrack (West)

Photo Point 1 – looking upstream (04/01/2014)

Photo Point 1 – looking downstream (04/01/2014)

Photo Point 2 – looking upstream (04/01/2014)

Photo Point 2 – looking downstream (04/01/2014)

Photo Point 3 – looking upstream (04/01/2014)

Photo Point 3 – looking downstream (04/01/2014)

	
Photo Point 4 – looking upstream (04/01/2014)	Photo Point 4 – looking downstream (04/01/2014)
	
Photo Point 5 – looking upstream (04/01/2014)	Photo Point 5 – looking downstream (04/01/2014)
	
Photo Point 6 – looking upstream (04/01/2014)	Photo Point 6 – looking downstream (04/01/2014)

	
Photo Point 7 – looking upstream (04/01/2014)	Photo Point 7 – looking downstream (04/01/2014)
	
Photo Point 8 – looking upstream (04/01/2014)	Photo Point 8 – looking downstream (04/01/2014)
	
Photo Point 9 – looking upstream (04/01/2014)	Photo Point 9 – looking downstream (04/01/2014)

	
Photo Point 10 – looking upstream (04/01/2014)	Photo Point 10 – looking downstream (04/01/2014)
	
Photo Point 11 – looking upstream (04/01/2014)	Photo Point 11 – looking downstream (04/01/2014)
	
Photo Point 12 – looking upstream (04/01/2014)	Photo Point 12 – looking downstream (04/01/2014)

	
Photo Point 13 – looking upstream (04/01/2014)	Photo Point 13 – looking downstream (04/01/2014)
	
Photo Point 14 – looking upstream (04/01/2014)	Photo Point 14 – looking downstream (04/01/2014)
	
Photo Point 15 – looking upstream (04/01/2014)	Photo Point 15 – looking downstream (04/01/2014)

	
Photo Point 16 – looking upstream (04/01/2014)	Photo Point 16 – looking downstream (04/01/2014)
	
Photo Point 17 – looking upstream (04/01/2014)	Photo Point 17 – looking downstream (04/01/2014)
	
Photo Point 18 – looking upstream (04/01/2014)	Photo Point 18 – looking downstream (04/01/2014)

	
Photo Point 19 – looking upstream (04/01/2014)	Photo Point 19 – looking downstream (04/01/2014)
	
Photo Point 20 – looking upstream (04/01/2014)	Photo Point 20 – looking downstream (04/01/2014)
	
Photo Point 21 – looking upstream (04/01/2014)	Photo Point 21 – looking downstream (04/01/2014)

	
Photo Point 22 – looking upstream (04/01/2014)	Photo Point 22 – looking downstream (04/01/2014)
	
Photo Point 23 – looking upstream (04/01/2014)	Photo Point 23 – looking downstream (04/01/2014)
	
Photo Point 24 – looking upstream (04/01/2014)	Photo Point 24 – looking downstream (04/01/2014)

Photo Point 25 – looking upstream (04/01/2014)

Photo Point 25 – looking downstream (04/01/2014)

Photo Point 26 – looking upstream (04/01/2014)

Table 5b. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

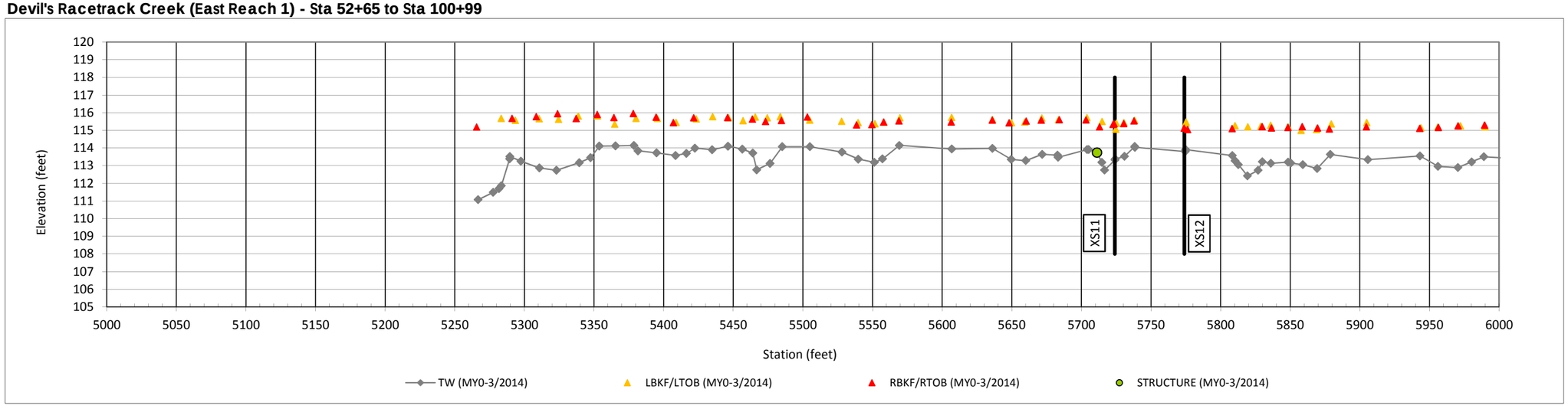
Devils Racetrack- East

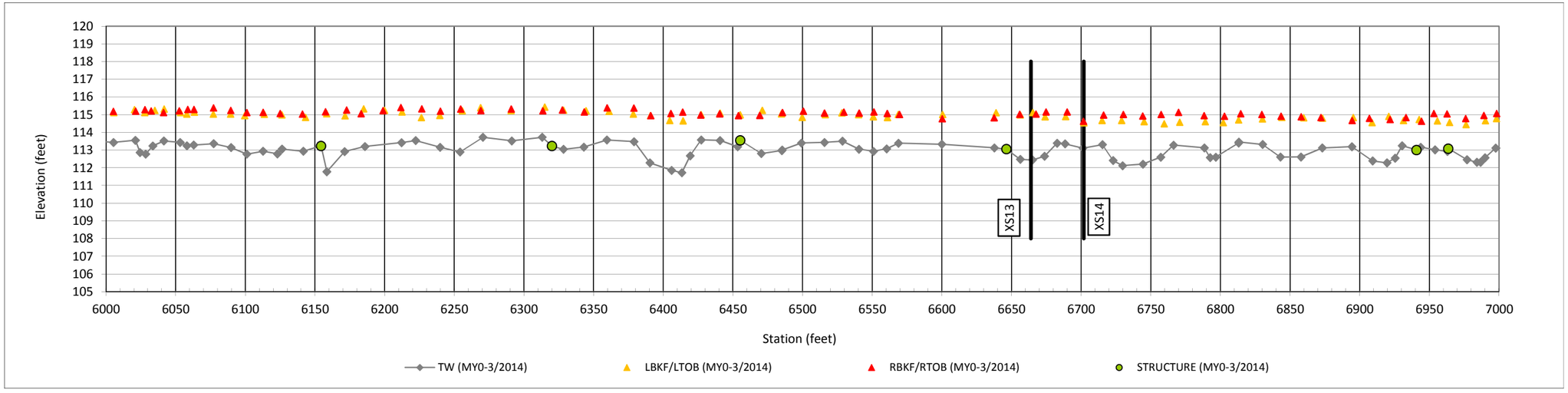
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design						As-Built/Baseline					
		Devil's Racetrack - East		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		Devil's Racetrack - East (Reach 1)		Devil's Racetrack - East (Reach 2)		Devil's Racetrack - East (Reach 3)		Devil's Racetrack - East (Reach 1)		Devil's Racetrack - East (Reach 2)		Devil's Racetrack - East (Reach 3)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																									
Bankfull Width (ft)	N/A	8.1	10.4	2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		13.0		8.0		8.0		12.2	13.7	8.2		---	
Floodprone Width (ft)		14.2	18.6	>20		>50		>50		>75		>150		100	500	100	500	100	500	>300		>300		---	
Bankfull Mean Depth		1.0	1.8	0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		1.0		0.6		---		0.8	1.1	0.7		---	
Bankfull Max Depth		2.1	2.8	0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		1.4	1.8	0.8	1.0	0.9		1.3	1.7	1.1		---	
Bankfull Cross-sectional Area (ft^2)		14.2	19.1	1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		12.8		4.8		---		10.3	13.9	5.7		---	
Width/Depth Ratio		5.0	7.8	5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		13.0	13.5	14.0	14.5	---		12.1	14.6	11.9		---	
Entrenchment Ratio		1.6	1.8	>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	7.7	38.5	12.5	62.6	---		>21.9	>24.5	>36.5		---	
Bank Height Ratio		2.6	4.3	1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	1.1	---		1.0		1.0		---	
D50 (mm)		0.179																		N/A		N/A		---	
Profile																									
Shallow Length (ft)	N/A			---		---		---		---		---		---		---		---		13.0	80.1	20.8	42.4	11.3	25.9
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0007	0.0025	0.0377	0.0671	---		0.0004	0.0099	0.0192	0.0318	0.0072	0.0675
Pool Length (ft)				---		---		---		---		---		---		---		---		16.0	77.3	16.5	66.1	13.0	34.2
Pool Max Depth (ft)		---		0.6		N/A		1.7	1.9	1.5		3.1		1.4	3.2	0.8	2.0	1.2		1.9	3.4	1.7	2.7	1.4	2.5
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	21	91	39	64	---		26	131	43	73	25	70
Pool Volume (ft^3)																									
Pattern																									
Channel Beltwidth (ft)	N/A	---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	17.0	65.0	10.0	40.0	---		15.0	55.0	21	41	12	32
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	20.0	62.0	12.0	36.0	---		18.0	65.0	12	26	10	35
Rc:Bankfull Width (ft/ft)		---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.5	4.8	1.5	4.5	---		1.5	4.7	1.5	3.2	---	
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		39	221	64	136	---		62	203	101	140	52	112
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	5.0	1.3	5.0	---		1.2	4.0	2.6	5.0	---	
Substrate, Bed and Transport Parameters																									
Ri%/Ru%/P%/G%/S%	N/A																								
SC%/Sa%/G%/C%/B%/Be%																									
d16/d35/d50/d84/d95/d100		-/-/0.179/0.642/1.0/9.6		---		---		---		---		---								N/A		N/A		N/A	
Reach Shear Stress (Competency) lb/ft^2		0.01												---		---		---		N/A		N/A		N/A	
Max part size (mm) mobilized at bankfull																									
Stream Power (Capacity) W/m^2																									
Additional Reach Parameters																									
Drainage Area (SM)	N/A	1.30		0.06		0.67		0.34		0.90		1.27		1.14		1.30		---		1.14		1.30		---	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%		<1%		<1%	
Rosgen Classification		Gc5		E/C5b		E5		E5		E5/C5		E6		E/C5		E/C5		E/C5		C		C		---	
Bankfull Velocity (fps)		0.3	0.4	1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		1.2		3.5		---		1.2	1.6	3.0		---	
Bankfull Discharge (cfs)		8.5		2.6		17.5		6.4		14.0		11.0		16.0		17.0		---		16.0		17.0		---	
Q-NFF regression		---																							
Q-USGS extrapolation		---																							
Q-Mannings		---																							
Valley Length (ft)		---		---		---		---		---		---		---		---		---							
Channel Thalweg Length (ft)		4,844		---		---		---		---		---		4,840		313		385		4,833		310		372	
Sinuosity		1.0		1.1		1.2		1.2		1.2		1.4		1.1	1.3	1.1	1.2	---		1.1		1.1		1.1	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		---		---		---		---		---		---		---	
Bankfull Slope (ft/ft)		0.0003		0.0260		0.0170		0.0040		0.0022		0.0040		0.0004	0.0008	0.0224	0.0251	---		0.0007	0.0008	0.0153	0.0166	0.0219	0.0231

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

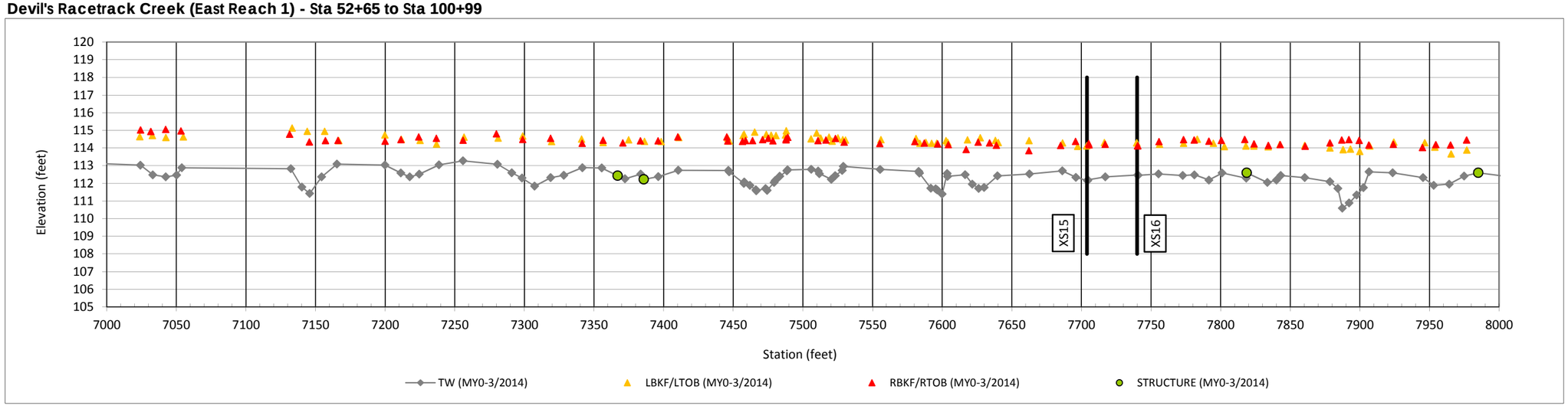
Devil's Racetrack Creek (East Reach 1) - Sta 52+65 to Sta 100+99

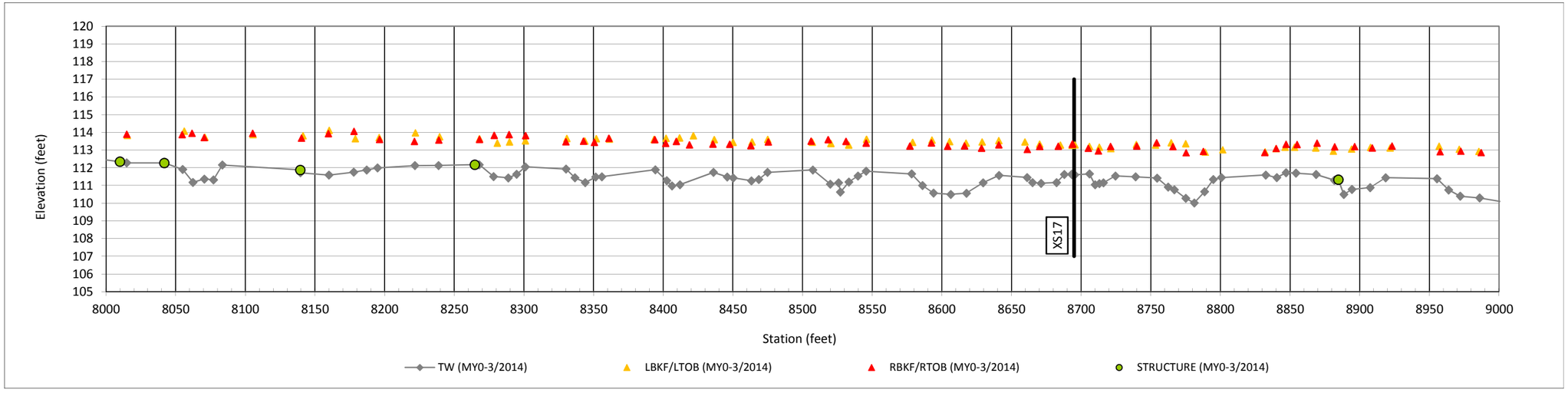




Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

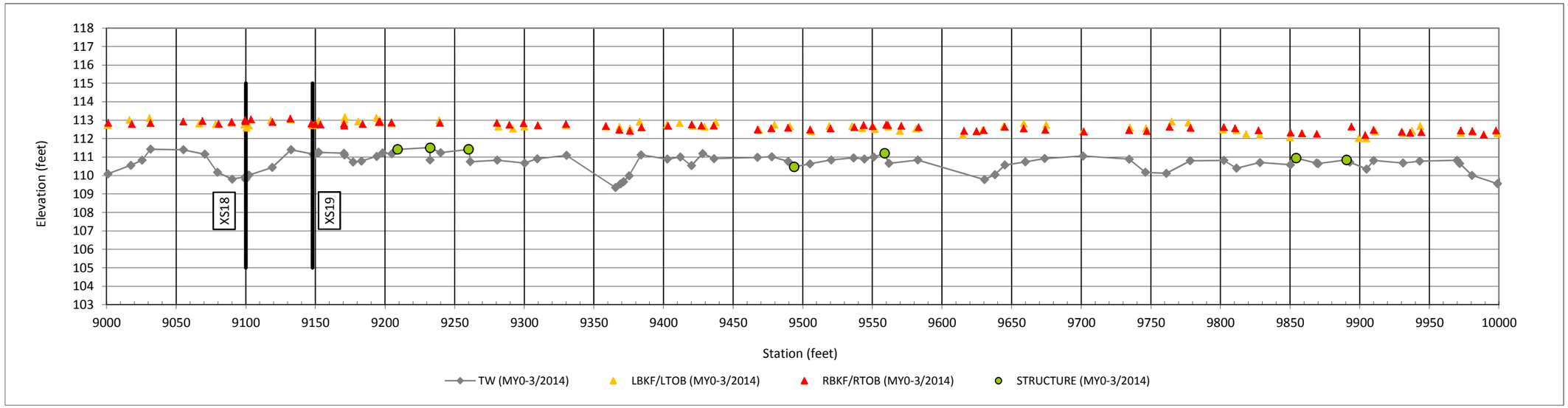
Devil's Racetrack Creek (East Reach 1) - Sta 52+65 to Sta 100+99





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Devil's Racetrack Creek (East Reach 1) - Sta 52+65 to Sta 100+99
Devil's Racetrack Creek (East Reach 2) - Sta Sta 100+99 to 104+12
Devil's Racetrack Creek (East Reach 3) - Sta Sta 104+12 to 107+97



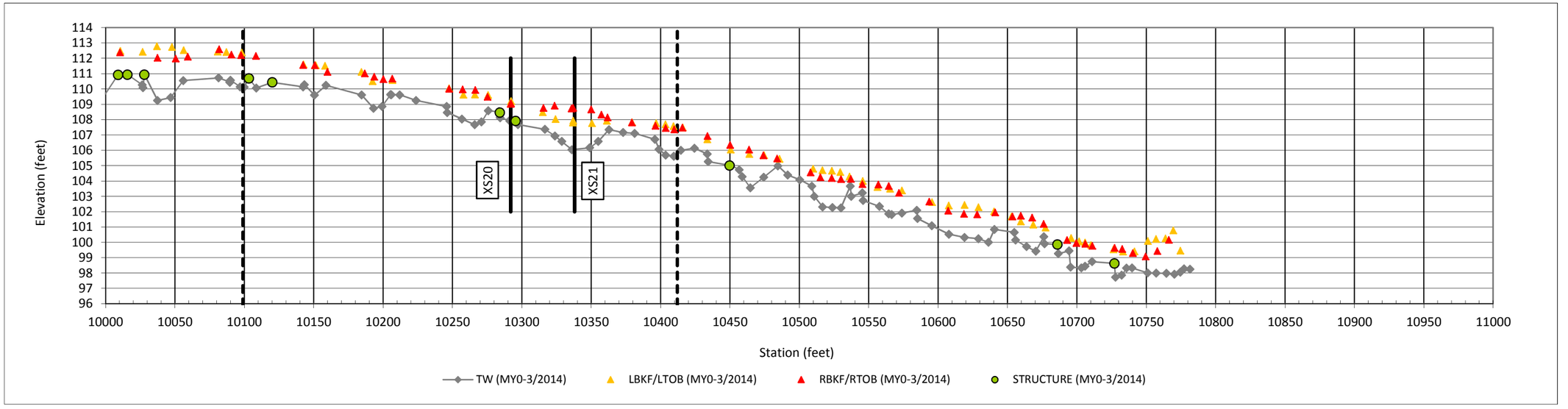


Table 6b. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Devil's Racetrack (East)

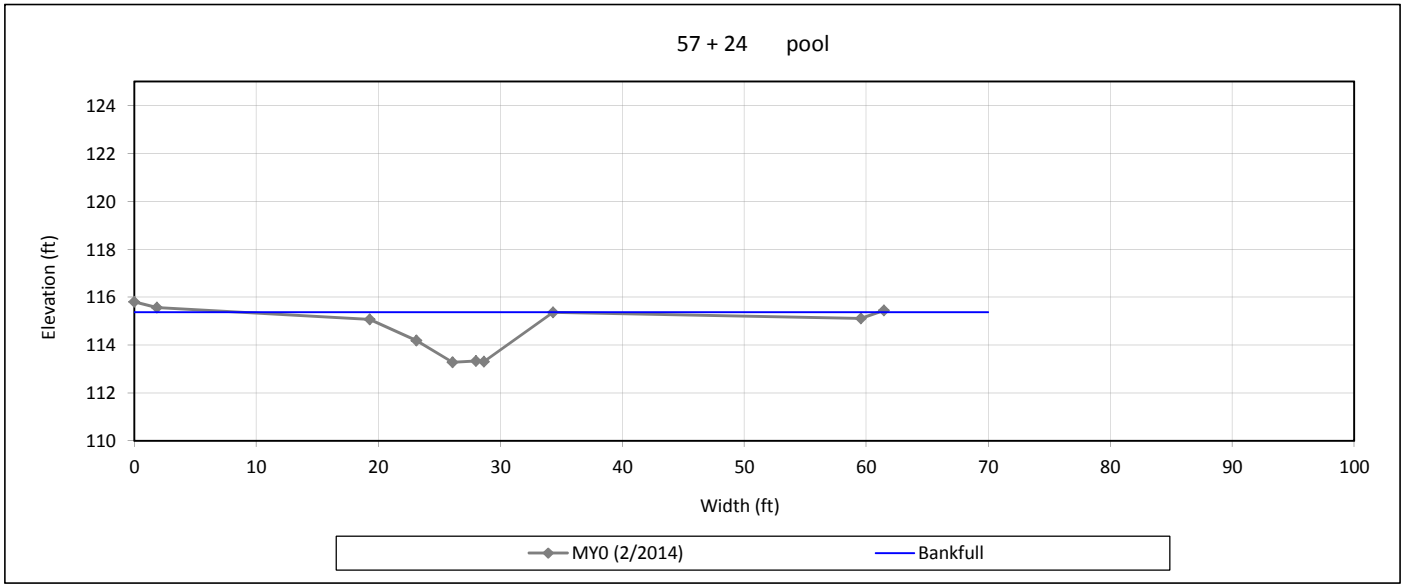
	Cross-Section 11 (Pool)						Cross-Section 12 (Riffle)						Cross-Section 13 (Pool)						Cross-Section 14 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation	115.4						115.1						115.0						114.6					
Bankfull Width (ft)	15.0						12.2						19.8						12.7					
Floodprone Width (ft)	N/A						>300						N/A						>300					
Bankfull Mean Depth (ft)	1.2						0.8						1.5						1.1					
Bankfull Max Depth (ft)	2.1						1.3						2.7						1.6					
Bankfull Cross-Sectional Area (ft^2)	18.8						10.3						30.2						13.3					
Bankfull Width/Depth Ratio	12.0						14.6						13.0						12.1					
Bankfull Entrenchment Ratio	N/A						>24.5						N/A						>23.7					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					

	Cross-Section 15 (Pool)						Cross-Section 16 (Riffle)						Cross-Section 17 (Riffle)						Cross-Section 18 (Pool)					
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**
based on fixed bankfull elevation	114.2						114.1						113.3						112.6					
Bankfull Width (ft)	15.6						13.4						13.7						15.5					
Floodprone Width (ft)	N/A						>300						>300						N/A					
Bankfull Mean Depth (ft)	1.1						1.0						1.0						1.6					
Bankfull Max Depth (ft)	2.1						1.7						1.7						2.8					
Bankfull Cross-Sectional Area (ft^2)	17.3						13.2						13.9						25.0					
Bankfull Width/Depth Ratio	14.0						13.6						13.4						9.5					
Bankfull Entrenchment Ratio	N/A						>22.3						>21.9						N/A					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					

	Cross-Section 19 (Riffle)						Cross-Section 20 (Riffle)						Cross-Section 21 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation	112.7						109.0						108.1					
Bankfull Width (ft)	13.3						8.2						8.8					
Floodprone Width (ft)	>300						>300						N/A					
Bankfull Mean Depth (ft)	0.9						0.7						1.2					
Bankfull Max Depth (ft)	1.6						1.1						2.0					
Bankfull Cross-Sectional Area (ft^2)	12.5						5.7						10.8					
Bankfull Width/Depth Ratio	14.1						11.9						7.3					
Bankfull Entrenchment Ratio	>22.6						>36.5						N/A					
Bankfull Bank Height Ratio	1.0						1.0						1.0					

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 11-DRC East



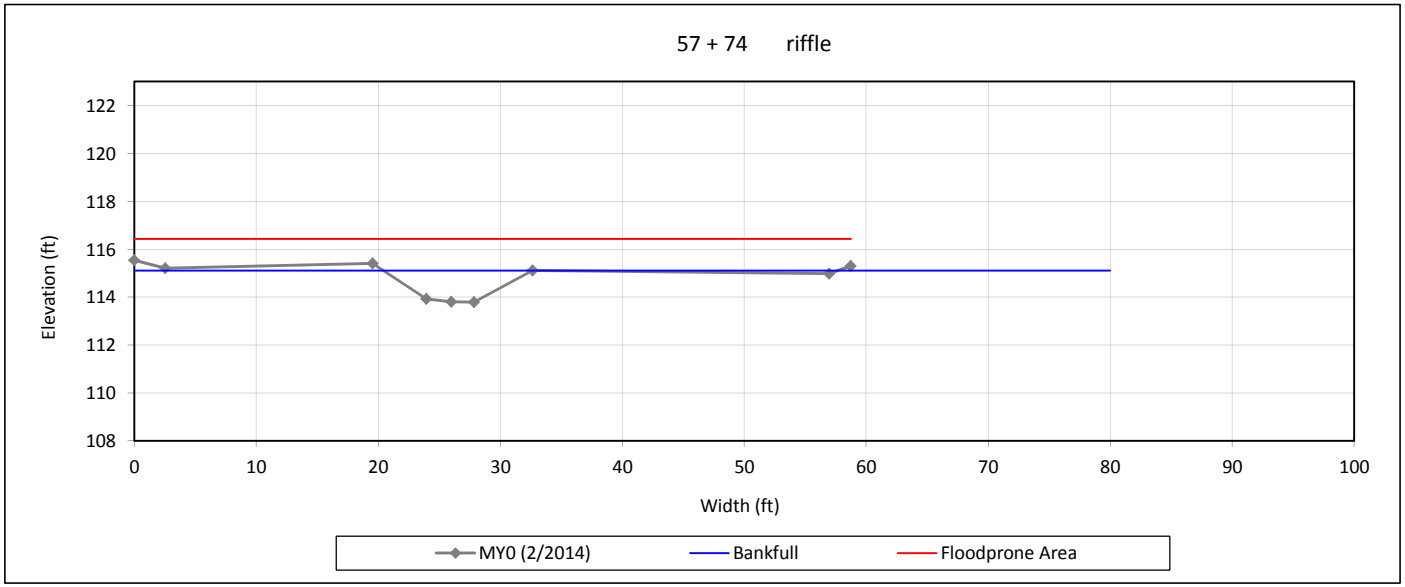
Bankfull Dimensions	
18.8	x-section area (ft.sq.)
15.0	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
15.6	wetted parimeter (ft)
1.2	hyd radi (ft)
12.0	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 12-DRC East



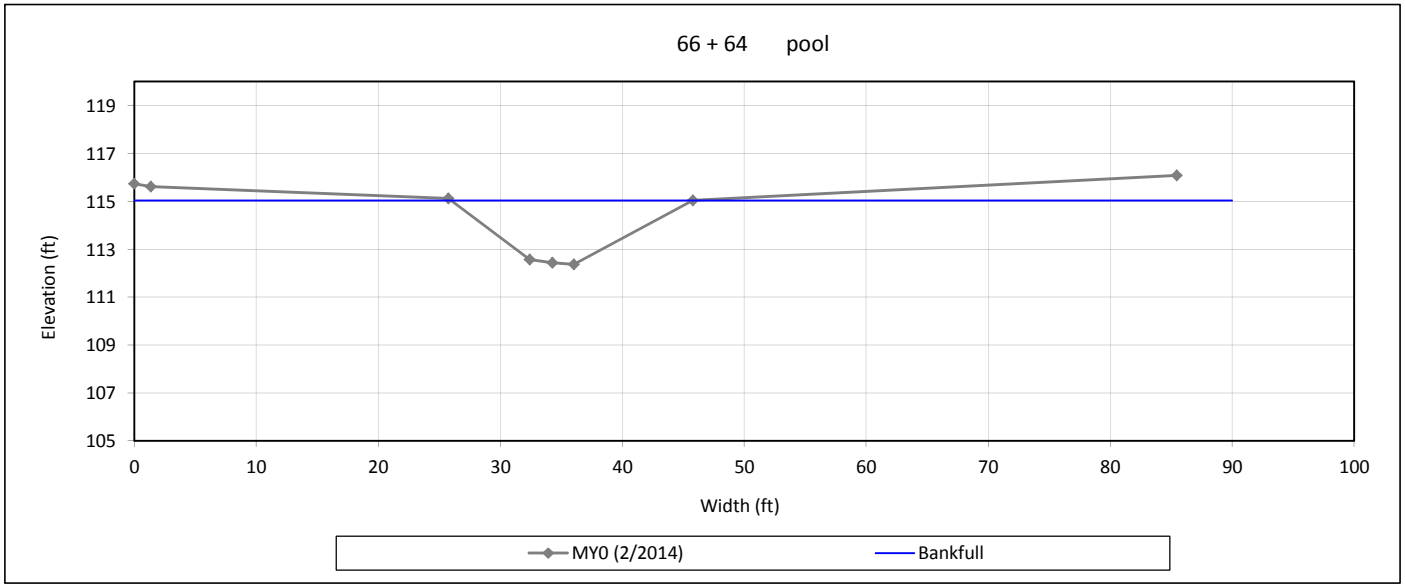
Bankfull Dimensions	
10.3	x-section area (ft.sq.)
12.2	width (ft)
0.8	mean depth (ft)
1.3	max depth (ft)
12.6	wetted parimeter (ft)
0.8	hyd radi (ft)
14.6	width-depth ratio
300.0	W flood prone area (ft)
24.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 13-DRC East



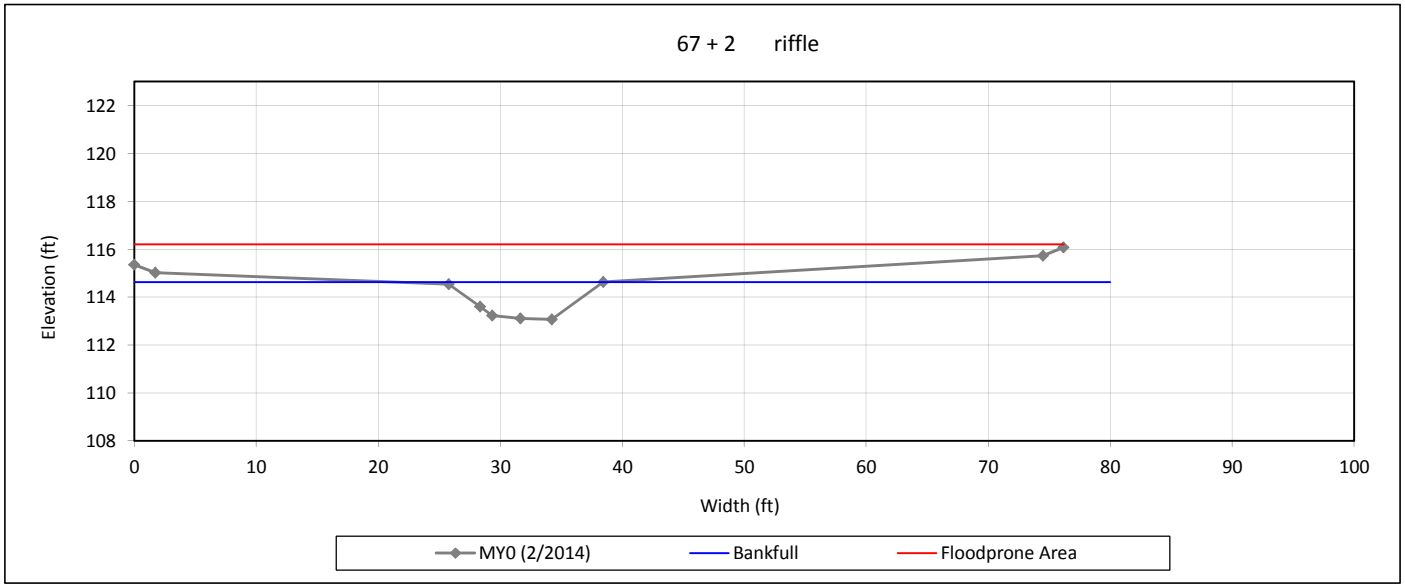
Bankfull Dimensions	
30.2	x-section area (ft.sq.)
19.8	width (ft)
1.5	mean depth (ft)
2.7	max depth (ft)
20.6	wetted parimeter (ft)
1.5	hyd radi (ft)
13.0	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 14-DRC East



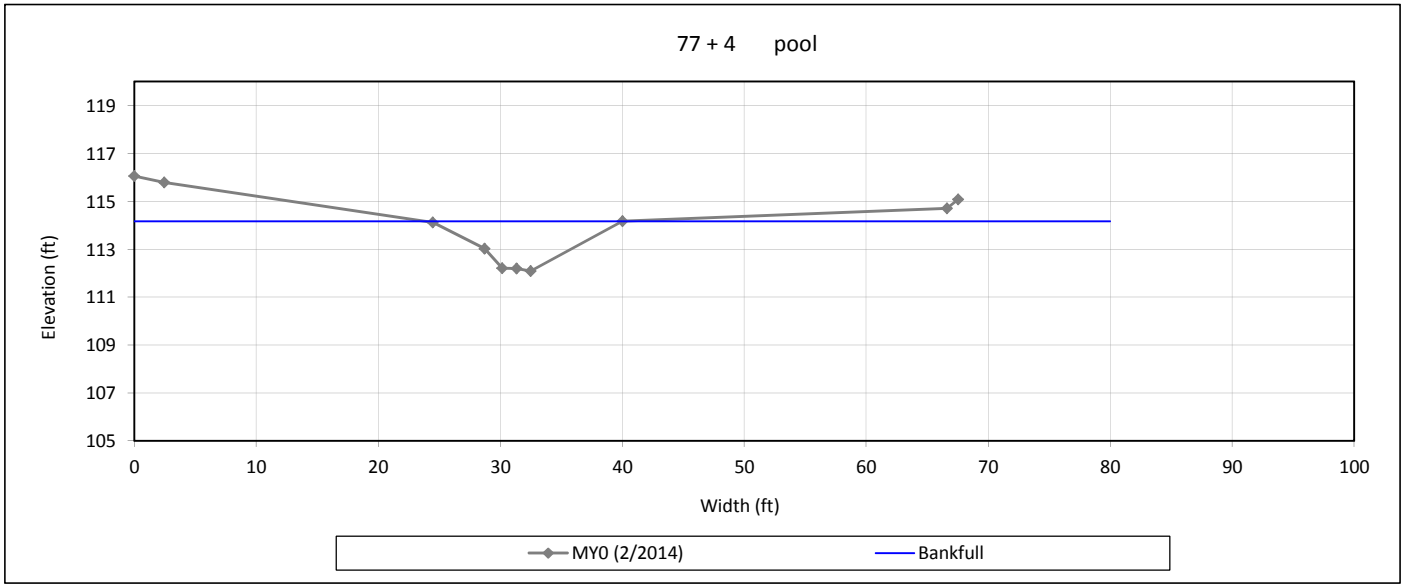
Bankfull Dimensions	
13.3	x-section area (ft.sq.)
12.7	width (ft)
1.1	mean depth (ft)
1.6	max depth (ft)
13.2	wetted parimeter (ft)
1.0	hyd radi (ft)
12.1	width-depth ratio
300.0	W flood prone area (ft)
23.7	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 15-DRC East



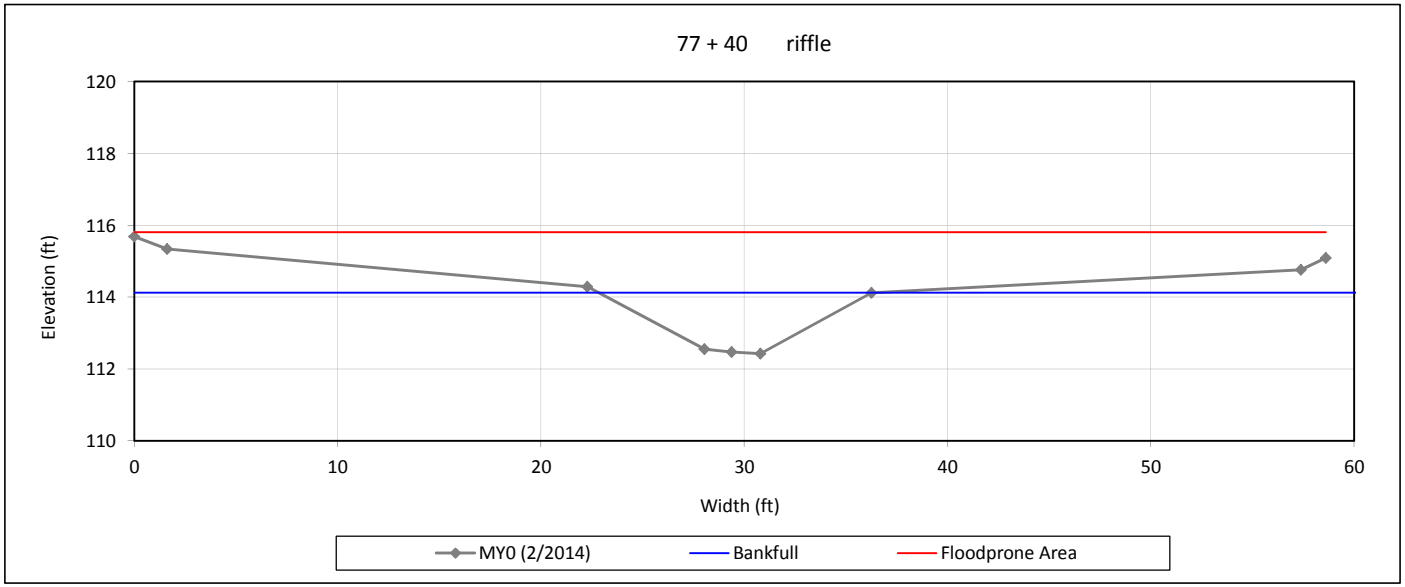
Bankfull Dimensions	
17.3	x-section area (ft.sq.)
15.6	width (ft)
1.1	mean depth (ft)
2.1	max depth (ft)
16.2	wetted parimeter (ft)
1.1	hyd radi (ft)
14.0	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 16-DRC East



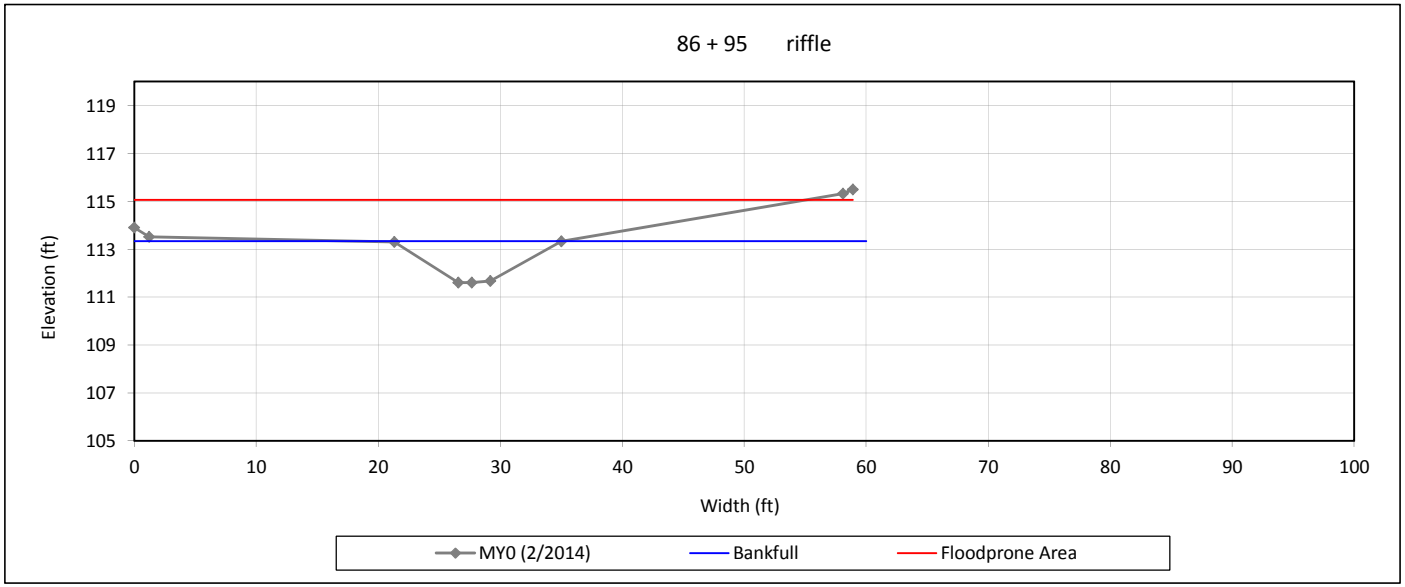
Bankfull Dimensions	
13.2	x-section area (ft.sq.)
13.4	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
13.9	wetted parimeter (ft)
1.0	hyd radi (ft)
13.6	width-depth ratio
300.0	W flood prone area (ft)
22.3	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 17-DRC East



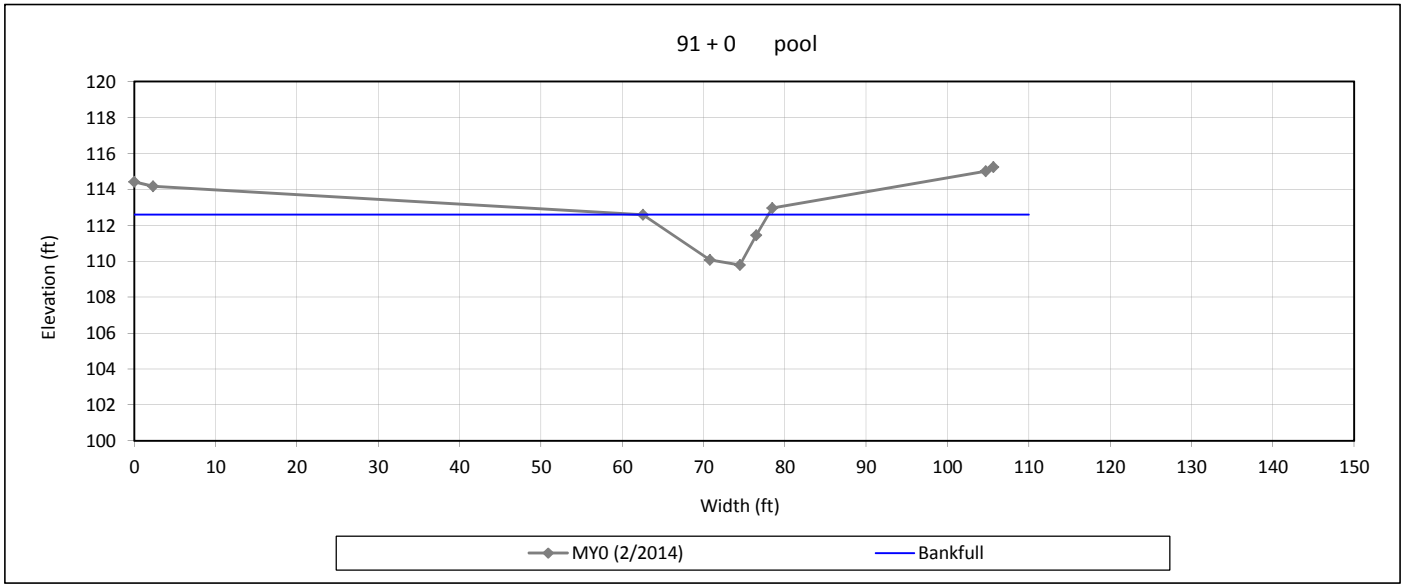
Bankfull Dimensions	
13.9	x-section area (ft.sq.)
13.7	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
14.2	wetted parimeter (ft)
1.0	hyd radi (ft)
13.4	width-depth ratio
300.0	W flood prone area (ft)
21.9	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 18-DRC East



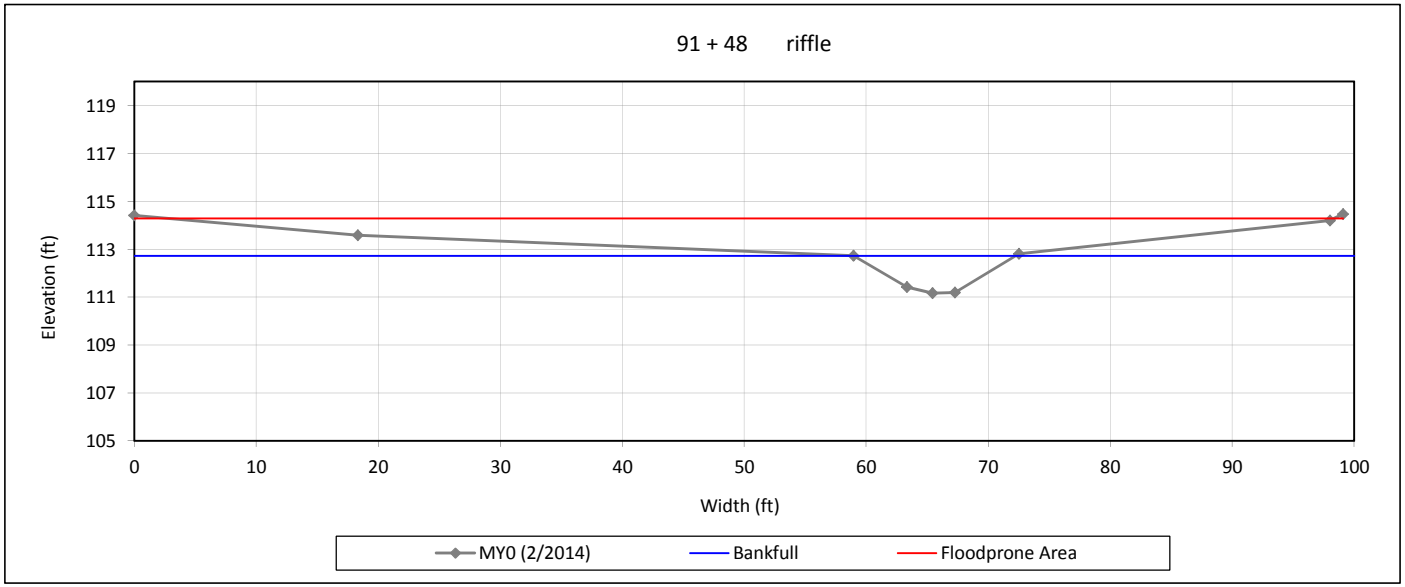
Bankfull Dimensions	
25.0	x-section area (ft.sq.)
15.5	width (ft)
1.6	mean depth (ft)
2.8	max depth (ft)
16.8	wetted parimeter (ft)
1.5	hyd radi (ft)
9.5	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 19-DRC East



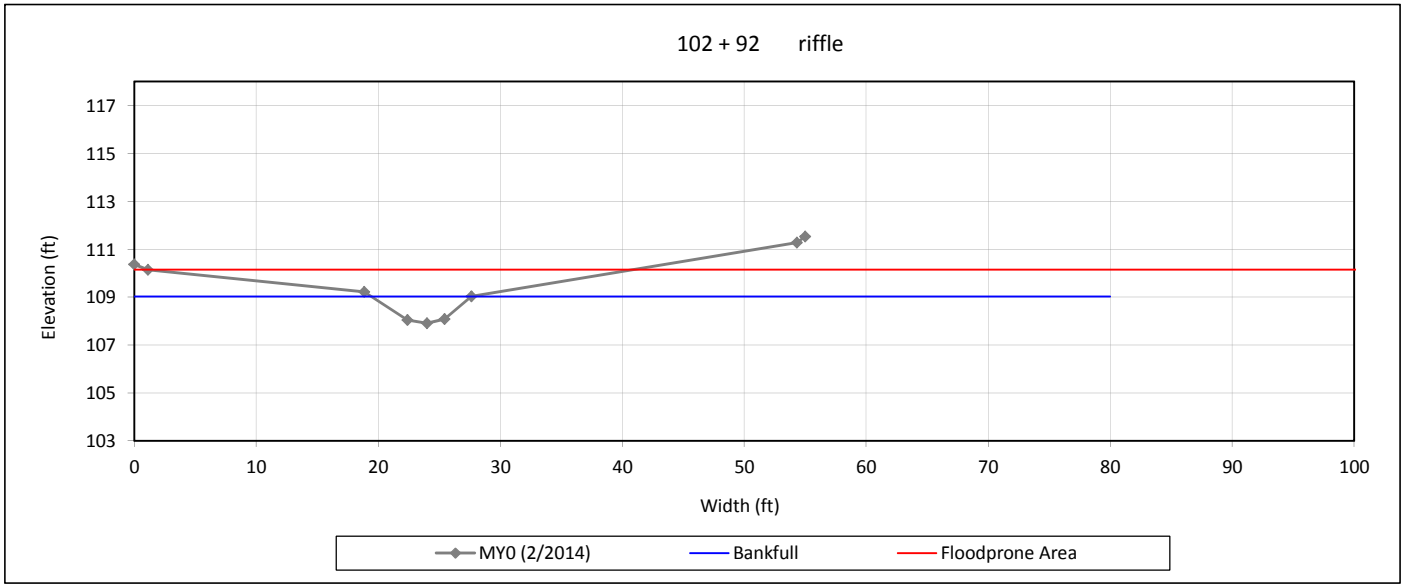
Bankfull Dimensions	
12.5	x-section area (ft.sq.)
13.3	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
13.7	wetted parimeter (ft)
0.9	hyd radi (ft)
14.1	width-depth ratio
300.0	W flood prone area (ft)
22.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 20-DRC East



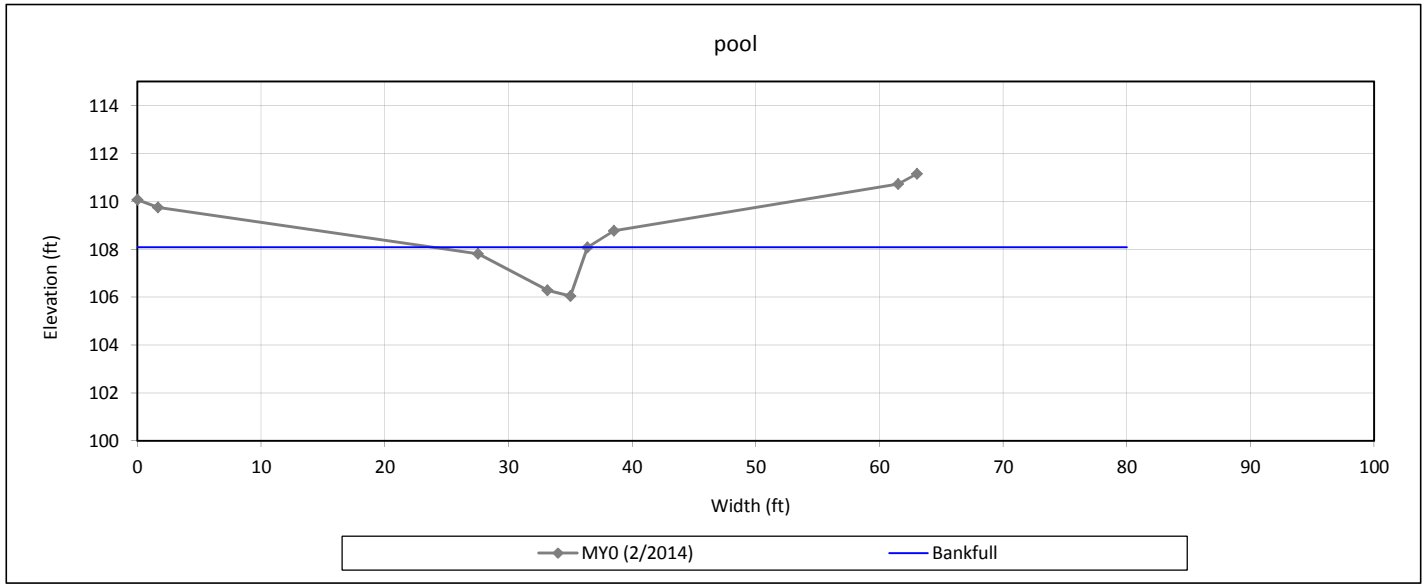
Bankfull Dimensions	
5.7	x-section area (ft.sq.)
8.2	width (ft)
0.7	mean depth (ft)
1.1	max depth (ft)
8.6	wetted parimeter (ft)
0.7	hyd radi (ft)
11.9	width-depth ratio
300.0	W flood prone area (ft)
36.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 21-DRC East



Bankfull Dimensions	
10.8	x-section area (ft.sq.)
8.8	width (ft)
1.2	mean depth (ft)
2.0	max depth (ft)
10.2	wetted parimeter (ft)
1.1	hyd radi (ft)
7.3	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—Devils Racetrack (East)

Photo Point 27 – looking downstream (04/01/2014)

Photo Point 28 – looking upstream (04/01/2014)

Photo Point 28 – looking downstream (04/01/2014)

Photo Point 29 – looking upstream (04/01/2014)

Photo Point 29 – looking downstream (04/01/2014)

	
Photo Point 30 – looking upstream (04/01/2014)	Photo Point 30 – looking downstream (04/01/2014)
	
Photo Point 31 – looking upstream (04/01/2014)	Photo Point 31 – looking downstream (04/01/2014)
	
Photo Point 32 – looking upstream (04/01/2014)	Photo Point 32 – looking downstream (04/01/2014)

	
Photo Point 33 – looking upstream (04/01/2014)	Photo Point 33 – looking downstream (04/01/2014)
	
Photo Point 34 – looking upstream (04/01/2014)	Photo Point 34 – looking downstream (04/01/2014)
	
Photo Point 35 – looking upstream (04/01/2014)	Photo Point 35 – looking downstream (04/01/2014)

Photo Point 36 – looking upstream (04/01/2014)

Photo Point 36 – looking downstream (04/01/2014)

Photo Point 37 – looking upstream (04/01/2014)

Photo Point 37 – looking downstream (04/01/2014)

Photo Point 38 – looking upstream (04/01/2014)

Photo Point 38 – looking downstream (04/01/2014)

	
Photo Point 39 – looking upstream (04/01/2014)	Photo Point 39 – looking downstream (04/01/2014)
	
Photo Point 40 – looking upstream (04/01/2014)	Photo Point 40 – looking downstream (04/01/2014)
	
Photo Point 41 – looking upstream (04/01/2014)	Photo Point 41 – looking downstream (04/01/2014)

	
Photo Point 42 – looking upstream (04/01/2014)	Photo Point 42 – looking downstream (04/01/2014)
	
Photo Point 43 – looking upstream (04/01/2014)	Photo Point 43 – looking downstream (04/01/2014)
	
Photo Point 44 – looking upstream (04/01/2014)	Photo Point 44 – looking downstream (04/01/2014)

	
Photo Point 45 – looking upstream (04/01/2014)	Photo Point 45 – looking downstream (04/01/2014)
	
Photo Point 46 – looking upstream (04/01/2014)	Photo Point 46 – looking downstream (04/01/2014)
	
Photo Point 47 – looking upstream (04/01/2014)	Photo Point 47 – looking downstream (04/01/2014)

	
Photo Point 48 – looking upstream (04/01/2014)	Photo Point 48 – looking downstream (04/01/2014)
	
Photo Point 49 – looking upstream (04/01/2014)	Photo Point 49 – looking downstream (04/01/2014)
	
Photo Point 50 – looking upstream (04/01/2014)	Photo Point 50 – looking downstream (04/01/2014)

	
Photo Point 51 – looking upstream (04/01/2014)	Photo Point 51 – looking downstream (04/01/2014)
	
Photo Point 52 – looking upstream (04/01/2014)	Photo Point 52 – looking downstream (04/01/2014)

Table 5c. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

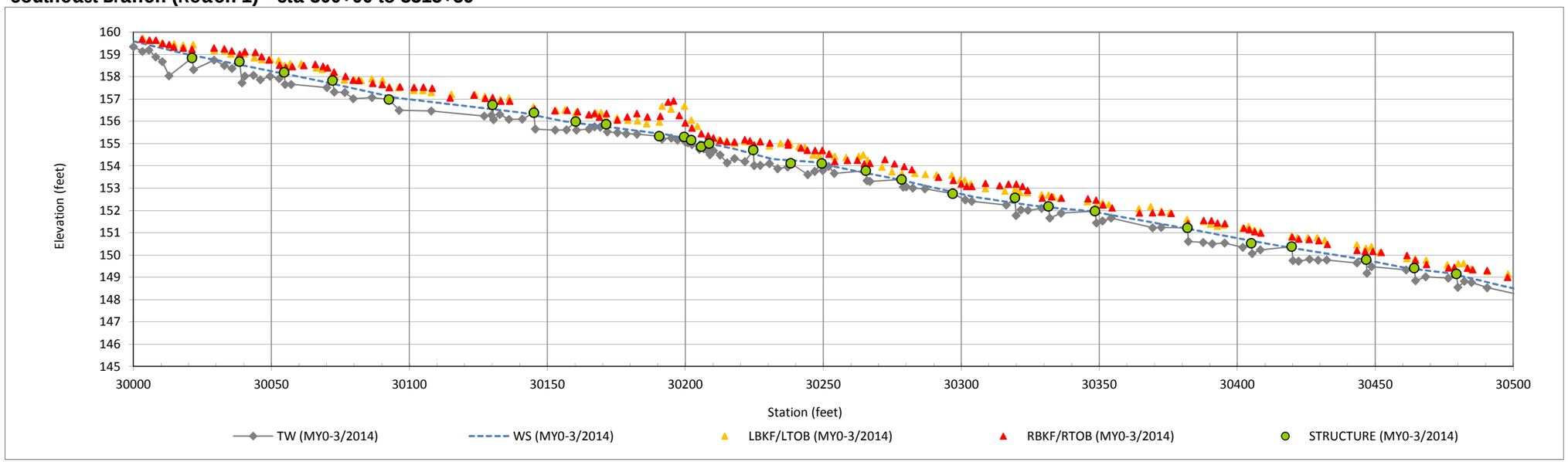
Southeast Branch

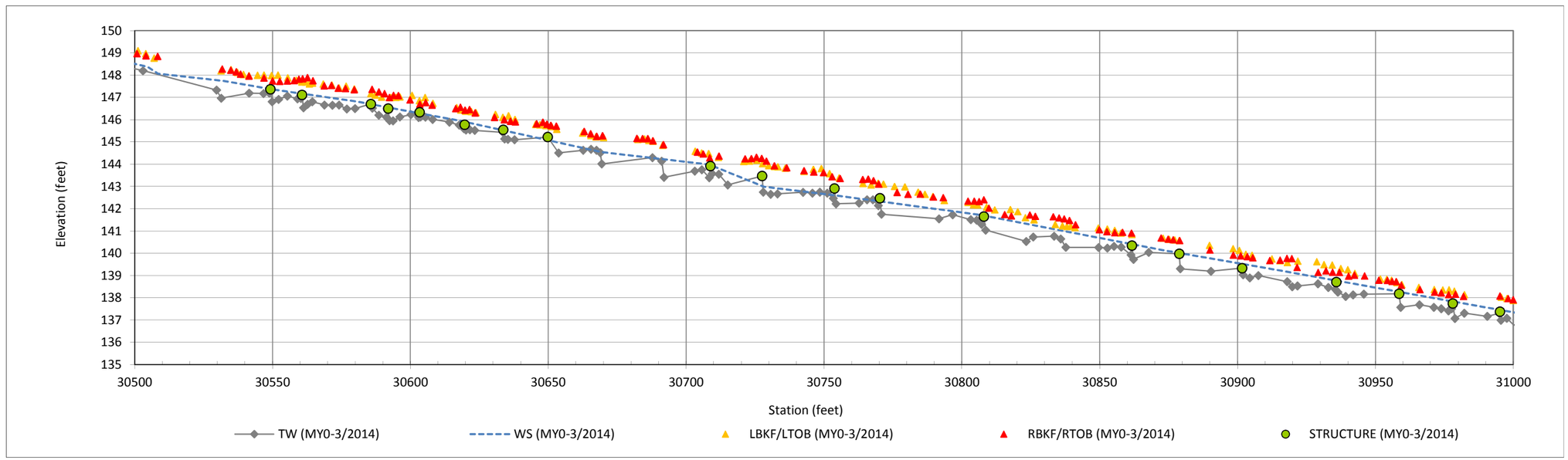
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design						As-Built/Baseline					
		Southeast Branch		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		Southeast Branch (Reach 1)		Southeast Branch (Reach 2)		Southeast Branch (Reach 3)		Southeast Branch (Reach 1)		Southeast Branch (Reach 2)		Southeast Branch (Reach 3)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																									
Bankfull Width (ft)	N/A	2.7	5.7	2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		3.0		4.0		5.4		3.0		3.8		5.3	
Floodprone Width (ft)		8.6	11.4	>20		>50		>50		>75		>150		25	35	50	70	100	300	>30		>60		>200	
Bankfull Mean Depth		0.2	0.4	0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		0.5		0.6		1.0		0.3		0.4		0.4	
Bankfull Max Depth		0.4	1.4	0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		0.4	0.6	0.5	0.7	0.8	1.2	0.5		0.5		0.6	
Bankfull Cross-sectional Area (ft^2)		1.1	1.4	1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		1.0		1.5		2.5		0.8		1.3		2.1	
Width/Depth Ratio		6.8	24.3	5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		9.0	10.0	10.0	12.0	11.0	12.0	11.4		10.8		13.8	
Entrenchment Ratio		1.5	4.2	>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	8.3	11.7	12.5	17.5	18.5	55.6	>9.9		>15.8		>37.5	
Bank Height Ratio		2.2	6.0	1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	1.1	1.0	1.2	1.0		1.0		1.0	
D50 (mm)		0.409																		N/A		N/A		N/A	
Profile																									
Shallow Length (ft)	N/A			---		---		---		---		---		---		---		---		2.1	64.4	3.4	144.4	6.0	47.3
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0162	0.0681	0.0144	0.0384	0.0035	0.0285	0.0010	0.0803	0.0021	0.0272	0.0005	0.0168
Pool Length (ft)				---		---		---		---		---		---		---		---		2.1	36.7	3.1	33.6	3.2	61.3
Pool Max Depth (ft)		0.4		0.6		N/A		1.7	1.9	1.5		3.1		0.5	1.1	0.4	1.2	0.5	1.5	0.7	1.5	0.5	1.0	0.5	1.1
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	15	24	20	32	9	38	4	76	8	90	14	52
Pool Volume (ft^3)																									
Pattern																									
Channel Beltwidth (ft)	N/A	---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	4.0	9.0	5.0	12.0	7.0	43.0	5.3	11.2	6.8	14.3	12.7	32.8
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	5.0	14.0	6.0	18.0	8.0	26.0	5.0	23.5	10.0	25.6	10.4	29.5
Rc:Bankfull Width (ft/ft)		---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.5	4.5	1.5	4.5	1.5	4.8	1.7	7.8	2.6	6.7	2.0	5.6
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		24	51	32	68	16	92	22	63	33	70	32	74
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	3.0	1.3	3.0	1.3	8.0	1.8	3.7	1.8	3.8	2.4	6.2
Substrate, Bed and Transport Parameters																									
Ri%/Ru%/P%/G%/S%	N/A																								
SC%/Sa%/G%/C%/B%/Be%																									
d16/d35/d50/d84/d95/d100		0.08/0.28/0.41/0.94/1.6/9.6		---		---		---		---		---								N/A		N/A			
Reach Shear Stress (Competency) lb/ft^2		0.51												---		---		---		N/A		N/A		N/A	
Max part size (mm) mobilized at bankfull																									
Stream Power (Capacity) W/m^2																									
Additional Reach Parameters																									
Drainage Area (SM)	N/A	0.19		0.06		0.67		0.34		0.90		1.27		0.03		0.07		0.10		0.03		0.07		0.10	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%		<1%		<1%	
Rosgen Classification		G/F5		E/C5b		E5		E5		E5/C5		E6		---		---		E/C5		E/C5		E/C5		E/C5	
Bankfull Velocity (fps)		2.2		1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		1.7		1.4		1.4		1.9		1.5		1.4	
Bankfull Discharge (cfs)		2.4		2.6		17.5		6.4		14.0		11.0		1.5		2.0		3.0		1.5		2.0		3.0	
Q-NFF regression		---																							
Q-USGS extrapolation		---																							
Q-Mannings		---																							
Valley Length (ft)		---		---		---		---		---		---		---		---		---							
Channel Thalweg Length (ft)		2,976		---		---		---		---		---		1,559		716		617		1,559		713		616	
Sinuosity		1.0		1.1		1.2		1.2		1.2		1.4		1.1	1.2	1.1	1.2	1.2	1.6	1.6		1.1		1.3	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		---		---		---		---		0.0221		0.0174		0.0030	
Bankfull Slope (ft/ft)		0.0230		0.0260		0.0170		0.0040		0.0022		0.0040		0.0108	0.0227	0.0096	0.0128	0.0025	0.0089	0.0222		0.0015	0.0119	0.0028	0.0030

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

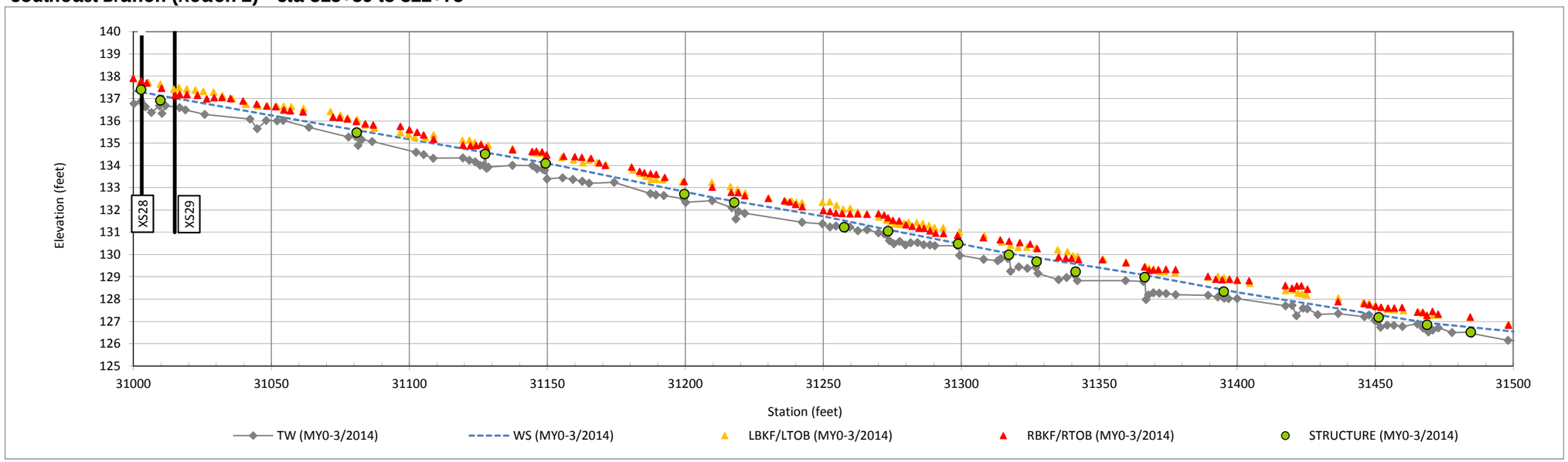
Southeast Branch (Reach 1) - Sta 300+00 to 3315+59

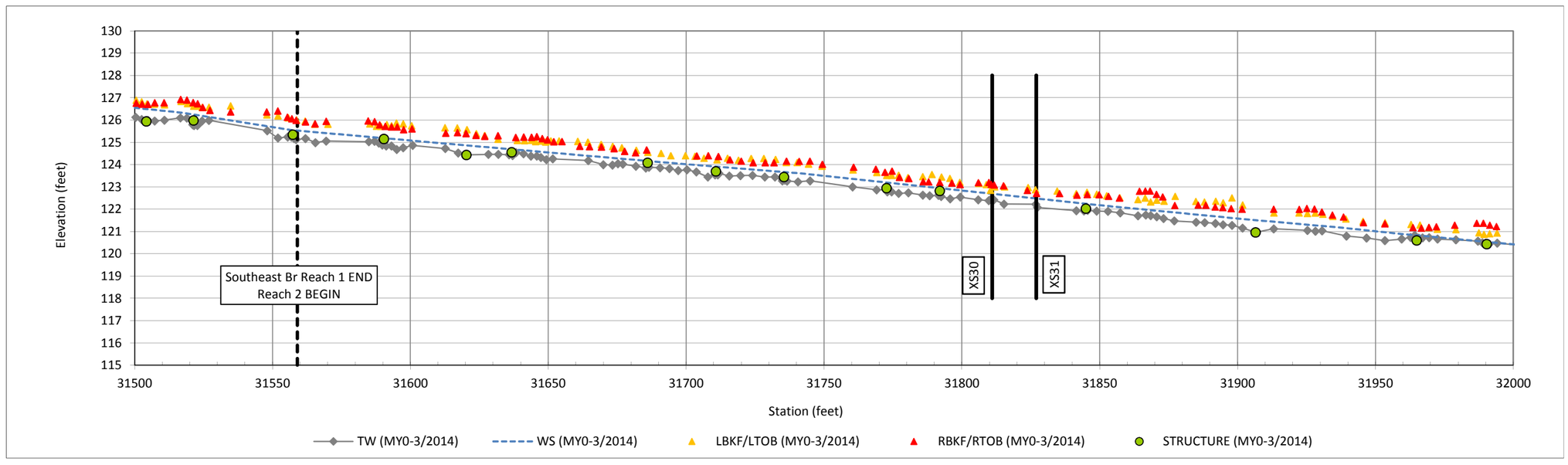




Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

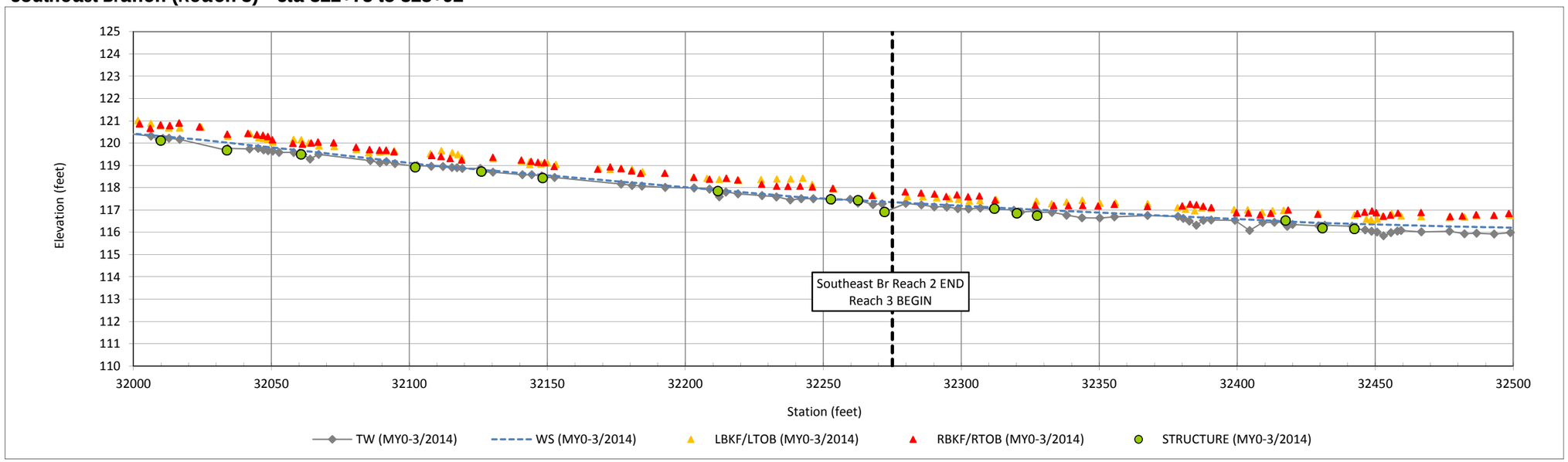
Southeast Branch (Reach 1) - Sta 300+00 to 315+59
Southeast Branch (Reach 2) - Sta 315+59 to 322+75





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Southeast Branch (Reach 2) - Sta 315+59 to 322+75
Southeast Branch (Reach 3) - Sta 322+75 to 328+92



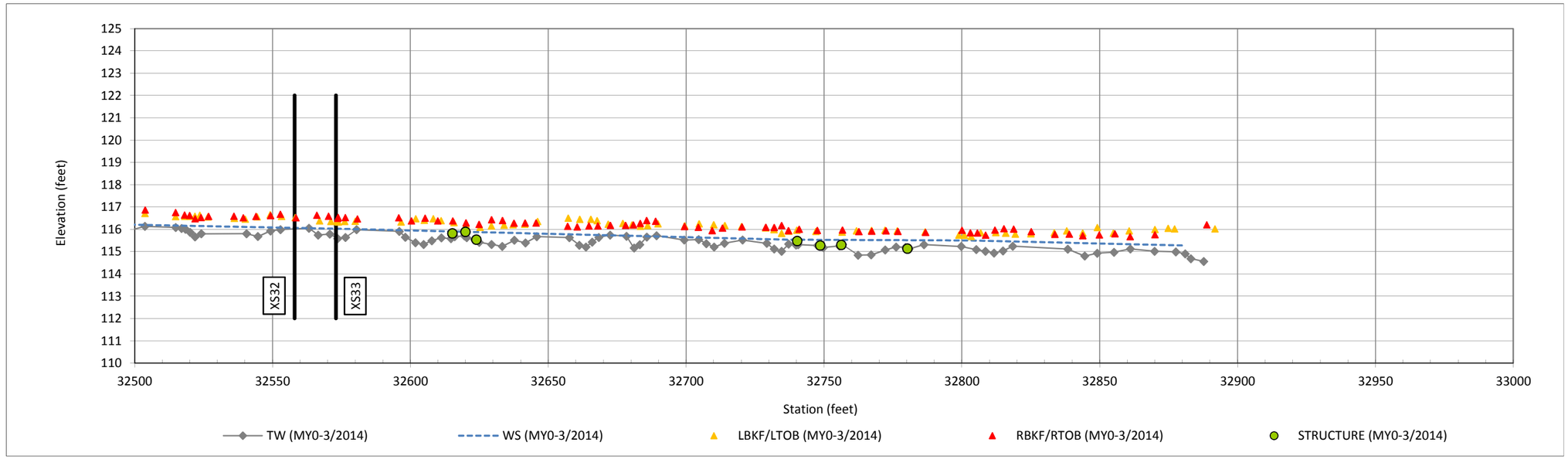


Table 6c. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

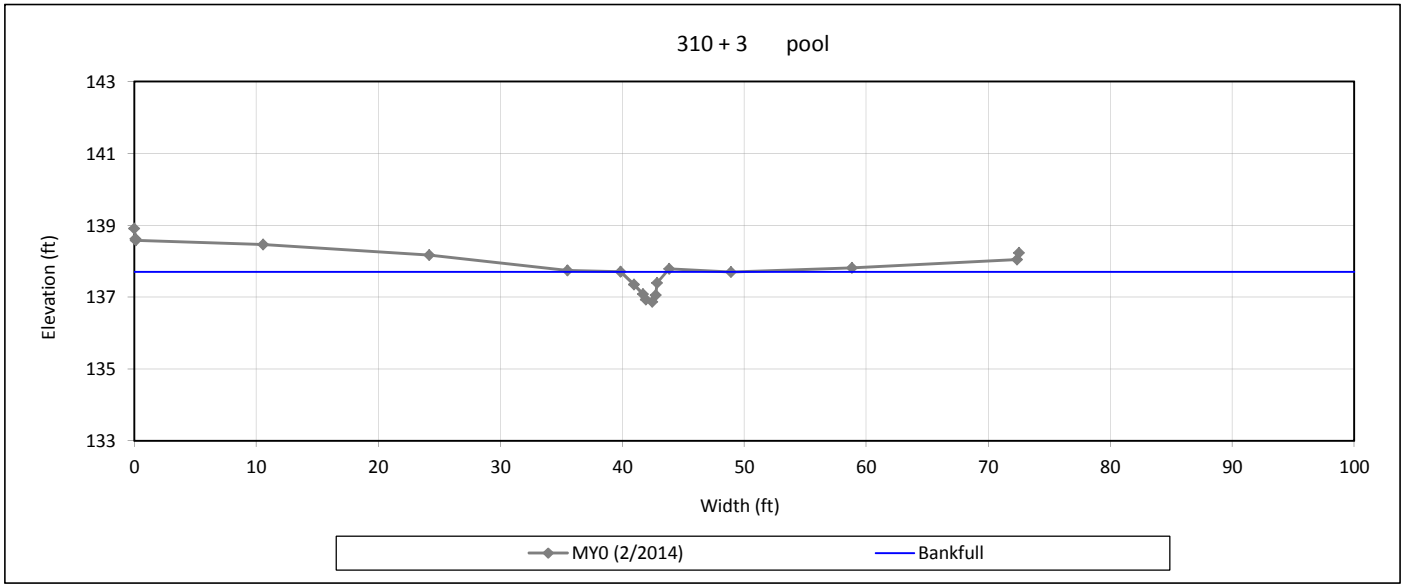
Southeast Branch

	Cross-Section 28 (Pool)						Cross-Section 29 (Riffle)						Cross-Section 30 (Pool)						Cross-Section 31 (Riffle)					
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**
based on fixed bankfull elevation	137.7						137.1						122.8						122.7					
Bankfull Width (ft)	3.8						3.0						3.8						3.8					
Floodprone Width (ft)	N/A						>30						N/A						>60					
Bankfull Mean Depth (ft)	0.4						0.3						0.3						0.4					
Bankfull Max Depth (ft)	0.8						0.5						0.4						0.5					
Bankfull Cross-Sectional Area (ft^2)	1.5						0.8						1.3						1.3					
Bankfull Width/Depth Ratio	9.3						11.4						11.2						10.8					
Bankfull Entrenchment Ratio	N/A						>9.9						N/A						.15.8					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					

	Cross-Section 32 (Riffle)						Cross-Section 33 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation	116.5						116.4					
Bankfull Width (ft)	5.3						6.3					
Floodprone Width (ft)	>200						N/A					
Bankfull Mean Depth (ft)	0.4						0.4					
Bankfull Max Depth (ft)	0.6						0.8					
Bankfull Cross-Sectional Area (ft^2)	2.1						2.4					
Bankfull Width/Depth Ratio	13.8						16.8					
Bankfull Entrenchment Ratio	>37.5						N/A					
Bankfull Bank Height Ratio	1.0						1.0					

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 28-DRC Southeast Br



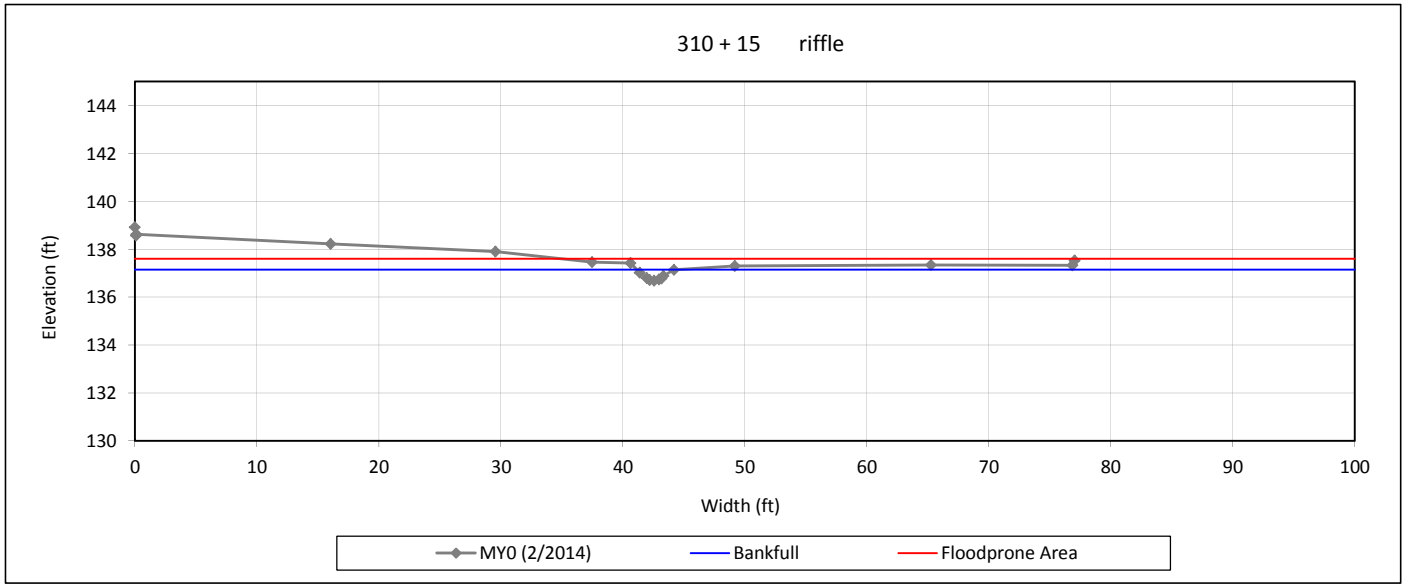
Bankfull Dimensions	
1.5	x-section area (ft.sq.)
3.8	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
4.3	wetted parimeter (ft)
0.4	hyd radi (ft)
9.3	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 29-Southeast Br



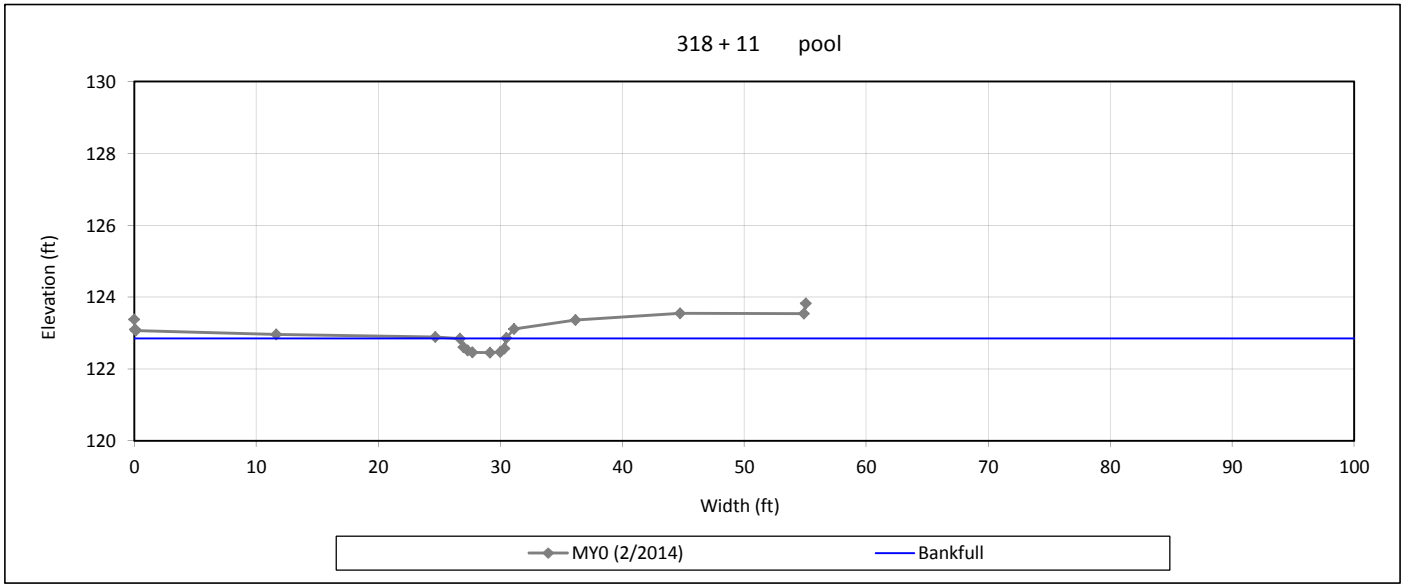
Bankfull Dimensions	
0.8	x-section area (ft.sq.)
3.0	width (ft)
0.3	mean depth (ft)
0.5	max depth (ft)
3.2	wetted parimeter (ft)
0.3	hyd radi (ft)
11.4	width-depth ratio
30.0	W flood prone area (ft)
9.9	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 30-Southeast Br



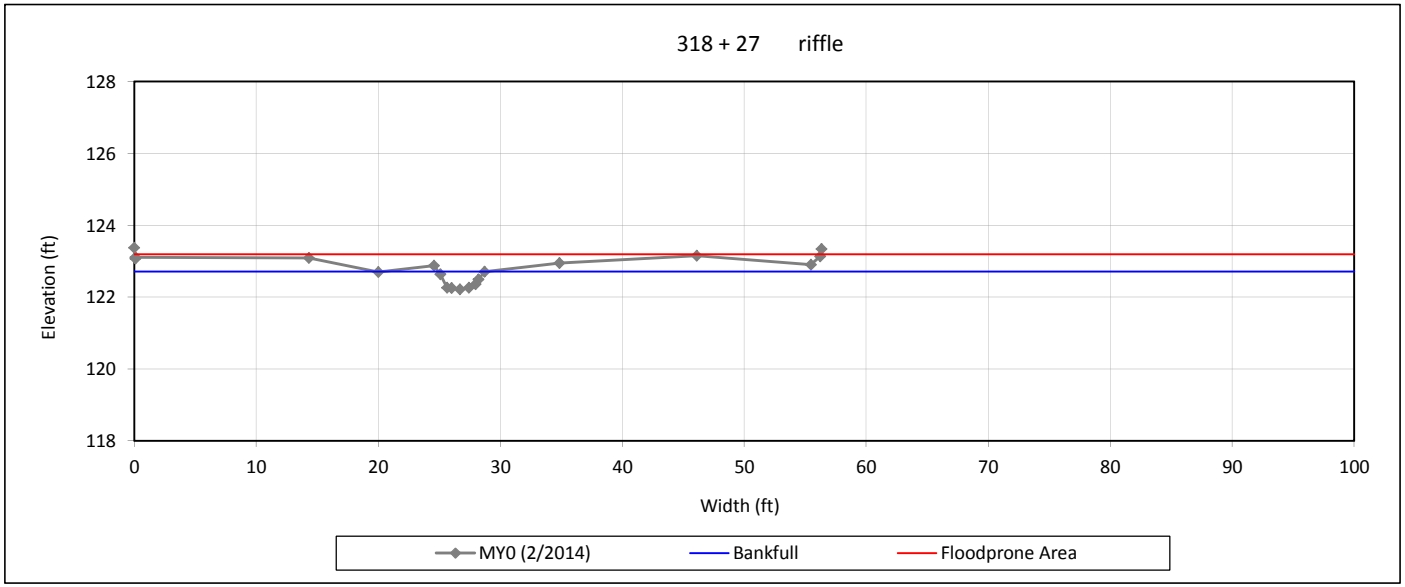
Bankfull Dimensions	
1.3	x-section area (ft.sq.)
3.8	width (ft)
0.3	mean depth (ft)
0.4	max depth (ft)
4.1	wetted parimeter (ft)
0.3	hyd radi (ft)
11.2	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 31-Southeast Br



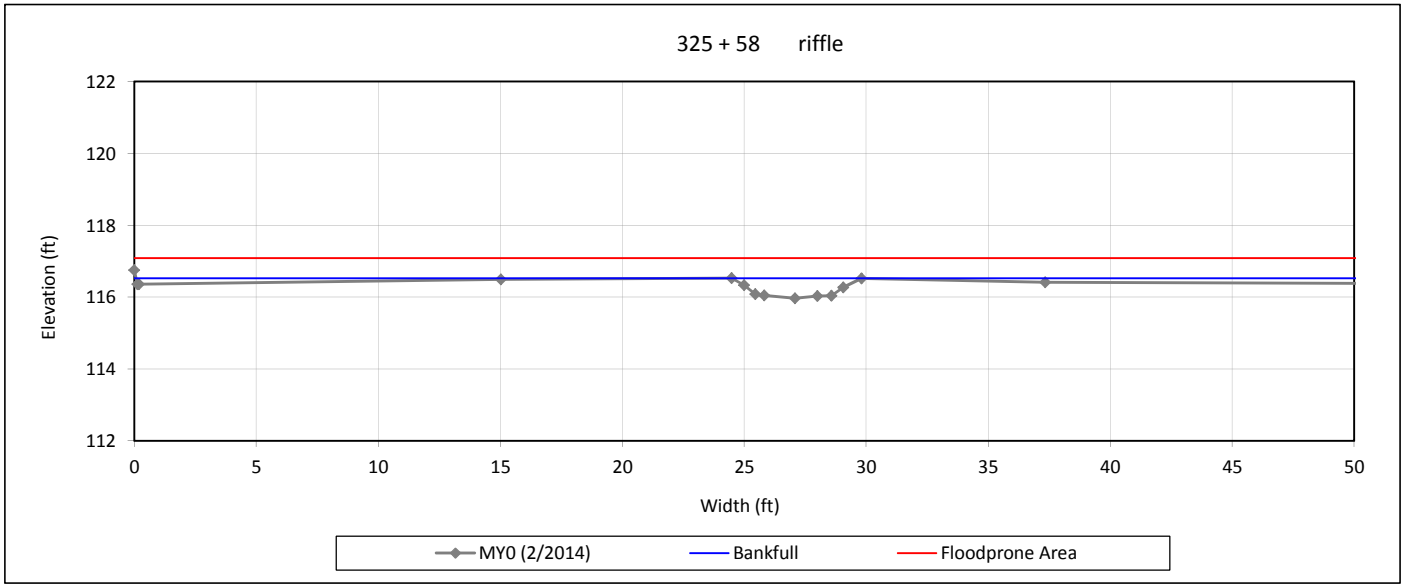
Bankfull Dimensions	
1.3	x-section area (ft.sq.)
3.8	width (ft)
0.4	mean depth (ft)
0.5	max depth (ft)
4.0	wetted parimeter (ft)
0.3	hyd radi (ft)
10.8	width-depth ratio
60.0	W flood prone area (ft)
15.8	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 32-Southeast Br



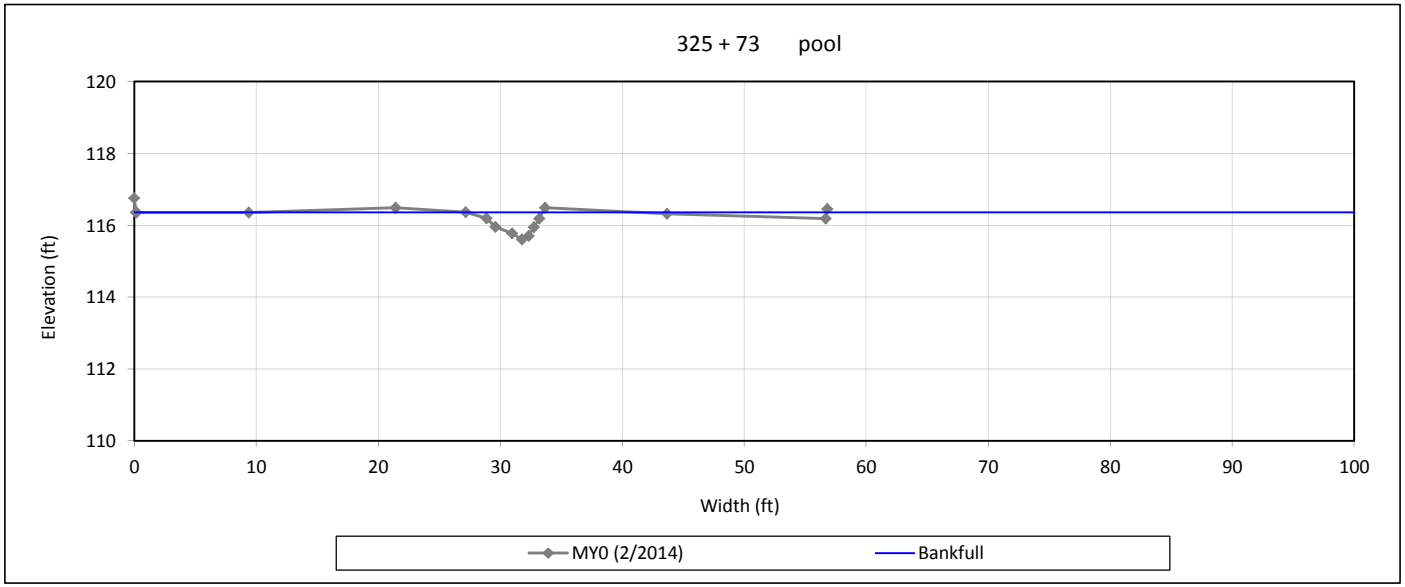
Bankfull Dimensions	
2.1	x-section area (ft.sq.)
5.3	width (ft)
0.4	mean depth (ft)
0.6	max depth (ft)
5.5	wetted parimeter (ft)
0.4	hyd radi (ft)
13.8	width-depth ratio
200.0	W flood prone area (ft)
37.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 33-Southeast Br



Bankfull Dimensions	
2.4	x-section area (ft.sq.)
6.3	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
6.6	wetted parimeter (ft)
0.4	hyd radi (ft)
16.8	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—Southeast Branch

	
Photo Point 70 – looking upstream (04/01/2014)	Photo Point 70 – looking downstream (04/01/2014)
	
Photo Point 71 – looking upstream (04/01/2014)	Photo Point 71 – looking downstream (04/01/2014)
	
Photo Point 72 – looking upstream (04/01/2014)	Photo Point 72 – looking downstream (04/01/2014)

Photo Point 73 – looking upstream (04/01/2014)

Photo Point 73 – looking downstream (04/01/2014)

Photo Point 74 – looking upstream (04/01/2014)

Photo Point 74 – looking downstream (04/01/2014)

Photo Point 75 – looking upstream (04/01/2014)

Photo Point 75 – looking downstream (04/01/2014)

	
Photo Point 76 – looking upstream (04/01/2014)	Photo Point 76 – looking downstream (04/01/2014)
	
Photo Point 77 – looking upstream (04/01/2014)	Photo Point 77 – looking downstream (04/01/2014)
	
Photo Point 78 – looking upstream (04/01/2014)	Photo Point 78 – looking downstream (04/01/2014)

	
Photo Point 79 – looking upstream (04/01/2014)	Photo Point 79 – looking downstream (04/01/2014)
	
Photo Point 80 – looking upstream (04/01/2014)	Photo Point 80 – looking downstream (04/01/2014)
	
Photo Point 81 – looking upstream (04/01/2014)	Photo Point 81 – looking downstream (04/01/2014)

	
Photo Point 82 – looking upstream (04/01/2014)	Photo Point 82 – looking downstream (04/01/2014)
	
Photo Point 83 – looking upstream (04/01/2014)	Photo Point 83 – looking downstream (04/01/2014)

Table 5d. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

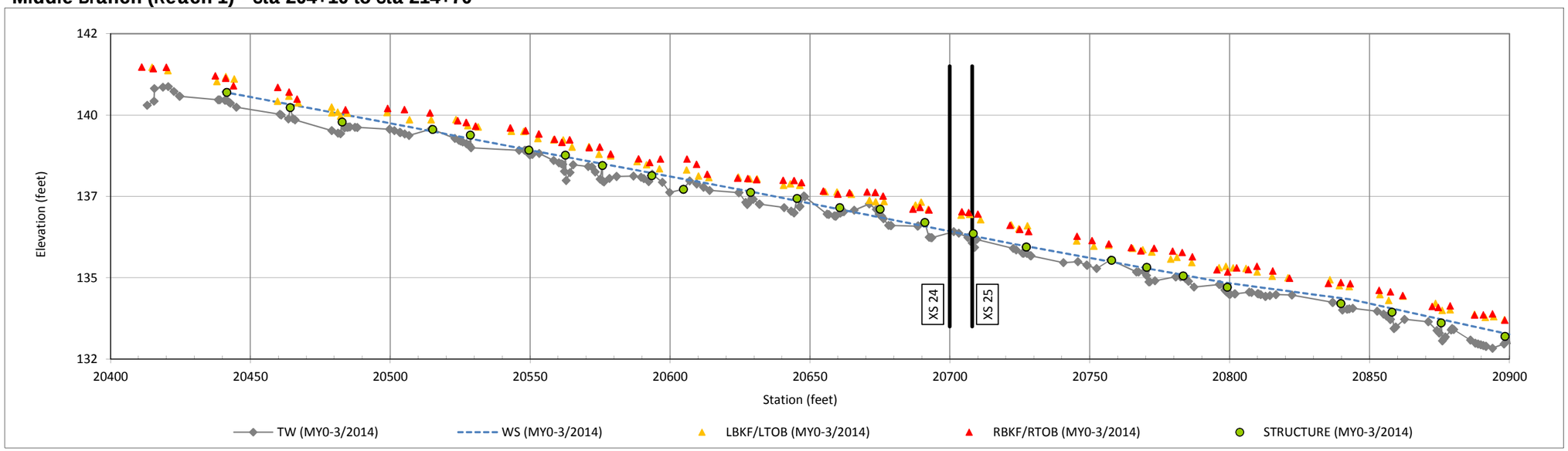
Middle Branch

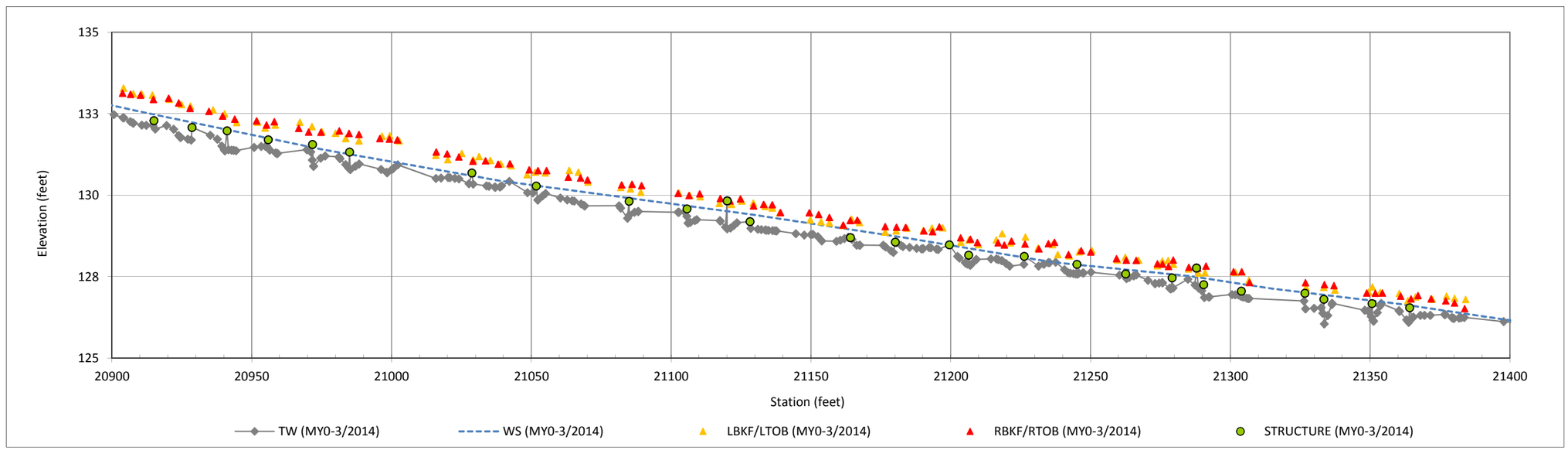
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design				As-Built/Baseline			
		Middle Branch		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		Middle Branch (Reach 1)		Middle Branch (Reach 2)		Middle Branch (Reach 1)		Middle Branch (Reach 2)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																					
Bankfull Width (ft)		1.8	2.3	2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		3.0		4.0		2.2		3.4	
Floodprone Width (ft)		4.6	6.8	>20		>50		>50		>75		>150		40	60	100	300	>50		>200	
Bankfull Mean Depth		0.2	0.3	0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		0.3		0.3		0.3		0.3	
Bankfull Max Depth		0.3	0.6	0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		0.4	0.5	0.5	0.6	0.5		0.5	
Bankfull Cross-sectional Area (ft^2)	N/A	0.4	0.5	1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		0.9		1.5		0.7		1.1	
Width/Depth Ratio		6.9	12.0	5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		10.0	10.5	10.0	12.0	6.7		10.1	
Entrenchment Ratio		2.0	3.8	>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	33.3	100.0	22.2	66.7	>22.9		>58.8	
Bank Height Ratio		5.3	6.5	1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	1.1	1.0		1.0	
D50 (mm)		0.083																N/A		N/A	
Profile																					
Shallow Length (ft)				---		---		---		---		---		---		---		2.5	46.6	7.9	16.1
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0144	0.0489	0.0002	0.0074	0.0008	0.0492	0.0059	0.0236
Pool Length (ft)	N/A			---		---		---		---		---		---		---		2.9	17.3	11.2	19.8
Pool Max Depth (ft)		---		0.6		N/A		1.7	1.9	1.5		3.1		0.4	1.0	0.5	1.0	0.5	1.2	0.6	0.9
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	15	24	5	22	8	56	18	24
Pool Volume (ft^3)																					
Pattern																					
Channel Beltwidth (ft)		---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	4.0	9.0	6.0	36.0	4.1	9.4	6.7	20.9
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	5.0	14.0	7.0	22.0	7.0	23.9	9.2	23.5
Rc:Bankfull Width (ft/ft)	N/A	---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.7	4.5	1.5	4.8	3.2	10.9	2.7	6.9
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		24	51	14	77	23	44	32	57
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	3.0	1.3	8.0	2.2	4.3	2.0	6.1
Substrate, Bed and Transport Parameters																					
Ri%/Ru%/P%/G%/S%																					
SC%/Sa%/G%/C%/B%/Be%																					
d16/d35/d50/d84/d95/d100	N/A	-/-/0.083/0.498/0.9/9.6		---		---		---		---		---						N/A		N/A	
Reach Shear Stress (Competency) lb/ft^2		0.24	0.27											---		---		N/A		N/A	
Max part size (mm) mobilized at bankfull																					
Stream Power (Capacity) W/m^2																					
Additional Reach Parameters																					
Drainage Area (SM)		0.02		0.06		0.67		0.34		0.90		1.27		0.01		0.01		0.01		0.01	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%	
Rosgen Classification		G5		E/C5b		E5		E5		E5/C5		E6		N/A		E/C5		E/C5		E/C5	
Bankfull Velocity (fps)		1.4	1.5	1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		1.3		0.8		1.4		0.9	
Bankfull Discharge (cfs)		0.6	0.7	2.6		17.5		6.4		14.0		11.0		1.0		1.0		1.0		1.0	
Q-NFF regression		---																			
Q-USGS extrapolation	N/A	---																			
Q-Mannings		---																			
Valley Length (ft)		---		---		---		---		---		---		---		---		985			
Channel Thalweg Length (ft)		1,736		---		---		---		---		---		1,060		436		1,058		432	
Sinuosity		1.0		1.1		1.2		1.2		1.2		1.4		1.1	1.2	1.2	1.5	1.1		1.2	
Water Surface Slope $(ft/ft)^2$		---		---		---		---		---		---		---		---		0.0145		0.0064	
Bankfull Slope (ft/ft)		0.0240		0.0260		0.0170		0.0040		0.0022		0.0040		0.0096	0.0163	0.0024	0.0077	0.0148		0.0024	0.0066

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Middle Branch (Reach 1) - Sta 204+10 to Sta 214+70





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Middle Branch (Reach 1) - Sta 204+10 to Sta 214+70
Middle Branch (Reach 2) - Sta 214+70 to Sta 219+10

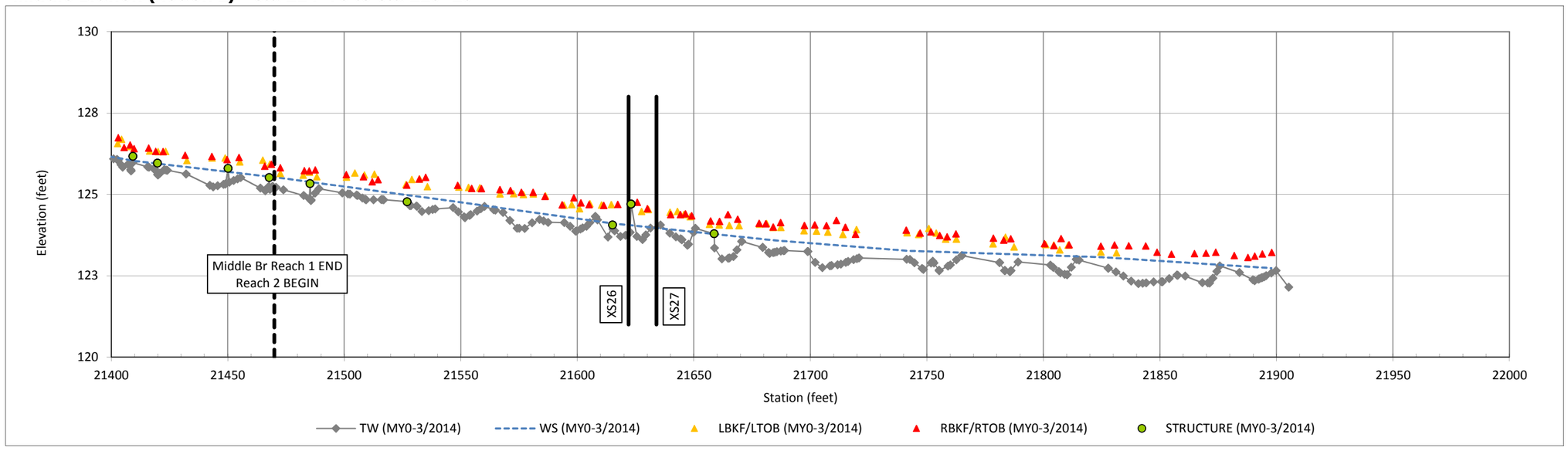


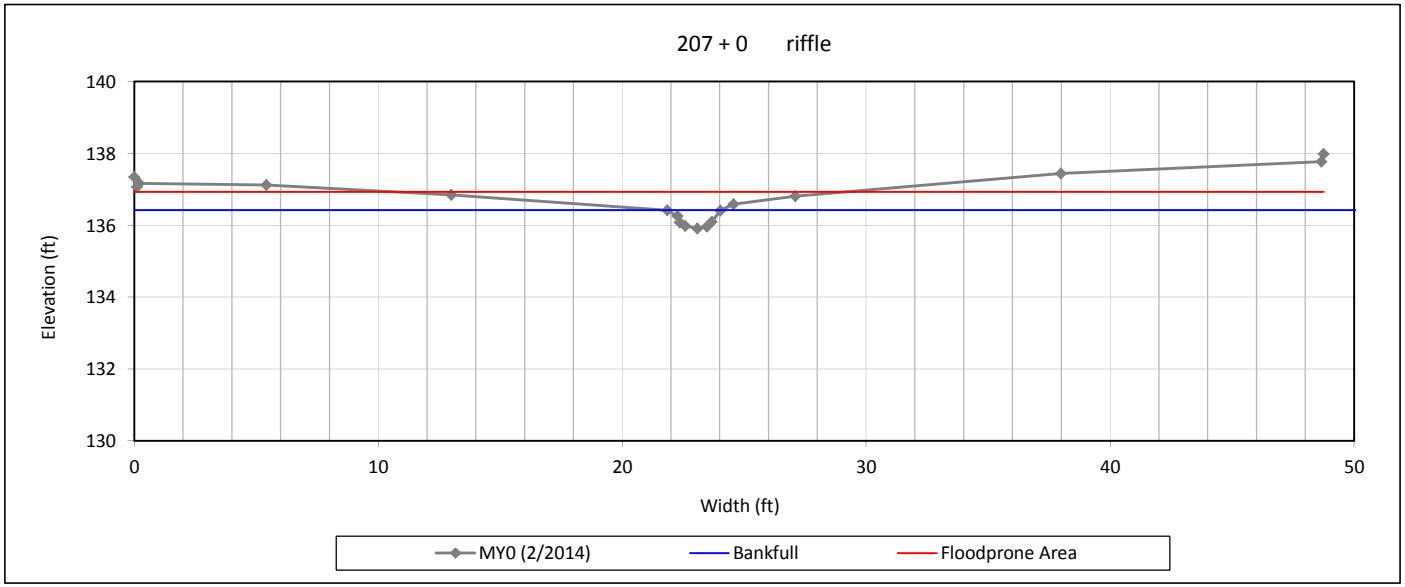
Table 6d. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Middle Branch

	Cross-Section 24 (Riffle)						Cross-Section 25 (Pool)						Cross-Section 26 (Pool)						Cross-Section 27 (Riffle)					
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**
based on fixed bankfull elevation	136.4						136.4						124.7						124.6					
Bankfull Width (ft)	2.2						3.1						4.1						3.4					
Floodprone Width (ft)	>50						N/A						N/A						>200					
Bankfull Mean Depth (ft)	0.3						0.4						0.3						0.3					
Bankfull Max Depth (ft)	0.5						0.7						0.9						0.5					
Bankfull Cross-Sectional Area (ft^2)	0.7						1.2						1.4						1.1					
Bankfull Width/Depth Ratio	6.7						8.1						11.9						10.1					
Bankfull Entrenchment Ratio	>22.9						N/A						N/A						>58.8					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 24-Middle Br



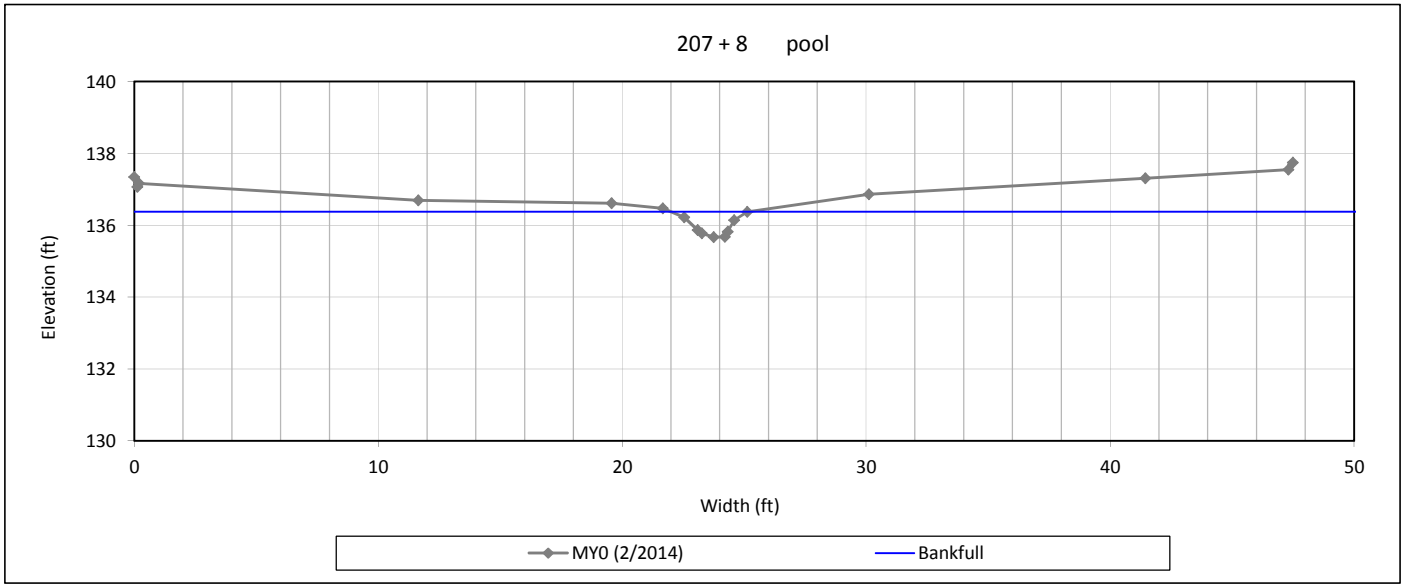
Bankfull Dimensions	
0.7	x-section area (ft.sq.)
2.2	width (ft)
0.3	mean depth (ft)
0.5	max depth (ft)
2.5	wetted parimeter (ft)
0.3	hyd radi (ft)
6.7	width-depth ratio
50.0	W flood prone area (ft)
22.9	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 25-Middle Br



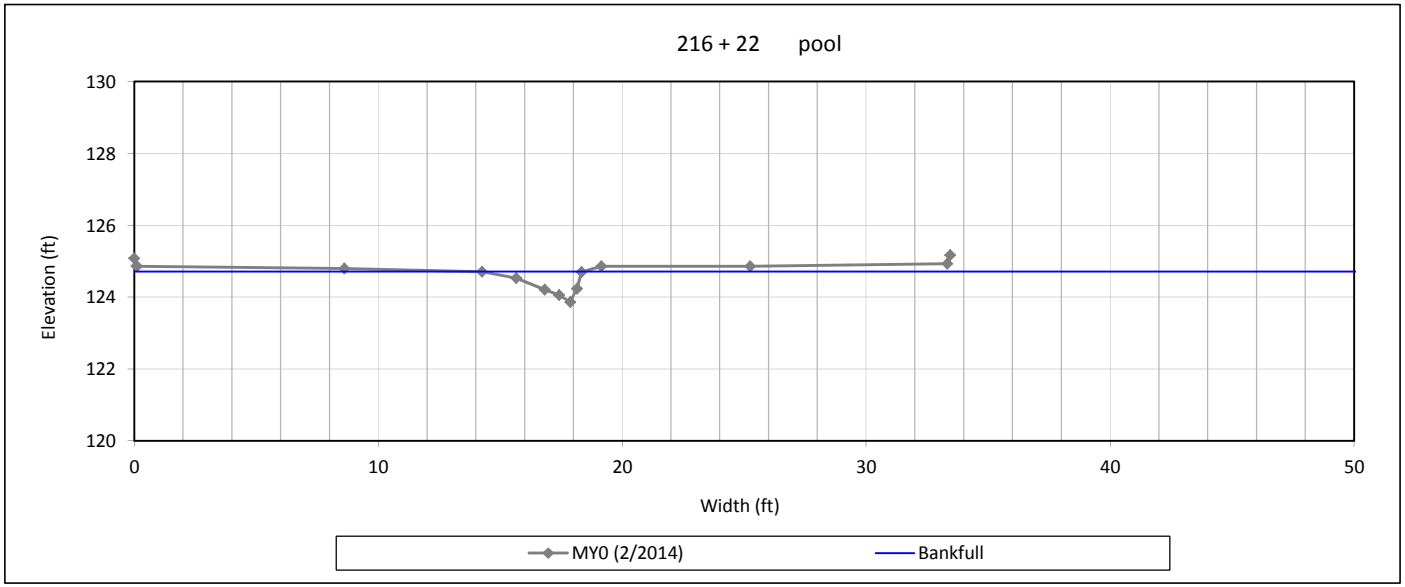
Bankfull Dimensions	
1.2	x-section area (ft.sq.)
3.1	width (ft)
0.4	mean depth (ft)
0.7	max depth (ft)
3.6	wetted parimeter (ft)
0.3	hyd radi (ft)
8.1	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 26-Middle Br



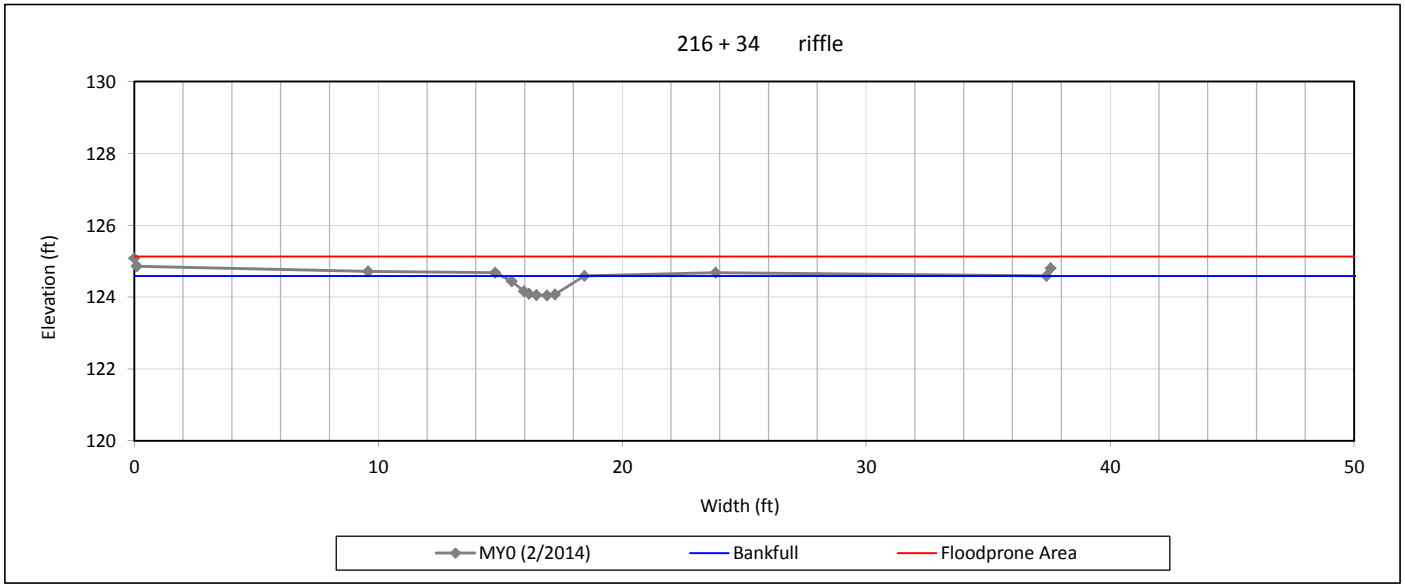
Bankfull Dimensions	
1.4	x-section area (ft.sq.)
4.1	width (ft)
0.3	mean depth (ft)
0.9	max depth (ft)
4.8	wetted parimeter (ft)
0.3	hyd radi (ft)
11.9	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 27-Middle Br



Bankfull Dimensions	
1.1	x-section area (ft.sq.)
3.4	width (ft)
0.3	mean depth (ft)
0.5	max depth (ft)
3.6	wetted parimeter (ft)
0.3	hyd radi (ft)
10.1	width-depth ratio
200.0	W flood prone area (ft)
58.8	enchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—Middle Branch

	
Photo Point 61 – looking upstream (04/01/2014)	Photo Point 61 – looking downstream (04/01/2014)
	
Photo Point 62 – looking upstream (04/01/2014)	Photo Point 62 – looking downstream (04/01/2014)
	
Photo Point 63 – looking upstream (04/01/2014)	Photo Point 63 – looking downstream (04/01/2014)

	
Photo Point 64 – looking upstream (04/01/2014)	Photo Point 64 – looking downstream (04/01/2014)
	
Photo Point 65 – looking upstream (04/01/2014)	Photo Point 65 – looking downstream (04/01/2014)
	
Photo Point 66 – looking upstream (04/01/2014)	Photo Point 66 – looking downstream (04/01/2014)

	
Photo Point 67 – looking upstream (04/01/2014)	Photo Point 67 – looking downstream (04/01/2014)
	
Photo Point 68 – looking upstream (04/01/2014)	Photo Point 68 – looking downstream (04/01/2014)
	
Photo Point 69 – looking upstream (04/01/2014)	Photo Point 69 – looking downstream (04/01/2014)

Table 5e. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

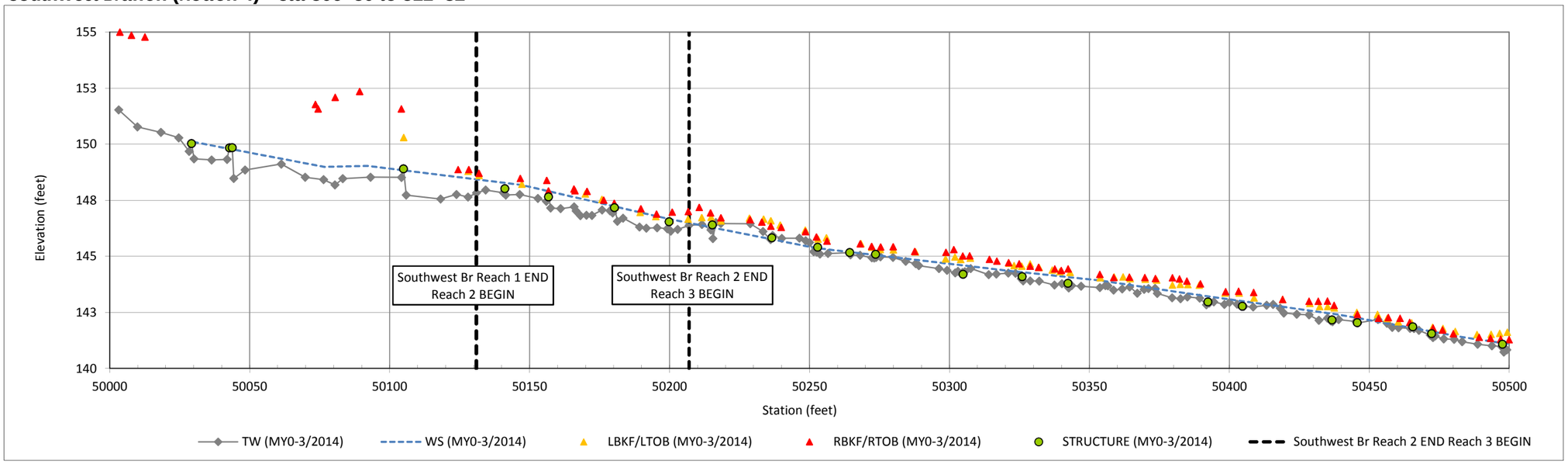
Southwest Branch

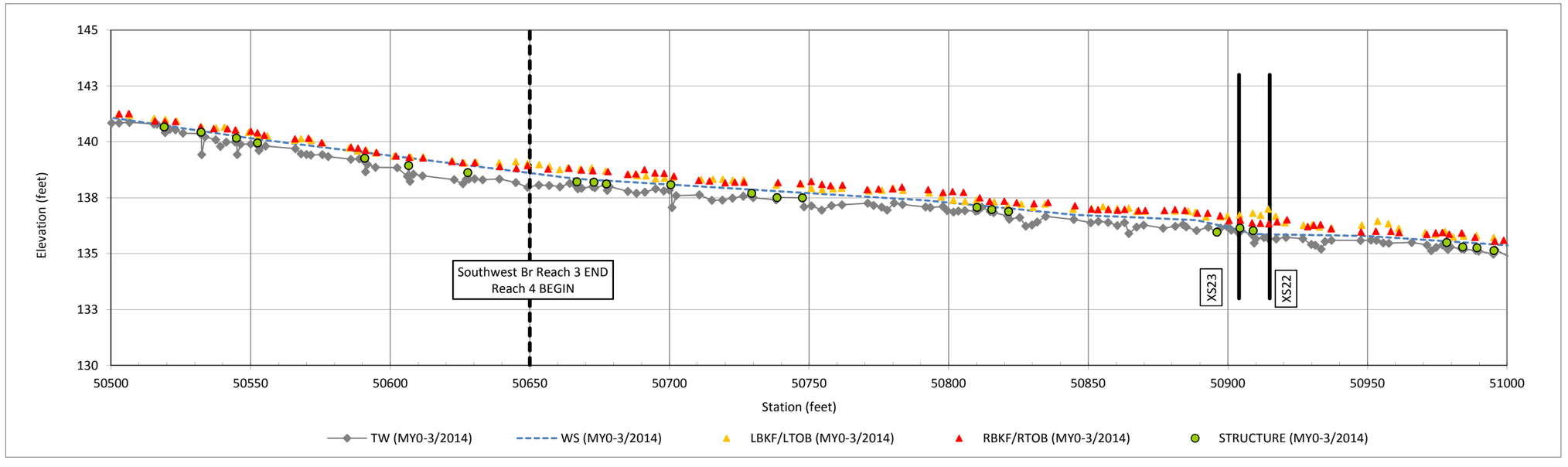
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design				As-Built/Baseline			
		Southwest Branch		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		Southwest Branch (Reaches 1 - 3)		Southwest Branch (Reach 4)		Southwest Branch (Reaches 1 - 3)		Southwest Branch (Reach 4)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																					
Bankfull Width (ft)	N/A	2.8	3.4	2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		3.0		3.3		---		2.4	
Floodprone Width (ft)		4.9	6.2	>20		>50		>50		>75		>150		40	60	100	300	---		>200	
Bankfull Mean Depth		0.2	0.3	0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		0.3		0.3		---		0.3	
Bankfull Max Depth		0.3	0.9	0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		0.5	0.6	0.4	0.5	---		0.4	
Bankfull Cross-sectional Area (ft^2)		0.8	0.9	1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		1.0		1.0		---		0.6	
Width/Depth Ratio		10.0	14.0	5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		9.0	10.0	10.0	12.0	---		9.7	
Entrenchment Ratio		1.5	1.9	>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	13.3	20.0	30.3	90.9	---		82.3	
Bank Height Ratio		10.0	10.7	1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	1.1	---		1.0	
D50 (mm)		0.105																---		N/A	
Profile																					
Shallow Length (ft)	N/A			---		---		---		---		---		---		---		3.8	51.6	8.3	44.1
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0257	0.0648	0.0109	0.0308	0.0015	0.0339	0.0032	0.0228
Pool Length (ft)				---		---		---		---		---		---		---		1.7	19.9	4.3	23.4
Pool Max Depth (ft)		---		0.6		N/A		1.7	1.9	1.5		3.1		0.5	1.1	0.4	1.0	0.3	1.2	0.6	1.4
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	15	24	5	23	8	53	12	51
Pool Volume (ft^3)																					
Pattern																					
Channel Beltwidth (ft)	N/A	---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	4.0	9.0	4.0	26.0	3.9	10.2	5.2	18.9
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	5.0	14.0	5.0	16.0	10.0	19.0	7.4	20.3
Rc:Bankfull Width (ft/ft)		---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.7	4.5	1.5	4.8	---		3.1	8.5
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		24	51	10	56	27	50	28	54
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	3.0	1.3	8.0	---		2.2	7.9
Substrate, Bed and Transport Parameters																					
Ri%/Ru%/P%/G%/S%	N/A																				
SC%/Sa%/G%/C%/B%/Be%																					
d16/d35/d50/d84/d95/d100		-/0.065/0.105/0.336/0.4/9.6		---		---		---		---		---						N/A		N/A	
Reach Shear Stress (Competency) lb/ft^2		0.37	0.42											---		---		N/A		N/A	
Max part size (mm) mobilized at bankfull																					
Stream Power (Capacity) W/m^2																					
Additional Reach Parameters																					
Drainage Area (SM)	N/A	0.03		0.06		0.67		0.34		0.90		1.27		0.02		0.02		0.02		0.02	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%	
Rosgen Classification		G5		E/C5b		E5		E5		E5/C5		E6		NA		E/C5		N/A		E/C5	
Bankfull Velocity (fps)		1.8	1.9	1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		1.7		1.3		N/A		2.5	
Bankfull Discharge (cfs)		1.6	1.7	2.6		17.5		6.4		14.0		11.0		1.5		1.5		1.5		1.5	
Q-NFF regression		---																			
Q-USGS extrapolation		---																			
Q-Mannings		---																			
Valley Length (ft)		---		---		---		---		---		---		---		---					
Channel Thalweg Length (ft)		1,080		---		---		---		---		---		650		482		646		479	
Sinuosity		1.0		1.1		1.2		1.2		1.2		1.4		1.1	1.2	1.1	1.5	1.0		1.3	
Water Surface Slope (ft/ft^2)		---		---		---		---		---		---		---		---		0.0191		0.0090	
Bankfull Slope (ft/ft)		0.0320		0.0260		0.0170		0.0040		0.0022		0.0040		0.0171	0.0216	0.0078	0.0096	0.0186	0.0191	0.0085	0.0088

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Southwest Branch (Reach 1) - Sta 500+00 to Sta 501+31
Southwest Branch (Reach 2) - Sta 500+00 to Sta 502+07
Southwest Branch (Reach 3) - Sta 502+07 to 506+50
Southwest Branch (Reach 4) - Sta 506+50 to 511+32





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Southwest Branch (Reach 4) - Sta 506+50 to 511+32

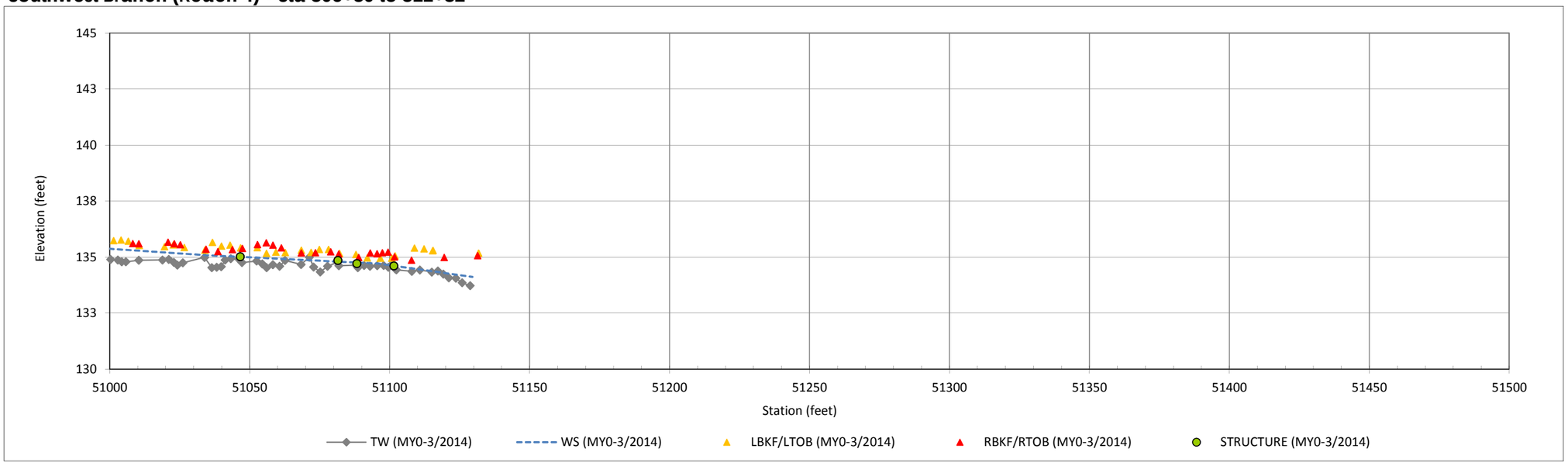


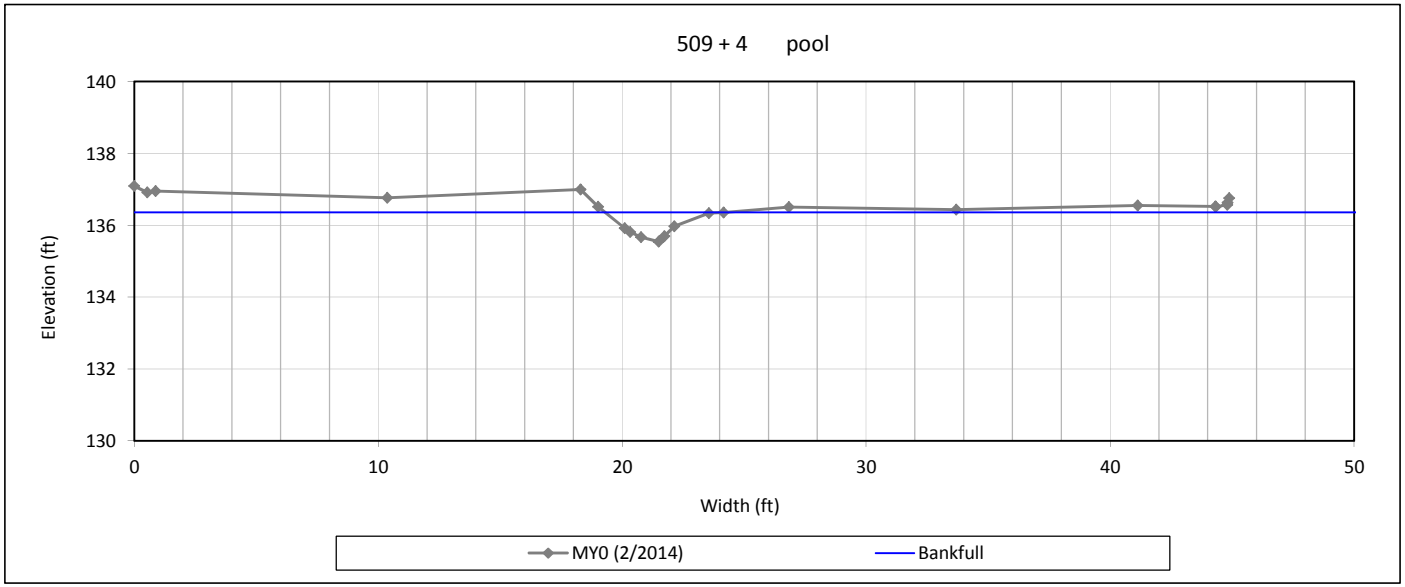
Table 6e. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

Southwest Branch

	Cross-Section 22 (Pool)						Cross-Section 23 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation	136.4						136.4					
Bankfull Width (ft)	4.9						2.4					
Floodprone Width (ft)	N/A						>200					
Bankfull Mean Depth (ft)	0.4						0.3					
Bankfull Max Depth (ft)	0.8						0.4					
Bankfull Cross-Sectional Area (ft^2)	1.8						0.6					
Bankfull Width/Depth Ratio	13.2						9.7					
Bankfull Entrenchment Ratio	N/A						>82.3					
Bankfull Bank Height Ratio	1.0						1.0					

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 22-Southwest Br



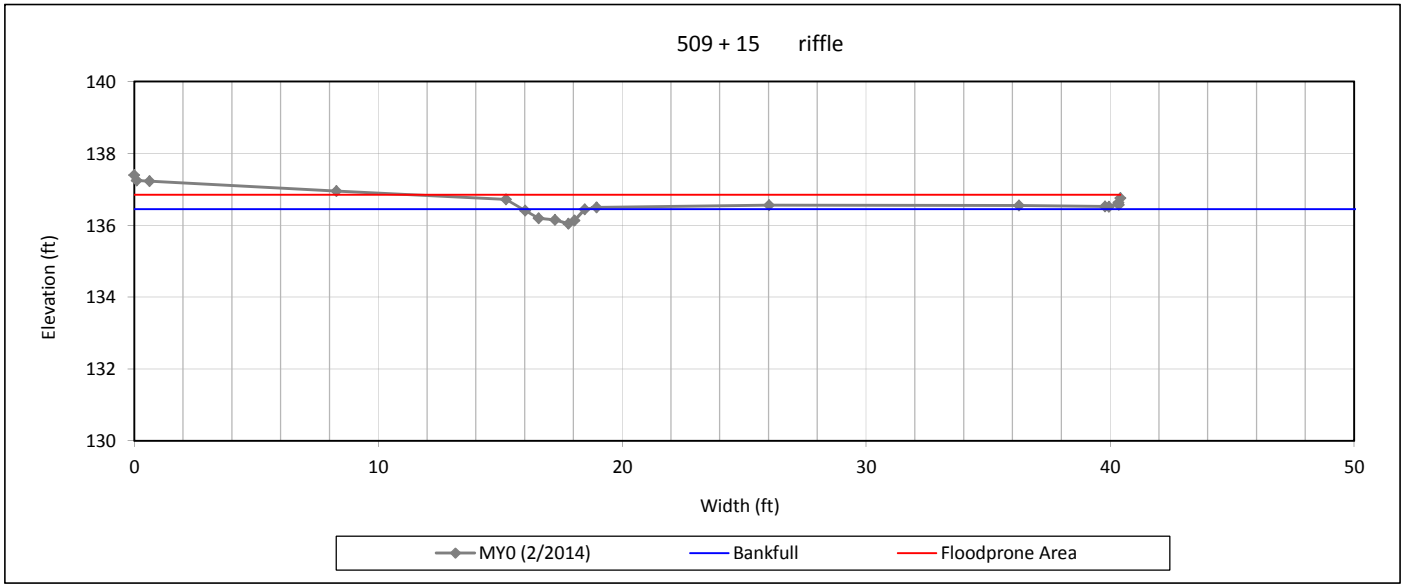
Bankfull Dimensions	
1.8	x-section area (ft.sq.)
4.9	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
5.2	wetted parimeter (ft)
0.3	hyd radi (ft)
13.2	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 23-Southwest Br



Bankfull Dimensions	
0.6	x-section area (ft.sq.)
2.4	width (ft)
0.3	mean depth (ft)
0.4	max depth (ft)
2.6	wetted parimeter (ft)
0.2	hyd radi (ft)
9.7	width-depth ratio
200.0	W flood prone area (ft)
82.3	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—Southwest Branch

	
Photo Point 55 – looking upstream (04/01/2014)	Photo Point 55 – looking downstream (04/01/2014)
	
Photo Point 56 – looking upstream (04/01/2014)	Photo Point 56 – looking downstream (04/01/2014)
	
Photo Point 57 – looking upstream (04/01/2014)	Photo Point 57 – looking downstream (04/01/2014)

	
Photo Point 58 – looking upstream (04/01/2014)	Photo Point 58 – looking downstream (04/01/2014)
	
Photo Point 59 – looking upstream (04/01/2014)	Photo Point 59 – looking downstream (04/01/2014)
	
Photo Point 60 – looking upstream (04/01/2014)	Photo Point 60 – looking downstream (04/01/2014)

Table 5f. Baseline Stream Data Summary
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

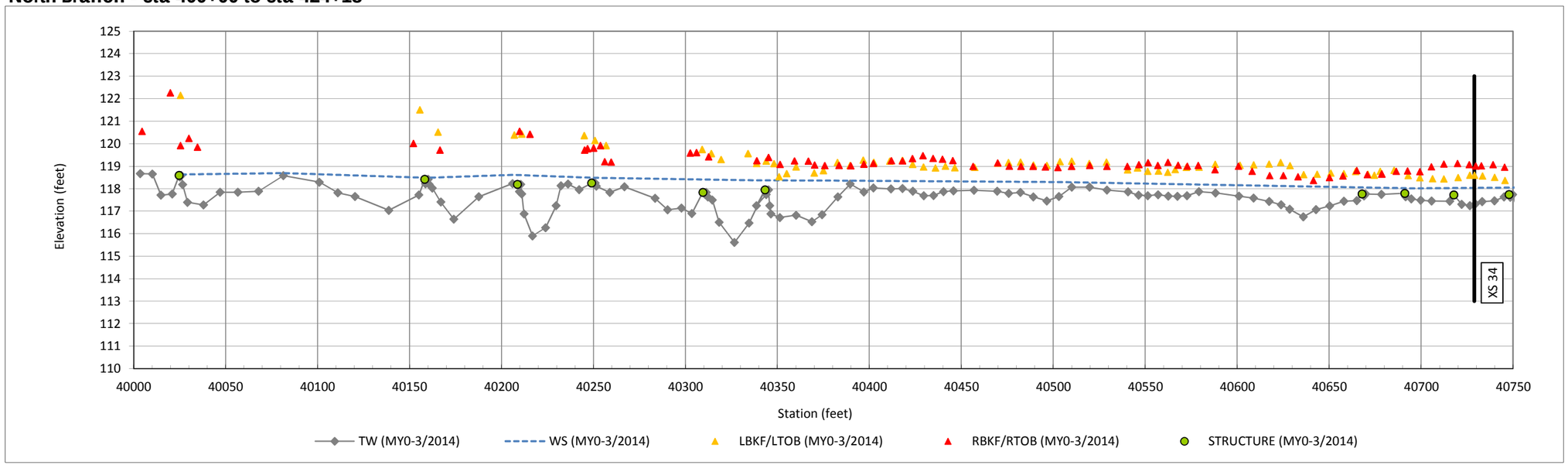
North Branch

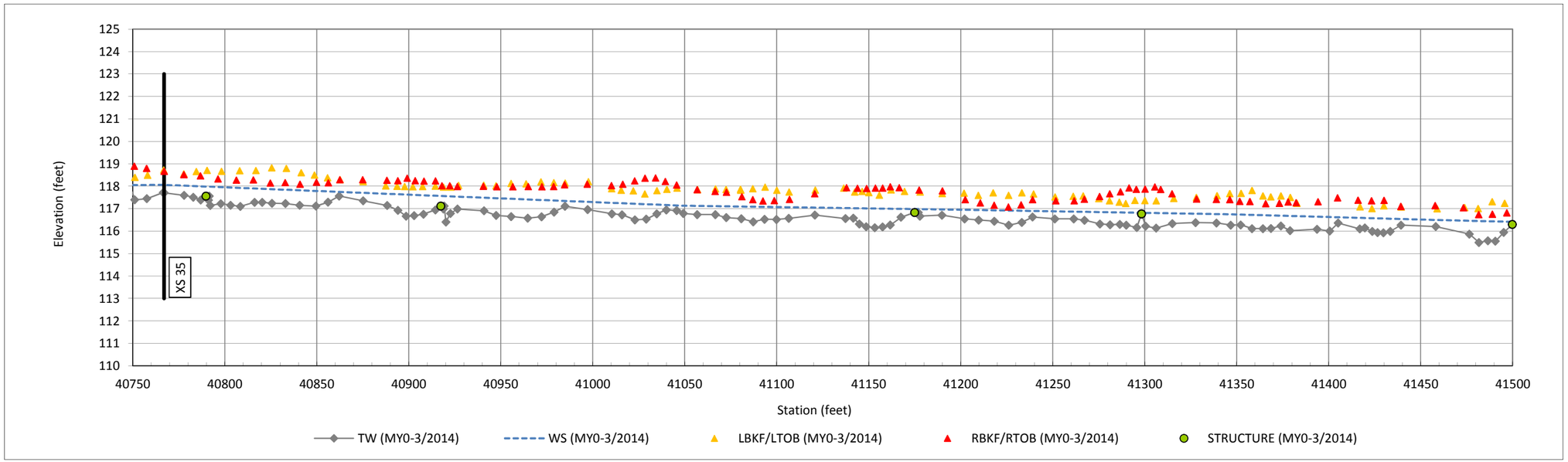
Parameter	Gage	Pre-Restoration Condition		Reference Reach Data										Design		As-Built/Baseline	
		North Branch		Scout West 1		Scout East 2		Scout West 2		Johanna Creek		Jarman Oak		North Branch		North Branch	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																	
Bankfull Width (ft)	N/A	---		2.6	6.3	4.7	6.1	5.6	7.6	9.7		9.3		9.2		8.6	9.3
Floodprone Width (ft)		---		>20		>50		>50		>75		>150		100	300	>200	
Bankfull Mean Depth		---		0.3	0.5	1.1	1.3	0.7	1.0	0.8		1.2		0.6		0.7	0.7
Bankfull Max Depth		---		0.5	0.7	1.7	1.8	1.2	1.3	1.1		2.3		0.9	1.1	1.0	1.2
Bankfull Cross-sectional Area (ft^2)		---		1.3	2.0	6.0	6.9	5.3	5.4	7.2	7.8	11.6		5.9		5.7	6.5
Width/Depth Ratio		---		5.4	19.4	3.6	5.4	5.7	11.0	10.1	19.7	7.4		14.0	14.5	13.1	13.2
Entrenchment Ratio		---		>2.2		>2.2		>2.2		8.0	9.6	16.1	26.9	10.9	32.6	>21.6	>23.2
Bank Height Ratio		---		1.1	1.3	1.0		1.1	1.2	1.0		1.0		1.0	1.1	1.0	
D50 (mm)		---														N/A	
Profile																	
Shallow Length (ft)	N/A			---		---		---		---		---		---		5.3	35.8
Shallow Slope (ft/ft)		---		0.026	0.047	N/A		0.033	0.051	N/A		0.0129		0.0010	0.0065	0.0013	0.0163
Pool Length (ft)				---		---		---		---		---		---		8.5	80.8
Pool Max Depth (ft)		---		0.6		N/A		1.7	1.9	1.5		3.1		0.9	2.1	1.0	3.8
Pool Spacing (ft)^		---		27	67	N/A		21	27	16	59	32	55	15	64	17	101
Pool Volume (ft^3)																	
Pattern																	
Channel Beltwidth (ft)	N/A	---		8.7	14.3	7.2	16.2	9.1	9.8	14.0	20.0	21.0	36.0	12.0	74.0	16	72
Radius of Curvature (ft)		---		3.1	9.0	5.5	16.0	5.4	6.8	15.0	27.0	13.7	18.6	14.0	44.0	15	40
Rc:Bankfull Width (ft/ft)		---		0.6	1.6	1.0	3.0	0.8	1.0	1.5	2.8	1.5	2.0	1.5	4.8	1.7	4.3
Meander Length (ft)		---		39.8	84.8	36.5	63.2	32.5	36.9	50.0		N/A		28	156	79	129
Meander Width Ratio		---		1.6	2.6	1.3	3.0	1.4	1.5	1.4	2.1	2.3	2.9	1.3	8.0	1.9	7.7
Substrate, Bed and Transport Parameters																	
Ri%/Ru%/P%/G%/S%	N/A																
SC%/Sa%/G%/C%/B%/Be%																	
d16/d35/d50/d84/d95/d100		---		---		---		---		---		---				N/A	
Reach Shear Stress (Competency) lb/ft^2		---												---		N/A	
Max part size (mm) mobilized at bankfull																	
Stream Power (Capacity) W/m^2																	
Additional Reach Parameters																	
Drainage Area (SM)	N/A	0.08		0.06		0.67		0.34		0.90		1.27		0.19		0.19	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%	
Rosgen Classification		N/A		E/C5b		E5		E5		E5/C5		E6		E/C5		C5	
Bankfull Velocity (fps)		---		1.3	2.0	2.5	2.9	1.2	1.2	1.8	1.9	0.95		0.9		0.8	0.9
Bankfull Discharge (cfs)		---		2.6		17.5		6.4		14.0		11.0		5.0		5.0	
Q-NFF regression		---															
Q-USGS extrapolation		---															
Q-Mannings		---															
Valley Length (ft)		---		---		---		---		---		---		---			
Channel Thalweg Length (ft)		---		---		---		---		---		---		2,418		2,410	
Sinuosity		---		1.1		1.2		1.2		1.2		1.4		1.2	1.6	1.31	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		---		---		0.0016	
Bankfull Slope (ft/ft)		---		0.0260		0.0170		0.0040		0.0022		0.0040		0.0007	0.0020	0.0004	0.0020

(---): Data was not provided
N/A: Not Applicable

Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

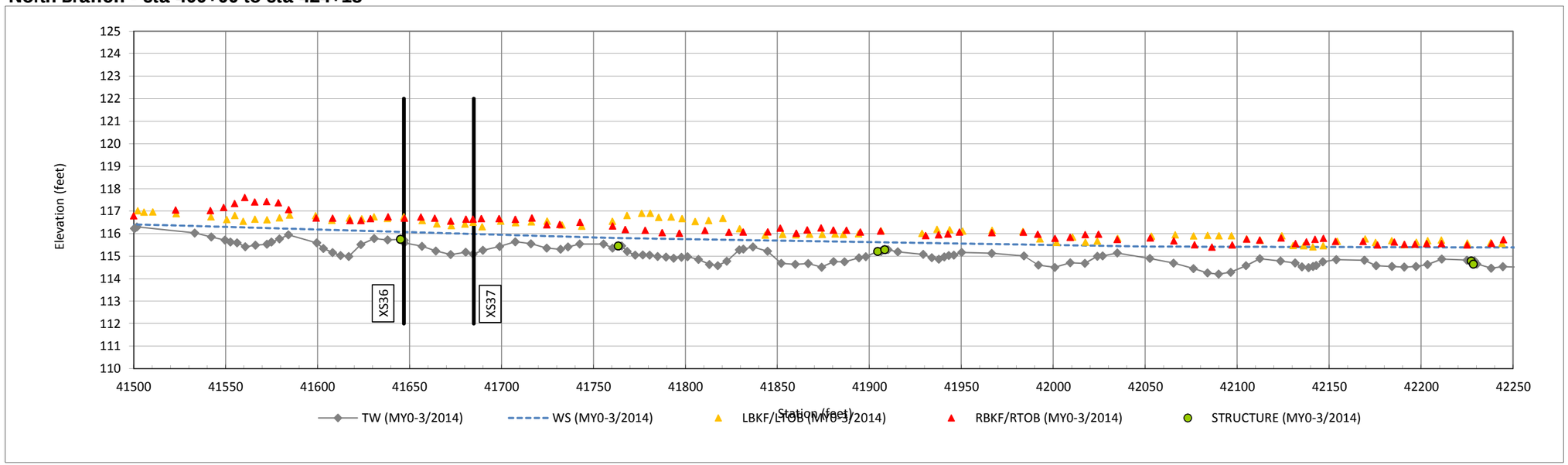
North Branch - Sta 400+00 to Sta 424+18





Longitudinal Profile Plots
Devils Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

North Branch - Sta 400+00 to Sta 424+18



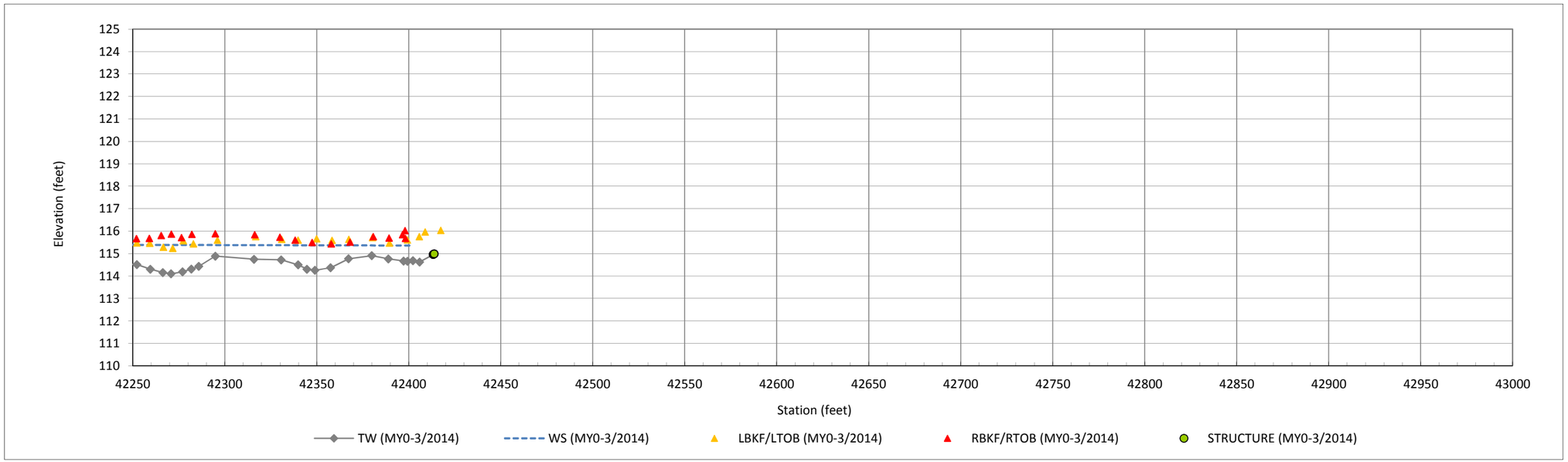


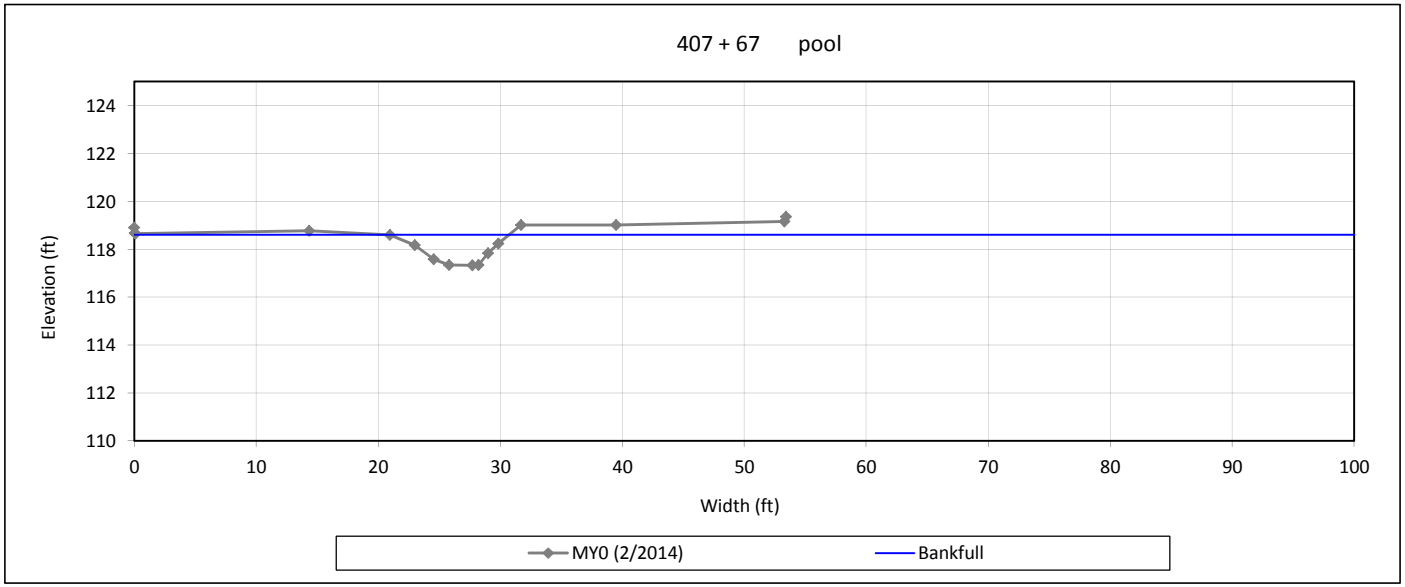
Table 6f. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Devil's Racetrack Mitigation Site (NCEEP Project No. 95021)
Monitoring Year 0

North Branch

	Cross-Section 34 (Pool)						Cross-Section 35 (Riffle)						Cross-Section 36 (Riffle)						Cross-Section 37 (Pool)					
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**
based on fixed bankfull elevation	118.6						118.7						116.8						116.5					
Bankfull Width (ft)	9.8						8.6						9.3						10.7					
Floodprone Width (ft)	N/A						>200						>200						N/A					
Bankfull Mean Depth (ft)	0.8						0.7						0.7						0.9					
Bankfull Max Depth (ft)	1.3						1.0						1.2						1.4					
Bankfull Cross-Sectional Area (ft^2)	7.5						5.7						6.5						9.2					
Bankfull Width/Depth Ratio	12.8						13.1						13.2						12.4					
Bankfull Entrenchment Ratio	N/A						>23.2						>21.6						N/A					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0					

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 34-North Br



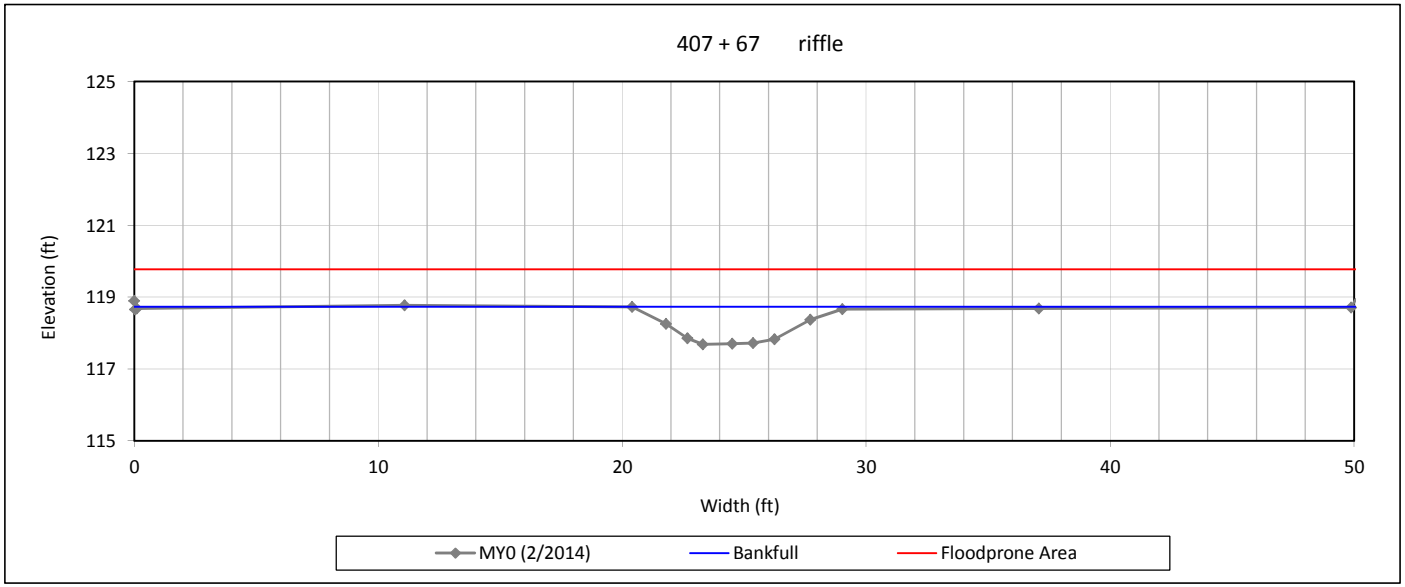
Bankfull Dimensions	
7.5	x-section area (ft.sq.)
9.8	width (ft)
0.8	mean depth (ft)
1.3	max depth (ft)
10.2	wetted parimeter (ft)
0.7	hyd radi (ft)
12.8	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 35-North Br



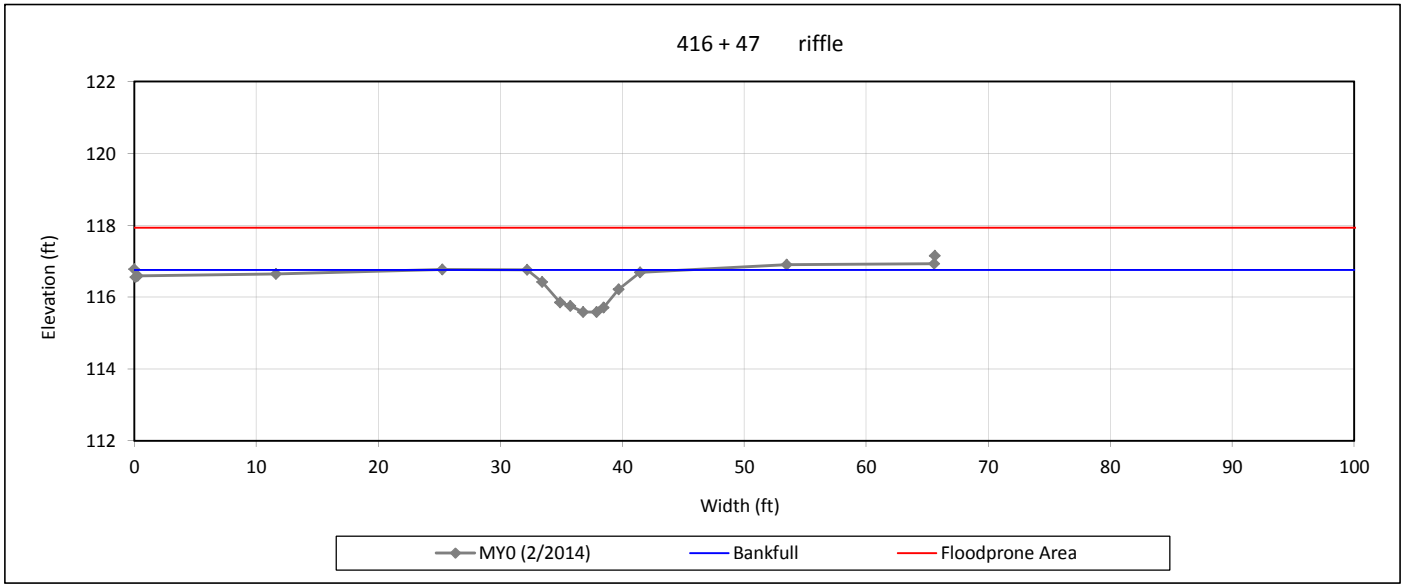
Bankfull Dimensions	
5.7	x-section area (ft.sq.)
8.6	width (ft)
0.7	mean depth (ft)
1.0	max depth (ft)
8.9	wetted parimeter (ft)
0.6	hyd radi (ft)
13.1	width-depth ratio
200.0	W flood prone area (ft)
23.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 36-North Br



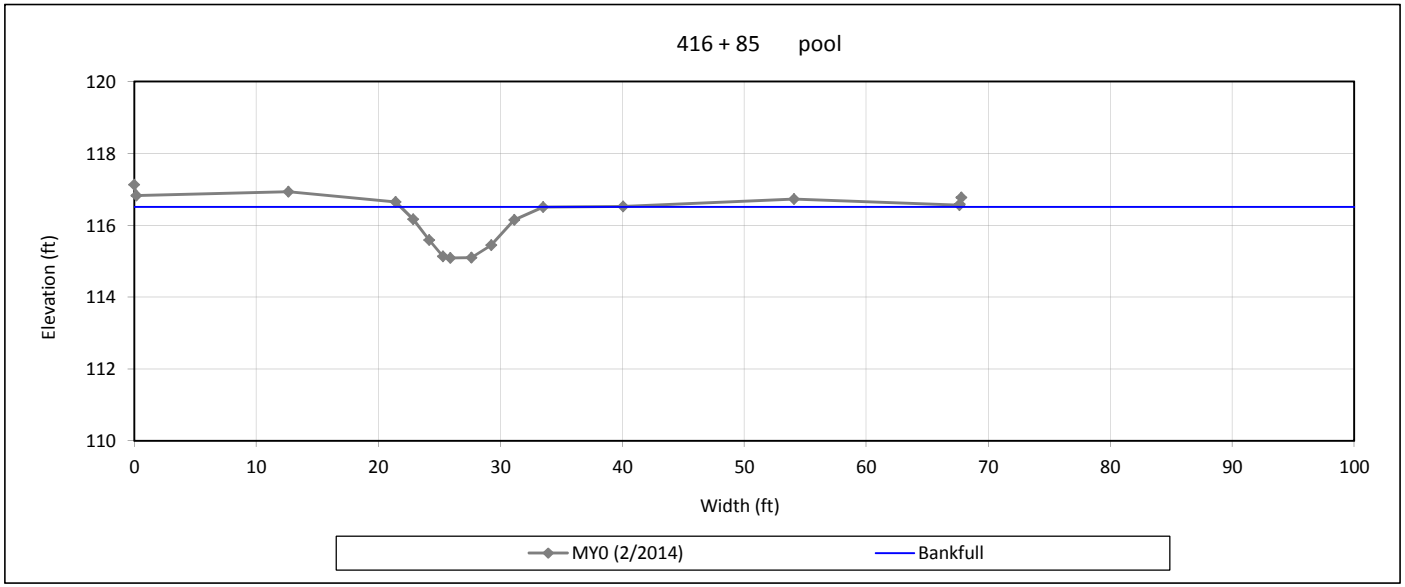
Bankfull Dimensions	
6.5	x-section area (ft.sq.)
9.3	width (ft)
0.7	mean depth (ft)
1.2	max depth (ft)
9.6	wetted parimeter (ft)
0.7	hyd radi (ft)
13.2	width-depth ratio
200.0	W flood prone area (ft)
21.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Cross-Section Plots
Devil's Racetrack Mitigtion Site (Project No. 95021)
Monitoring Year 0

Cross Section 37-North Br



Bankfull Dimensions	
9.2	x-section area (ft.sq.)
10.7	width (ft)
0.9	mean depth (ft)
1.4	max depth (ft)
11.1	wetted parimeter (ft)
0.8	hyd radi (ft)
12.4	width-depth ratio

Survey Date: 2/2014
Field Crew: Turner Surveying

View Downstream

Stream Photographs—North Branch

	
Photo Point 84 – looking upstream (04/01/2014)	Photo Point 84 – looking downstream (04/01/2014)
	
Photo Point 85 – looking upstream (04/01/2014)	Photo Point 85 – looking downstream (04/01/2014)
	
Photo Point 86 – looking upstream (04/01/2014)	Photo Point 86 – looking downstream (04/01/2014)

	
Photo Point 87 – looking upstream (04/01/2014)	Photo Point 87 – looking downstream (04/01/2014)
	
Photo Point 88 – looking upstream (04/01/2014)	Photo Point 88 – looking downstream (04/01/2014)
	
Photo Point 89 – looking upstream (04/01/2014)	Photo Point 89 – looking downstream (04/01/2014)

	
Photo Point 90 – looking upstream (04/01/2014)	Photo Point 90 – looking downstream (04/01/2014)
	
Photo Point 91 – looking upstream (04/01/2014)	Photo Point 91 – looking downstream (04/01/2014)
	
Photo Point 92 – looking upstream (04/01/2014)	Photo Point 92 – looking downstream (04/01/2014)

	
Photo Point 93 – looking upstream (04/01/2014)	Photo Point 93 – looking downstream (04/01/2014)
	
Photo Point 94 – looking upstream (04/01/2014)	Photo Point 94 – looking downstream (04/01/2014)

APPENDIX 3. Vegetation Plot Data

Table 7. Planted and Total Stem Counts
Devils Racetrack Mitigation Site (EEP Project No. 95021)
Monitoring Year 0

			Current Plot Data (MY0 2014)																												
			95021-01-0001			95021-01-0002			95021-01-0003			95021-01-0004			95021-01-0005			95021-01-0006			95021-01-0007			95021-01-0008			95021-01-0009			95021-01-0010		
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**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	river birch	Tree	1	1	1	1	1	1	3	3	3	2	2	2	1	1	1	5	5	5	5	5	5	2	2	2	2	2	2	1	1	1
Fraxinus pennsylvanica	green ash	Tree	3	3	3	4	4	4	3	3	3	1	1	1	2	2	2	2	2	2	1	1	1	4	4	4	1	1	1	3	3	3
Liriodendron tulipifera	tuliptree	Tree																			8	8	8									
Nyssa biflora	swamp tupelo	Tree																									1	1	1	1	1	1
Nyssa sylvatica	blackgum	Tree	2	2	2	1	1	1	4	4	4				1	1	1	1	1	1				1	1	1						
Platanus occidentalis	American sycamore	Tree	2	2	2	2	2	2	2	2	2	4	4	4	1	1	1	1	1	1	2	2	2	3	3	3	5	5	5	5	5	5
Quercus michauxii	swamp chestnut oak	Tree	4	4	4				1	1	1	2	2	2	3	3	3	1	1	1				2	2	2	3	3	3	1	1	1
Quercus phellos	willow oak	Tree	3	3	3	6	6	6	1	1	1	5	5	5	5	5	5	2	2	2	1	1	1	1	1	1				3	3	3
Taxodium distichum	bald cypress	Tree	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5				4	4	4	5	5	5	3	3	3
Stem count			17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
size (ares)			1			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			7	7	7	6	6	6	7	7	7	6	6	6	7	7	7	7	7	7	5	5	5	7	7	7	6	6	6	7	7	7
Stems per ACRE			688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 7. Planted and Total Stem Counts
Devils Racetrack Mitigation Site (EEP Project No. 95021)
Monitoring Year 0

			Current Plot Data (MY0 2014)																																
			95021-01-0011			95021-01-0012			95021-01-0013			95021-01-0014			95021-01-0015			95021-01-0016			95021-01-0017			95021-01-0018			95021-01-0019			95021-01-0020			95021-01-0021			95021-01-0022		
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	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	2	2	2	1	1	1	2	2	2							6	6	6	2	2	2										3	3	3			
Fraxinus pennsylvanica	green ash	Tree	5	5	5	4	4	4				2	2	2	1	1	1	3	3	3	2	2	2	1	1	1	2	2	2	1	1	1	5	5	5	3	3	3
Liriodendron tulipifera	tuliptree	Tree	6	6	6	1	1	1																									3	3	3			
Nyssa biflora	swamp tupelo	Tree							1	1	1				2	2	2	1	1	1				2	2	2	3	3	3	1	1	1						
Nyssa sylvatica	blackgum	Tree																																				
Platanus occidentalis	American sycamore	Tree	2	2	2	5	5	5	3	3	3	3	3	3	4	4	4	4	4	4	1	1	1							4	4	4				1	1	1
Quercus michauxii	swamp chestnut oak	Tree							1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	5	5	5	7	7	7	2	2	2						
Quercus phellos	willow oak	Tree				4	4	4	5	5	5							1	1	1				4	4	4				2	2	2	1	1	1	6	6	6
Taxodium distichum	bald cypress	Tree	2	2	2	2	2	2	5	5	5	10	10	10	8	8	8				10	10	10	5	5	5	4	4	4	7	7	7	5	5	5	7	7	7
Stem count			17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16	16	17	17	17	17	17	17	17	17	17
size (ares)			1			1			1			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			5	5	5	6	6	6	6	6	6	4	4	4	5	5	5	6	6	6	5	5	5	5	5	5	4	4	4	6	6	6	5	5	5	4	4	4
Stems per ACRE			688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	647.5	647.5	647.5	688	688	688	688	688	688	688	688	688

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 7. Planted and Total Stem Counts
Devils Racetrack Mitigation Site (EEP Project No. 95021)
Monitoring Year 0

			Current Plot Data (MY0 2014)																																
			95021-01-0023			95021-01-0024			95021-01-0025			95021-01-0026			95021-01-0027			95021-01-0028			95021-01-0029			95021-01-0030			95021-01-0031			95021-01-0032			95021-01-0033			95021-01-0034		
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**	**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	2	2	2				2	2	2	1	1	1	1	1	1	4	4	4				3	3	3	3	3	3
Fraxinus pennsylvanica	green ash	Tree				6	6	6	3	3	3	4	4	4	1	1	1	1	1	1				1	1	1	1	1	1	9	9	9	2	2	2	1	1	1
Liriodendron tulipifera	tuliptree	Tree																																				
Nyssa biflora	swamp tupelo	Tree	2	2	2				1	1	1							3	3	3	1	1	1	1	1	1	5	5	5	1	1	1	2	2	2	5	5	5
Nyssa sylvatica	blackgum	Tree																																				
Platanus occidentalis	American sycamore	Tree	7	7	7	4	4	4	3	3	3	1	1	1	1	1	1	2	2	2	3	3	3				2	2	2	2	2	2	4	4	4	1	1	1
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	2	2	2	1	1	1	6	6	6	5	5	5							8	8	8	3	3	3	2	2	2	1	1	1	4	4	4
Quercus phellos	willow oak	Tree	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	10	6	6	6	6	6	6	1	1	1				2	2	2	2	2	2
Taxodium distichum	bald cypress	Tree	3	3	3	4	4	4	6	6	6	3	3	3	9	9	9	3	3	3	6	6	6	4	4	4	2	2	2	7	7	7	4	4	4	2	2	2
Stem count			17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	21	21	21	17	17	17	21	21	21	18	18	18	21	21	21	18	18	18	18	18	18
size (ares)			1			1			1			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			6	6	6	5	5	5	7	7	7	6	6	6	5	5	5	6	6	6	5	5	5	6	6	6	7	7	7	5	5	5	7	7	7	7	7	7
Stems per ACRE			688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	849.8	849.8	849.8	688	688	688	849.8	849.8	849.8	728.4	728.4	728.4	849.8	849.8	849.8	728.4	728.4	728.4	728.4	728.4	728.4

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 7. Planted and Total Stem Counts
Devils Racetrack Mitigation Site (EEP Project No. 95021)
Monitoring Year 0

			Current Plot Data (MY0 2014)																																
			95021-01-0035			95021-01-0036			95021-01-0037			95021-01-0038			95021-01-0039			95021-01-0040			95021-01-0041			95021-01-0042			95021-01-0043			95021-01-0044			95021-01-0045			95021-01-0046		
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**	**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	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	3	3	3	6	6	6	2	2	2	2	2	2	4	4	4
Fraxinus pennsylvanica	green ash	Tree	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	3	3	3				4	4	4	5	5	5	1	1	1			
Liriodendron tulipifera	tuliptree	Tree																																				
Nyssa biflora	swamp tupelo	Tree	5	5	5	2	2	2	6	6	6	3	3	3				2	2	2	1	1	1	4	4	4	1	1	1	2	2	2						
Nyssa sylvatica	blackgum	Tree																																				
Platanus occidentalis	American sycamore	Tree	5	5	5	1	1	1							3	3	3	4	4	4	2	2	2	2	2	2				5	5	5	4	4	4	2	2	2
Quercus michauxii	swamp chestnut oak	Tree	2	2	2	3	3	3	3	3	3	2	2	2	5	5	5	2	2	2	1	1	1	4	4	4	2	2	2	2	2	2	1	1	1	1	1	1
Quercus phellos	willow oak	Tree				4	4	4	1	1	1	2	2	2	1	1	1	2	2	2	3	3	3	3	3	3				1	1	1	3	3	3	5	5	5
Taxodium distichum	bald cypress	Tree	2	2	2	3	3	3	3	3	3	6	6	6	4	4	4	5	5	5	6	6	6	1	1	1	4	4	4				6	6	6	5	5	5
Stem count			20	20	20	18	18	18	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
size (ares)			1			1			1			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			6	6	6	7	7	7	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	6	6	6	5	5	5	6	6	6	6	6	6	5	5	5
Stems per ACRE			809.4	809.4	809.4	728.4	728.4	728.4	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 7. Planted and Total Stem Counts
Devils Racetrack Mitigation Site (EEP Project No. 95021)
Monitoring Year 0

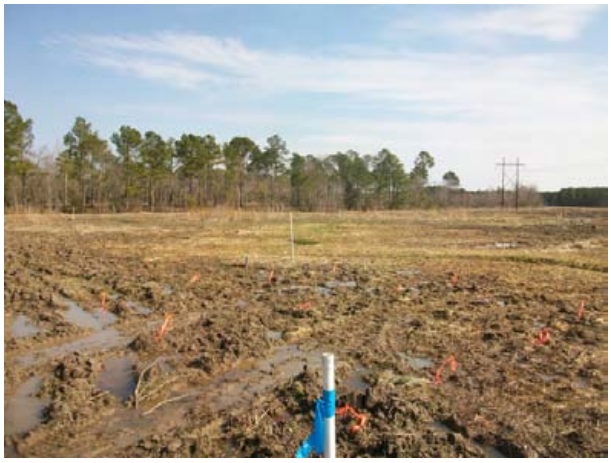
			Current Plot Data (MY0 2014)															Annual Means		
			95021-01-0047			95021-01-0048			95021-01-0049			95021-01-0050			95021-01-0051			MY0 (2014)		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	river birch	Tree							5	5	5	5	5	5	3	3	3	106	106	106
Fraxinus pennsylvanica	green ash	Tree	5	5	5	6	6	6	5	5	5	3	3	3	2	2	2	126	126	126
Liriodendron tulipifera	tuliptree	Tree													2	2	2	20	20	20
Nyssa biflora	swamp tupelo	Tree													1	1	1	60	60	60
Nyssa sylvatica	blackgum	Tree																10	10	10
Platanus occidentalis	American sycamore	Tree	1	1	1				3	3	3	3	3	3	5	5	5	124	124	124
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	108	108	108
Quercus phellos	willow oak	Tree	6	6	6	7	7	7	1	1	1	1	1	1	3	3	3	125	125	125
Taxodium distichum	bald cypress	Tree	4	4	4	3	3	3	1	1	1	3	3	3				206	206	206
Stem count			17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	885	885	885
size (ares)			1			1			1			1			1			51		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			1.26		
Species count			5	5	5	4	4	4	6	6	6	6	6	6	7	7	7	9	9	9
Stems per ACRE			688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	702.2	702.2	702.2

Color for Density

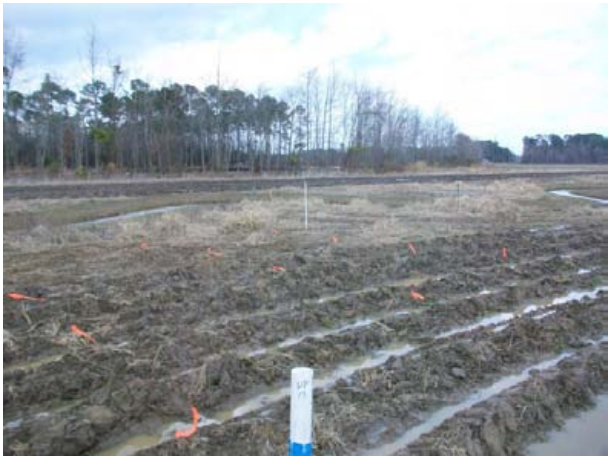
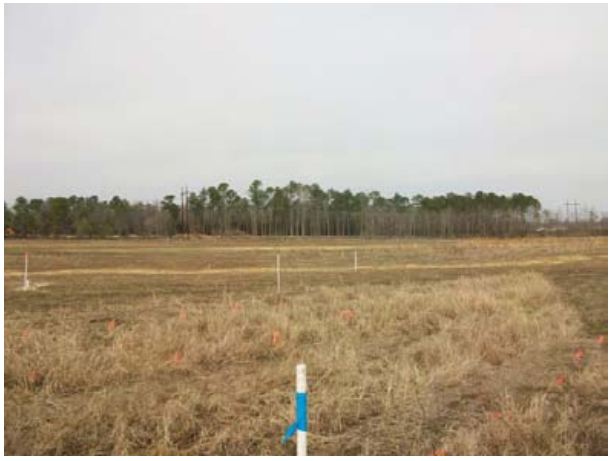
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Vegetation Photographs

	
Vegetation Plot 1 (02/20/2014)	Vegetation Plot 2 (02/20/2014)
	
Vegetation Plot 3 (02/20/2014)	Vegetation Plot 4 (02/20/2014)
	
Vegetation Plot 5 (02/20/2014)	Vegetation Plot 6 (02/20/2014)

	
Vegetation Plot 7 (02/20/2014)	Vegetation Plot 8 (02/20/2014)
	
Vegetation Plot 9 (02/20/2014)	Vegetation Plot 10 (02/20/2014)
	
Vegetation Plot 11 (02/20/2014)	Vegetation Plot 12 (02/20/2014)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	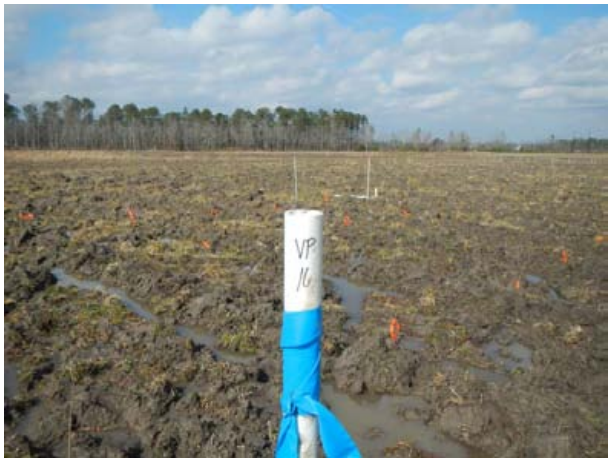
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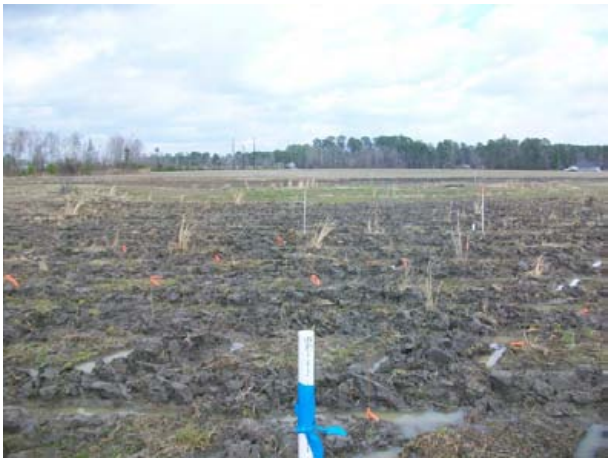	
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	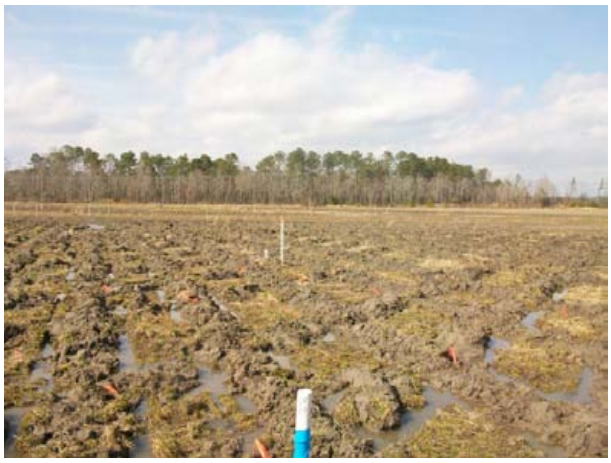
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	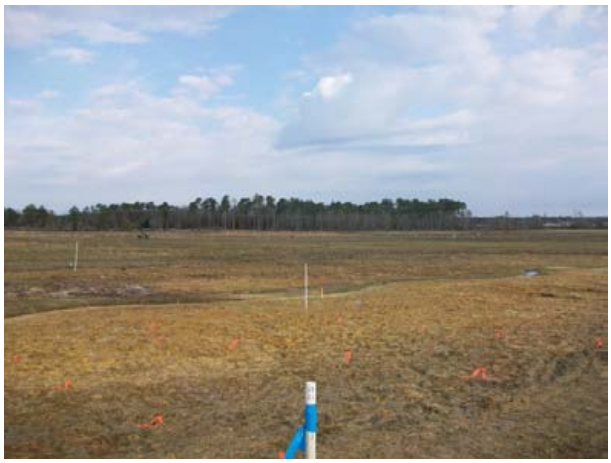
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	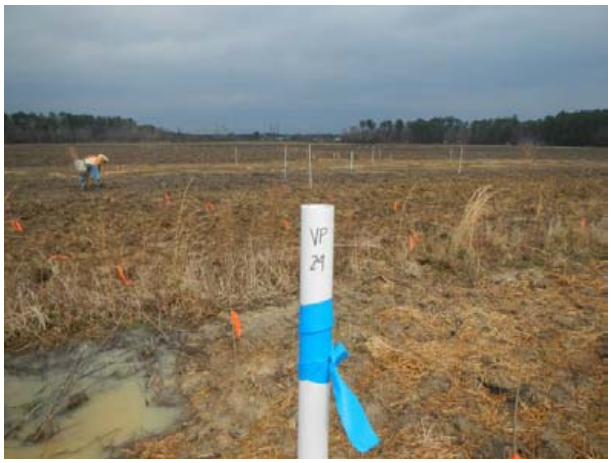
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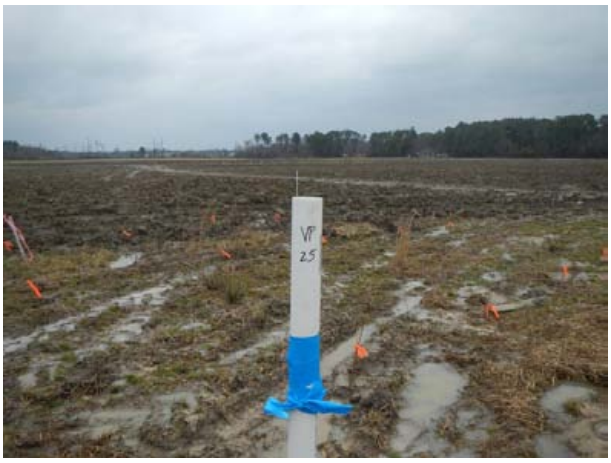	
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	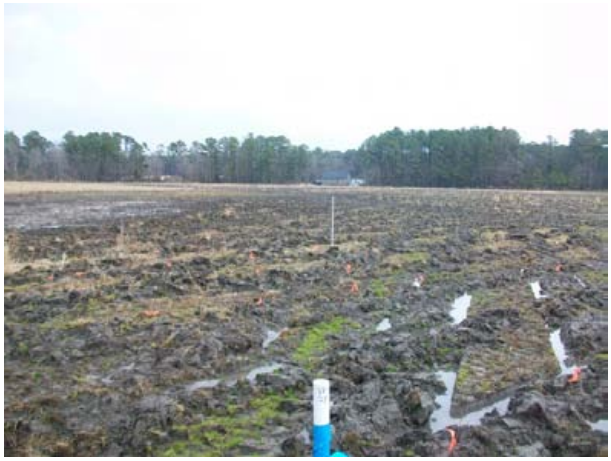
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	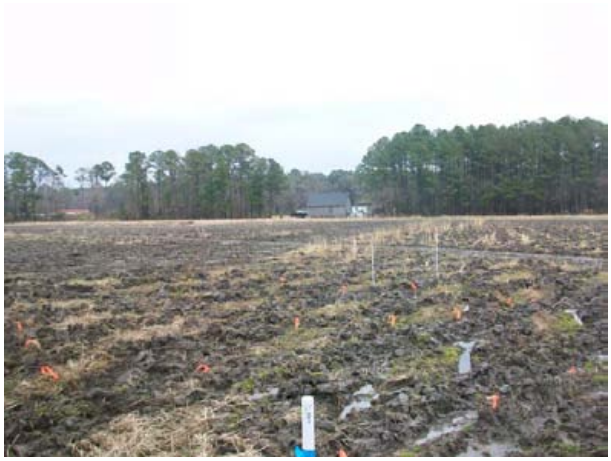
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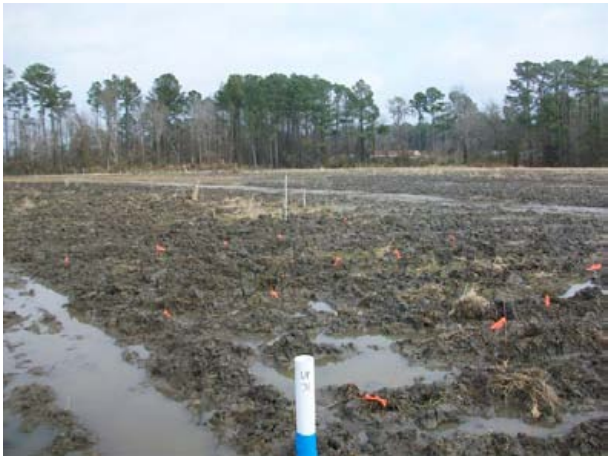	
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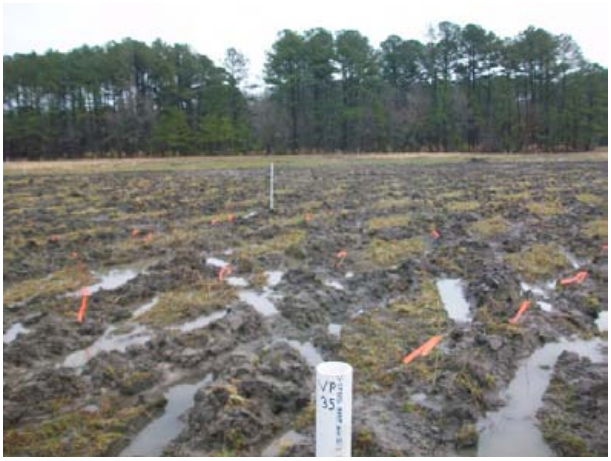
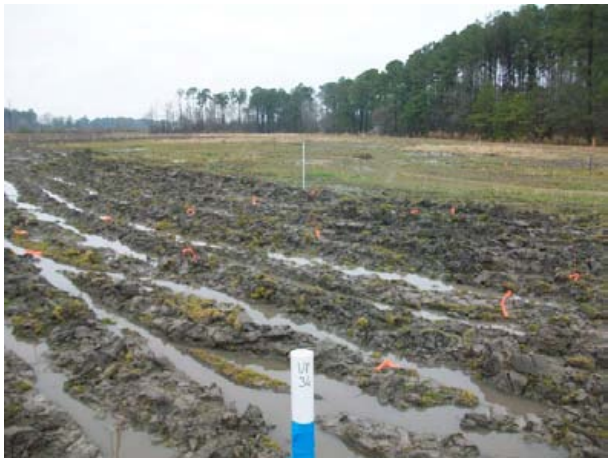
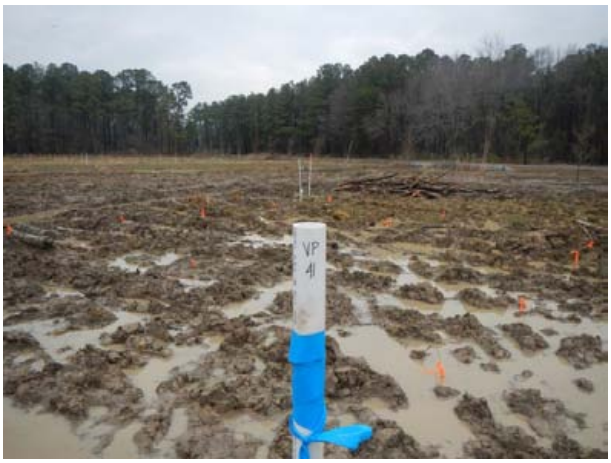
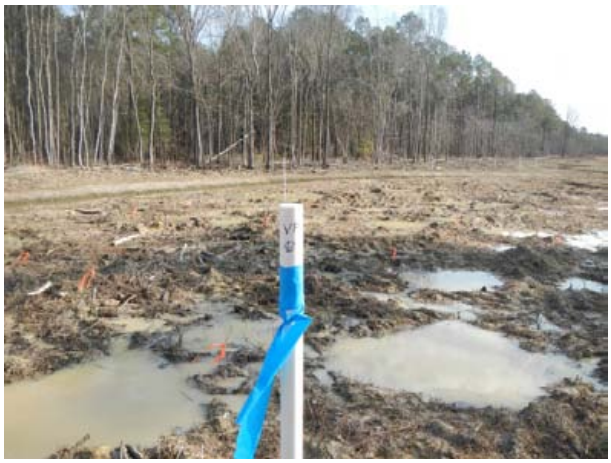
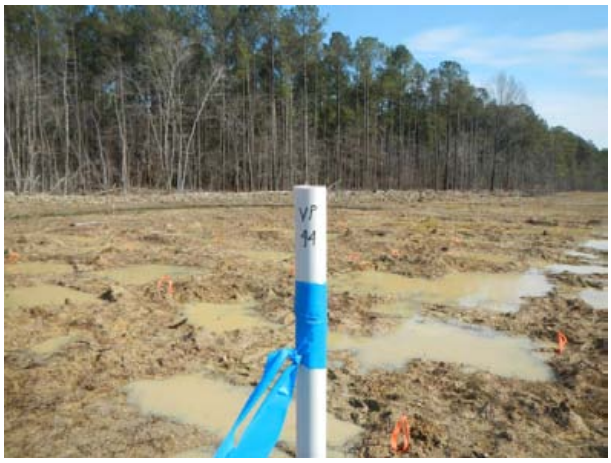
Vegetation Plot 33 (02/20/2014)	Vegetation Plot 34 (02/20/2014)
	
Vegetation Plot 35 (02/20/2014)	Vegetation Plot 36 (02/20/2014)

	
Vegetation Plot 37 (02/20/2014)	Vegetation Plot 38 (02/20/2014)
	
Vegetation Plot 39 (02/20/2014)	Vegetation Plot 40 (02/20/2014)
	
Vegetation Plot 41 (02/20/2014)	Vegetation Plot 42 (02/20/2014)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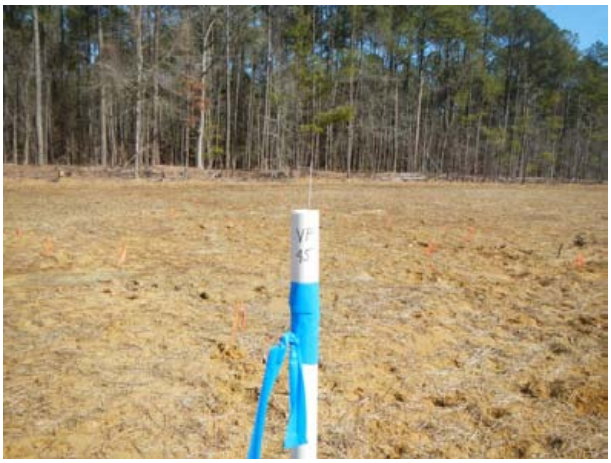	
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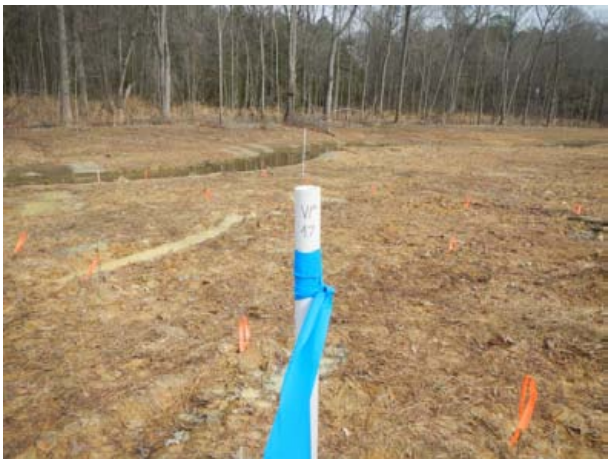
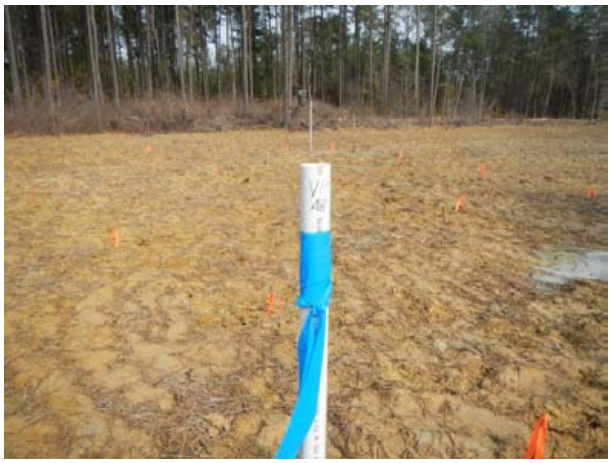
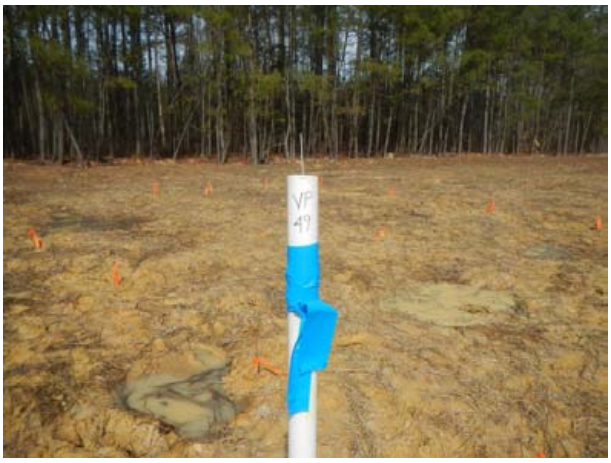
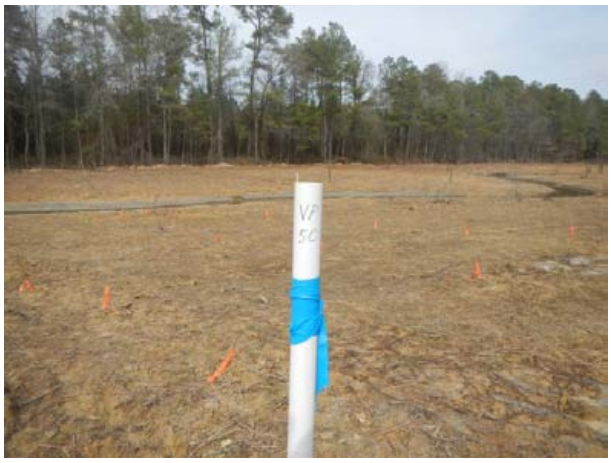
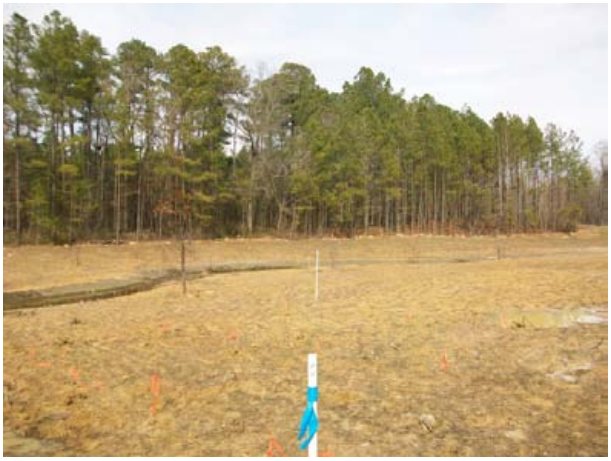
	
Vegetation Plot 47 (02/20/2014)	Vegetation Plot 48 (02/20/2014)



Vegetation Plot 49 (02/20/2014)



Vegetation Plot 50 (02/20/2014)

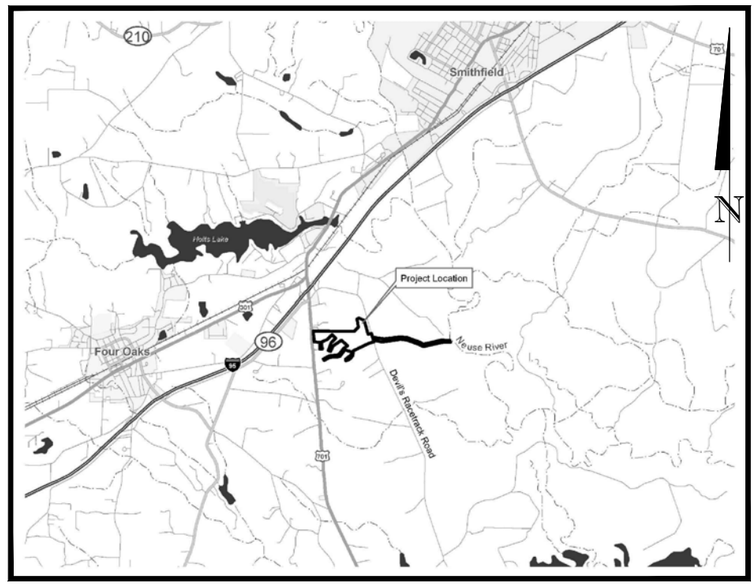


Vegetation Plot 51 (02/20/2014)

APPENDIX 4. As-Built Plan Sheets

Devil's Racetrack Mitigation Site

Johnston County, NC
for
North Carolina Ecosystem Enhancement Program



Vicinity Map
Not to Scale

Ecosystem Enhancement PROGRAM

BEFORE YOU DIG!
CALL 1-800-632-4949
N.C. ONE-CALL CENTER
IT'S THE LAW!

BASE LINE DRAWINGS
ISSUED MAY 2, 2014

Site Directions:

From I-95 exit 90 (HWY 701) take Devil's Racetrack Road east approximately 1.2 miles. The temporary construction entrances will be located on both sides of the road.

Sheet Index

Title Sheet	0.1
Legend	0.2
Stream Overview	1.0
Base Line Plans	1.1-1.18

Project Directory

Surveying:
Turner Land Surveying, PLLC
3201 Glenridge Drive
Raleigh, NC 27604
David S. Turner, PLS
919-875-1378

Stewart Proctor Engineering and Surveying, PLLC
322 Chapanoke Road, Suite 100
Raleigh, NC 27603
Herbert Proctor Jr., PLS
919-799-1855

Engineering:
Wildlands Engineering, Inc
License No. F-0831
5605 Chapel Hill Road, Suite 122
Raleigh, NC 27607
Jeff Keaton, PE
919-851-9986

Owner:
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652
Jeff Jurek
919-715-1157

DENR Contract No. 003989

EEP ID No. 95021

Disturbed Area = 107 Acres

WILDLANDS ENGINEERING
1430 S. Mint Street, Ste 104
Charlotte, NC 28203
Tel: 704.332.7754
Fax: 704.332.3306
Firm License No. F-0831

NORTH CAROLINA PROFESSIONAL SEAL 037027 ENGINEER JEFFREY KEATON 5-19-14

Devil's Racetrack Mitigation Site
Guilford, North Carolina
Title Sheet

Revisions:

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	FCK
Checked By:	KG

Sheet 0.1

Mar 19, 2014

O:\Active Projects\005-02129 Devils Racetrack\Monitoring\Baseline Monitoring\Plans\02129-MON-Cover.dwg

May 19, 2014

PL — PL — Existing Property Line/ Right-of-Way

Existing Road Edge Of Pavement

Existing Thalweg

Existing Fence

100 — Existing Major Contour

Existing Minor Contour

100 — Existing NCDOT 2 Foot Contour

OHE — Existing Overhead Electric

SS — SS — Existing Sanitary Sewer

Existing Dirt Path

Existing Wood Power Pole

Existing Metal Power Pole

SS — Existing Sanitary Sewer Manhole

Existing Utility Easement

Existing Pipe Culvert

Existing Treeline

Existing Tree

FEMA FP — FEMA FP — 100 Year Floodplain

CE — CE — Conservation Easement

10+00 — Design Thalweg Alignment

Design Bankfull

100 — Design Contour

Design Pipe Culvert

Design Forestry Road

Design Farm Path

Design Outlet Protection

Design Log & Roll Shallow

Design Log & Roll Shallow With Brush

Design Brush Shallow

Design Brush Shallow With Log Toe

Design Rock & Roll Riffle

Design Chunky Riffle

Design Log Vane

Design Brush Toe

Design Angled Log Drop

Design Brush Mattress

Design Transplanted Sod Mats

Design Brush Drop

Design Double Log Drop

Design Cover Log

Design Log With Root Wad

Design Channel Fill

Design Wetland Area

Design Rootwad

Design Construction Entrance

Design Straw Wattle

Design Temporary Stream Crossing

Design Pump Around

Design Haul Road

Design Stockpile/ Staging Area

LOD — Limits Of Disturbance

Wetland Planting Zone

VP # — VEGETATION PLOT

XS # — CROSS SECTION

PP # — PHOTO POINT

CG — CREST GAGE

GW — GROUND WATER GAGE

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Charlotte, NC 28203
Ph: 704.332.7754
Fax: 704.332.3306
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NORTH CAROLINA PROFESSIONAL SEAL 030027 ENGINEER KATHERINE E. KENTON 5-19-14

Devil's Racetrack Mitigation Site
Guilford, North Carolina

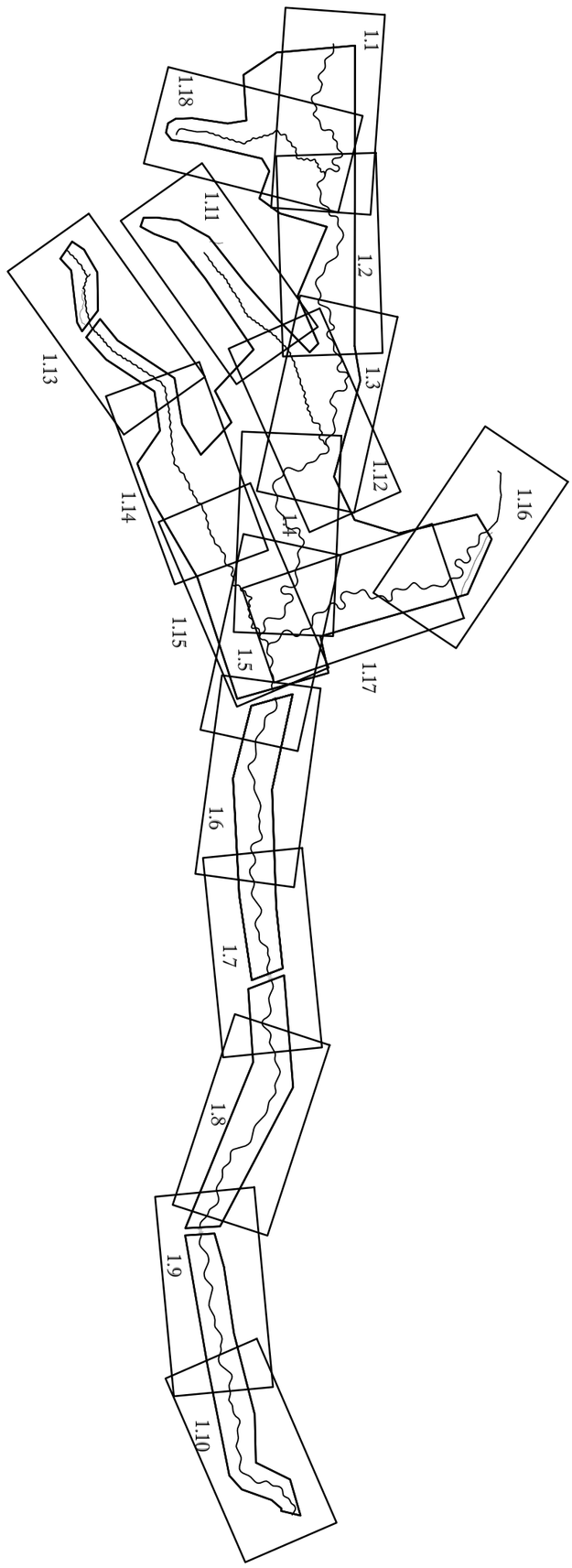
Legend

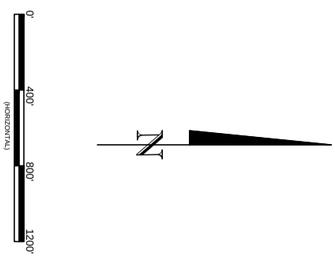
Revisions:

Date: May 5, 2014
Job Number: 005-02129
Project Engineer: JK
Drawn By: FCK
Checked By: KG

Sheet 0.2

O:\Active Projects\005-02129 Devils Racetrack\Monitoring\Baseline Monitoring\Plans\02129-MON-Legend.dwg





Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

1.0

Sheet

Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Monitoring Overview
Base Line Plans

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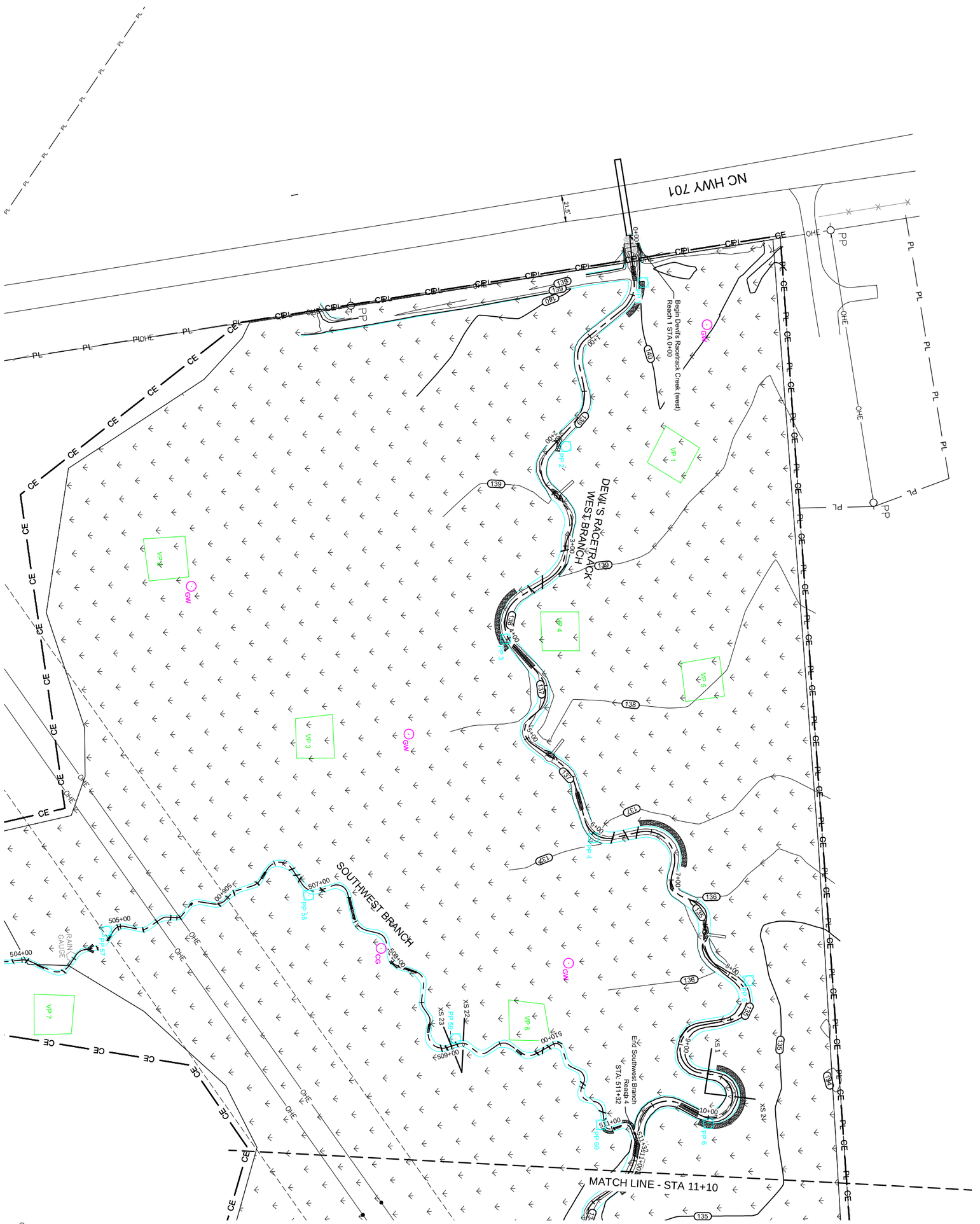

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

1.1
Sheet

Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek West
Base Line Plans

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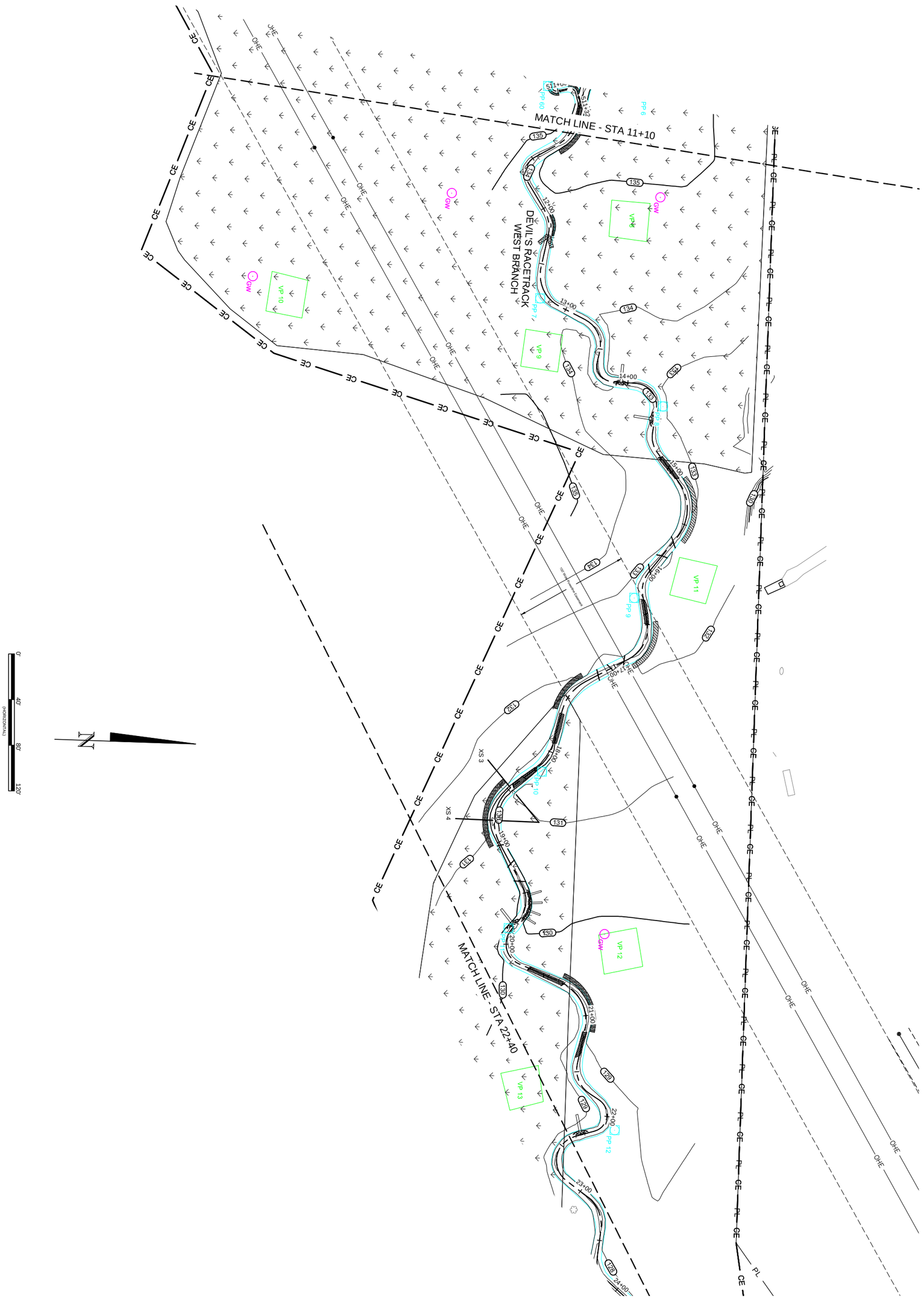

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

1.2

Sheet

Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek West
Base Line Plans

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Fax: 704.332.3306
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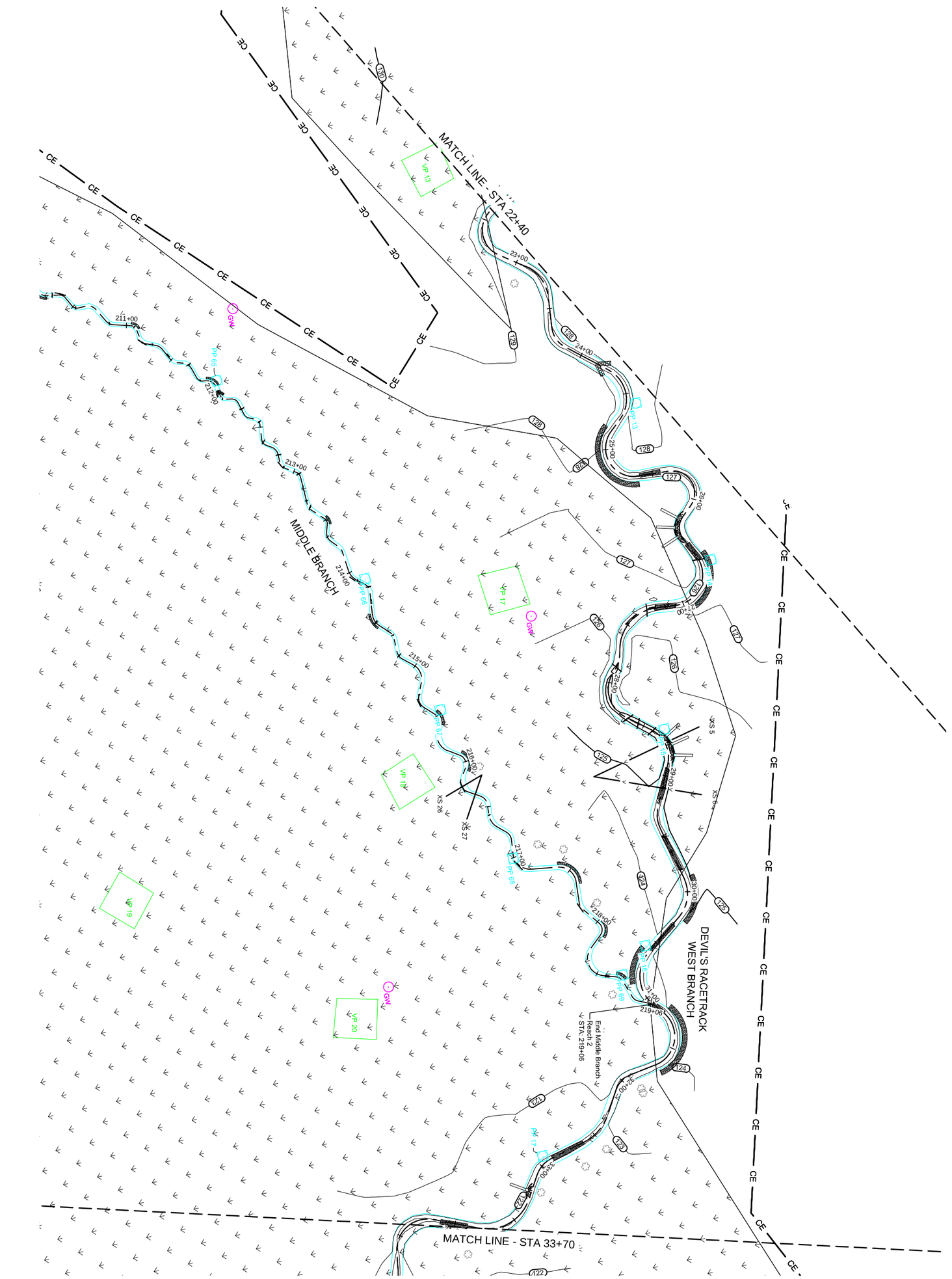

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

Revisions:

1.3

Sheet

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek West
Base Line Plans

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Fax: 704.332.3306
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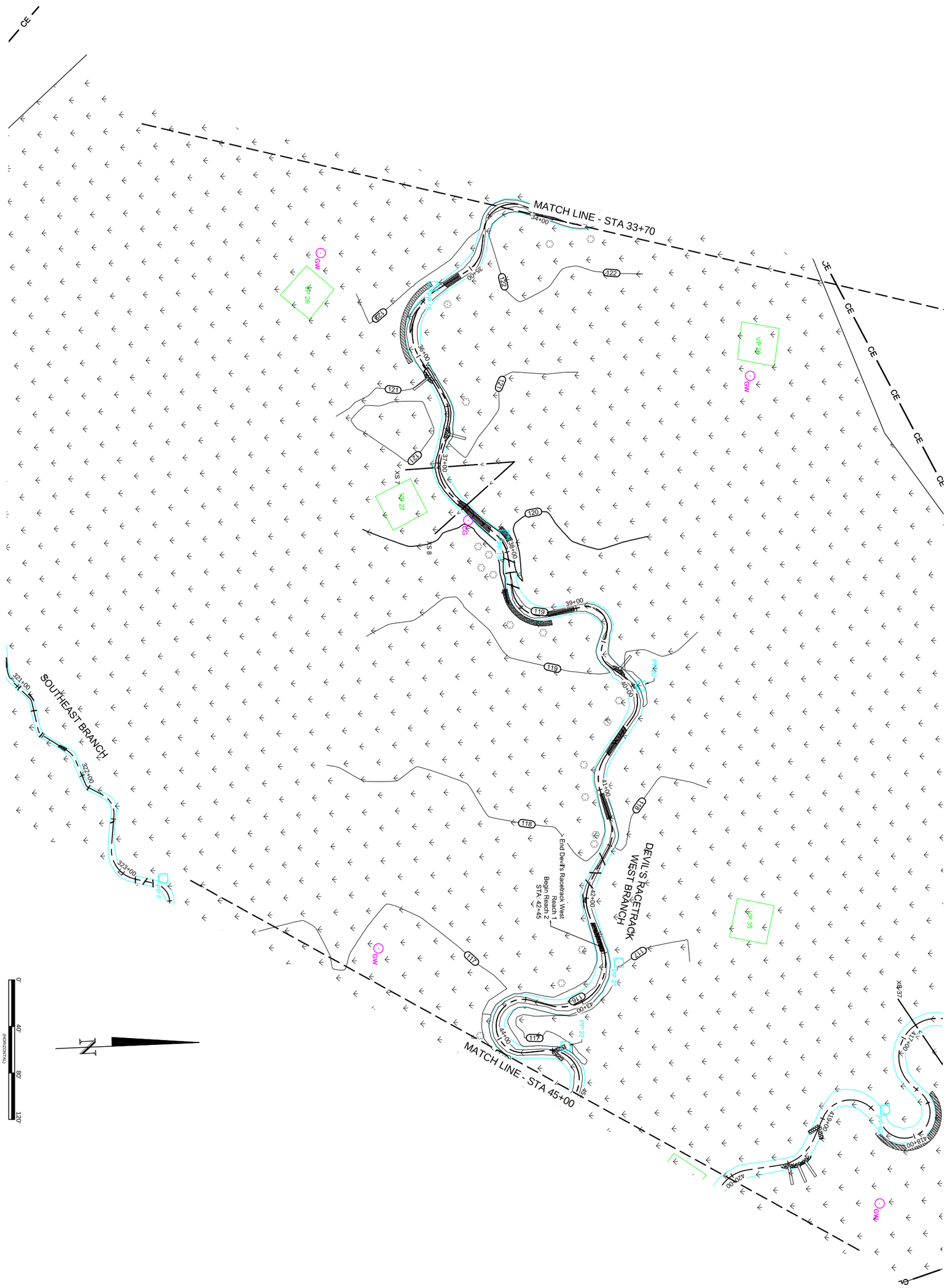

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

1.4
Sheet

Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek West
Base Line Plans

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Fax: 704.332.3306
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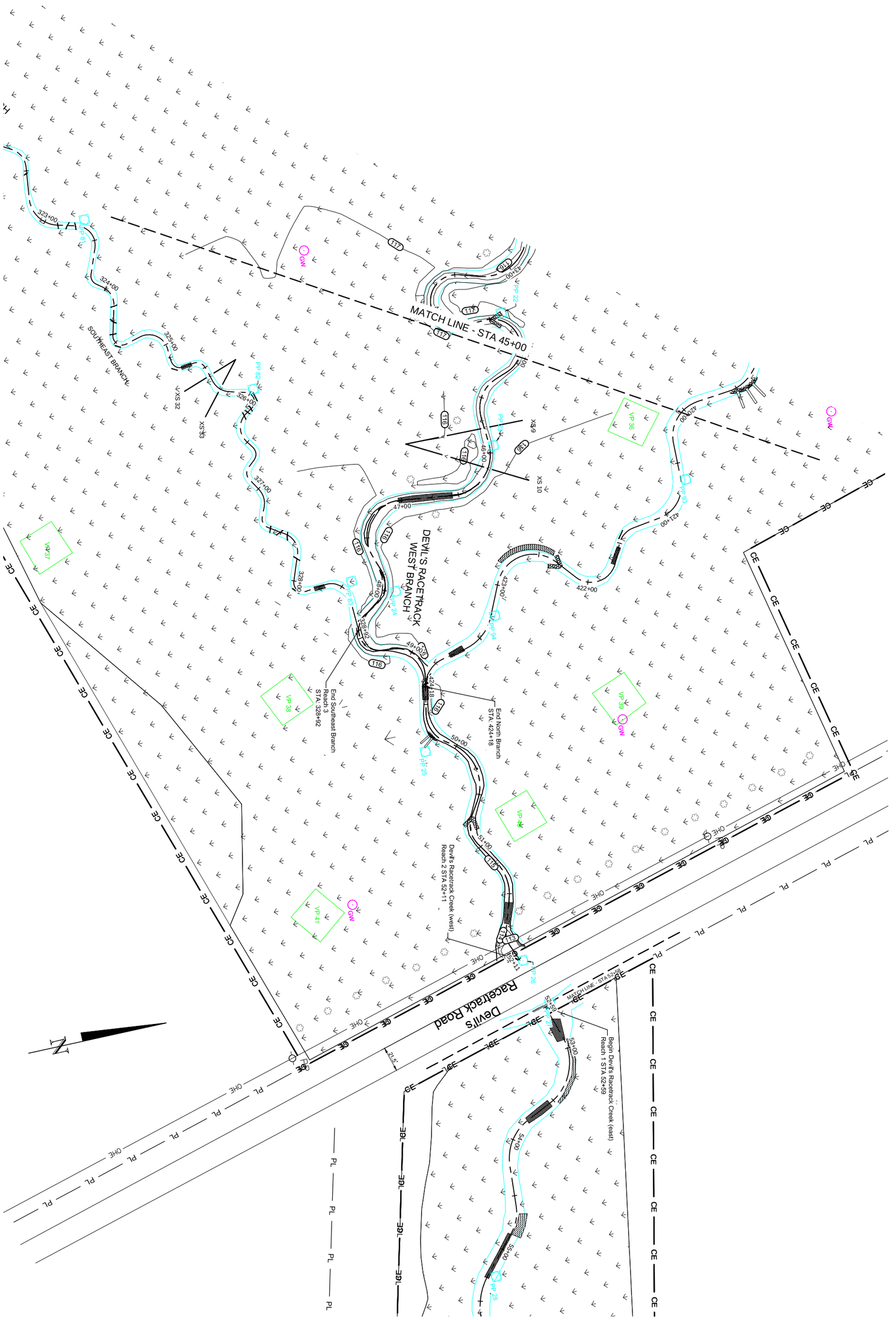

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

Revisions:

1.5

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Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek West
Base Line Plans

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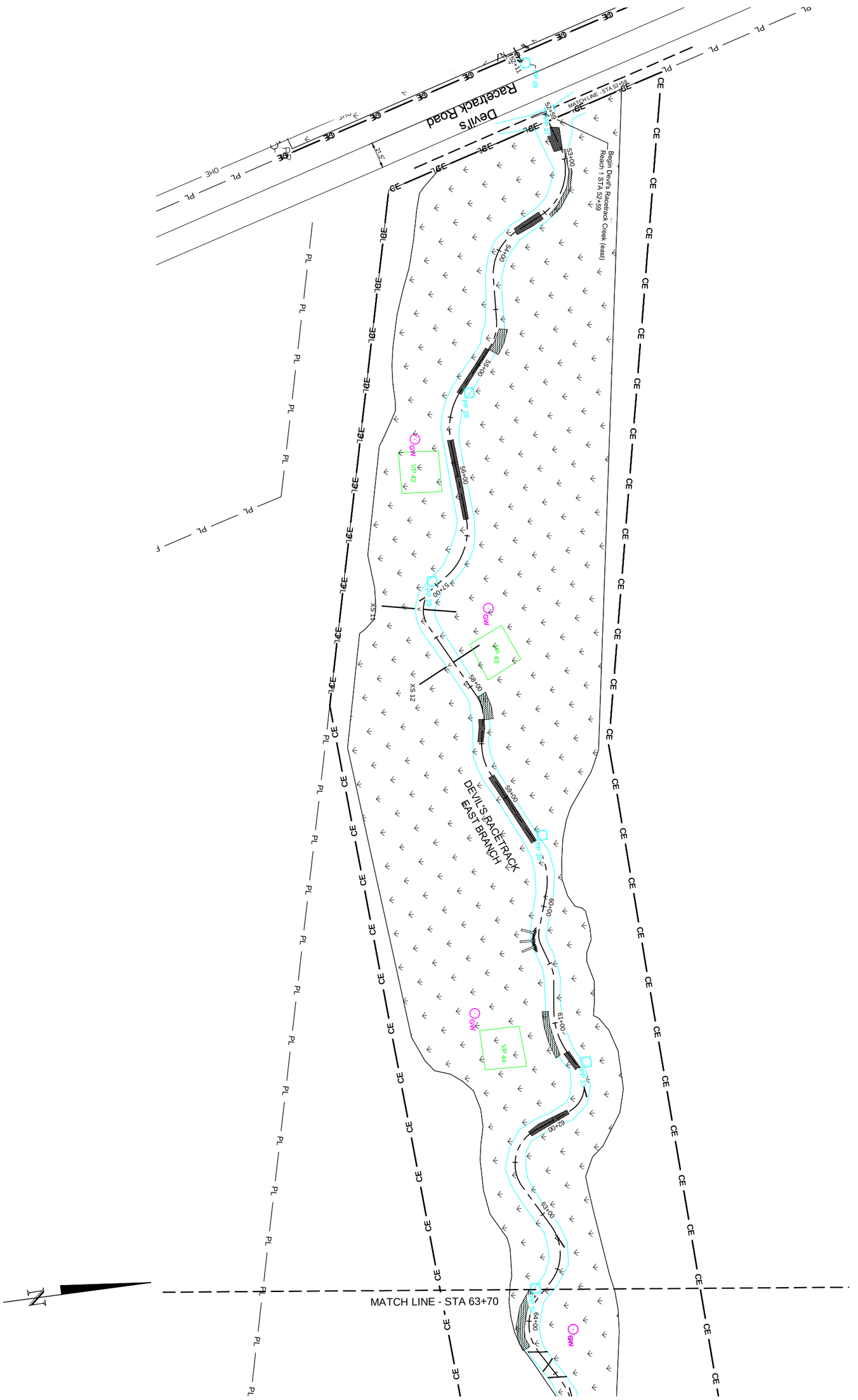
Fax: 704.332.3306
Firm License No. F-0831



Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

Revisions:

1.6

Sheet

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek East
Base Line Plans

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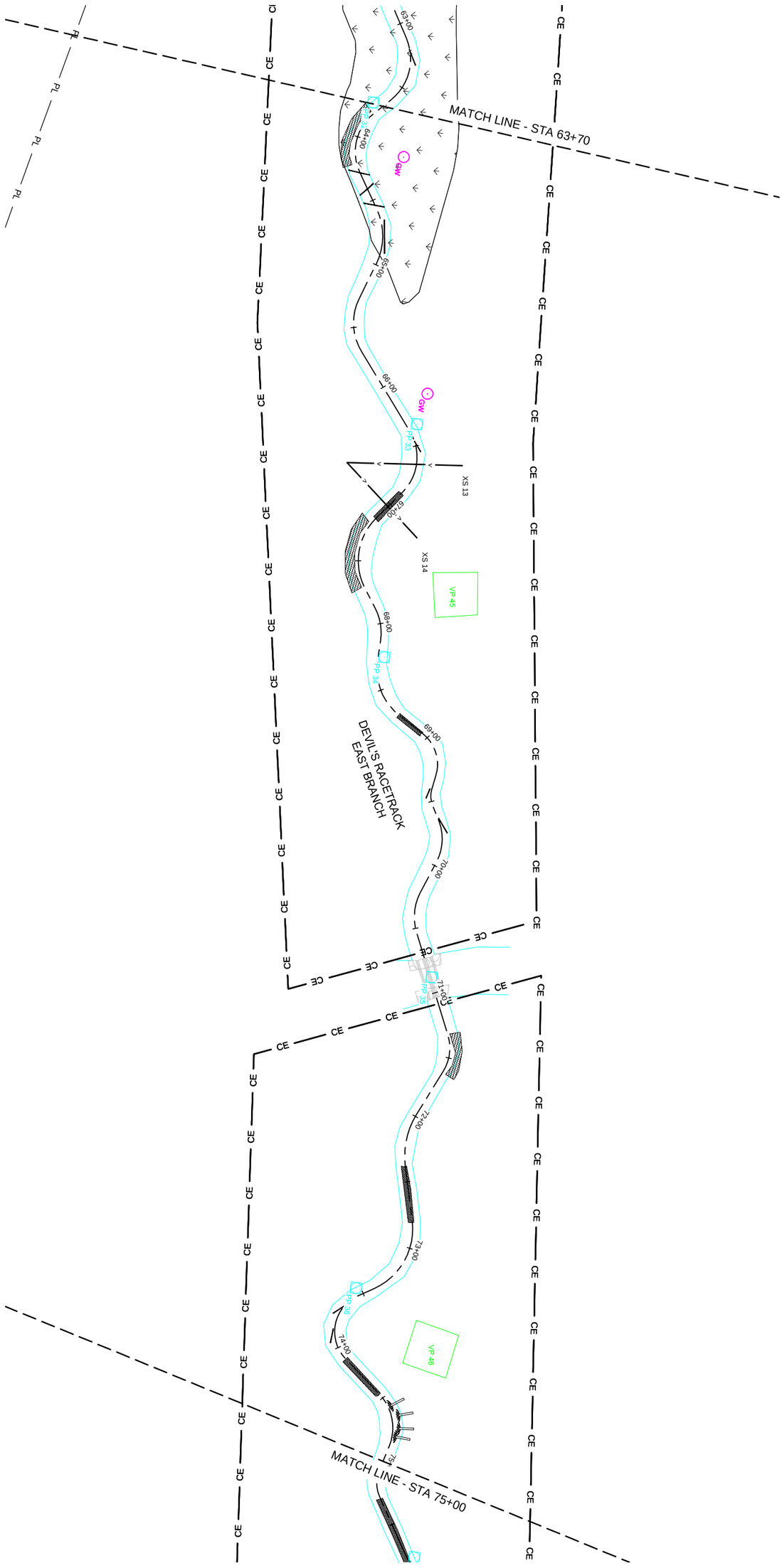
Fax: 704.332.3306
Firm License No. F-0831



Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

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Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek East
Base Line Plans

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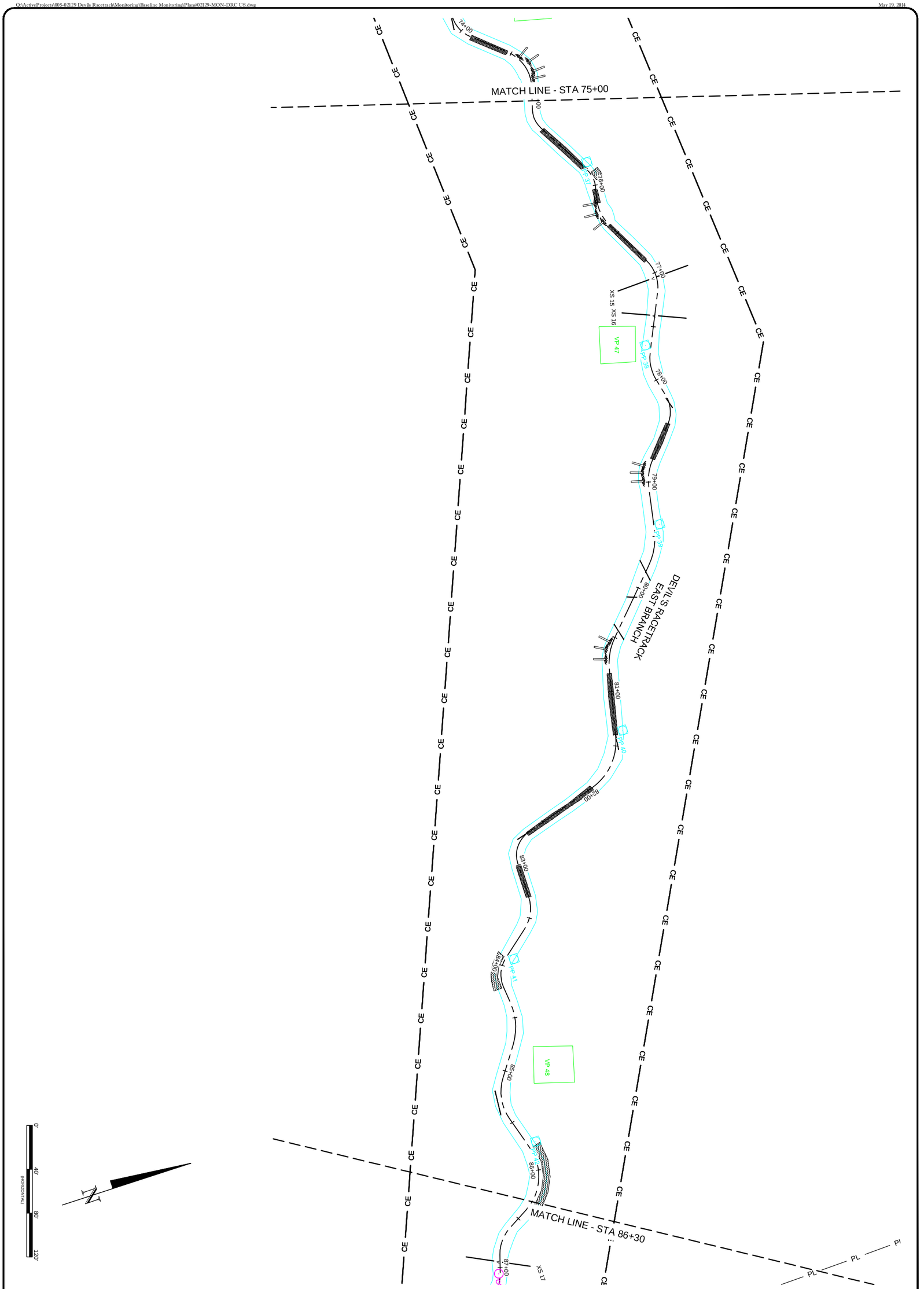

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

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Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek East
Base Line Plans

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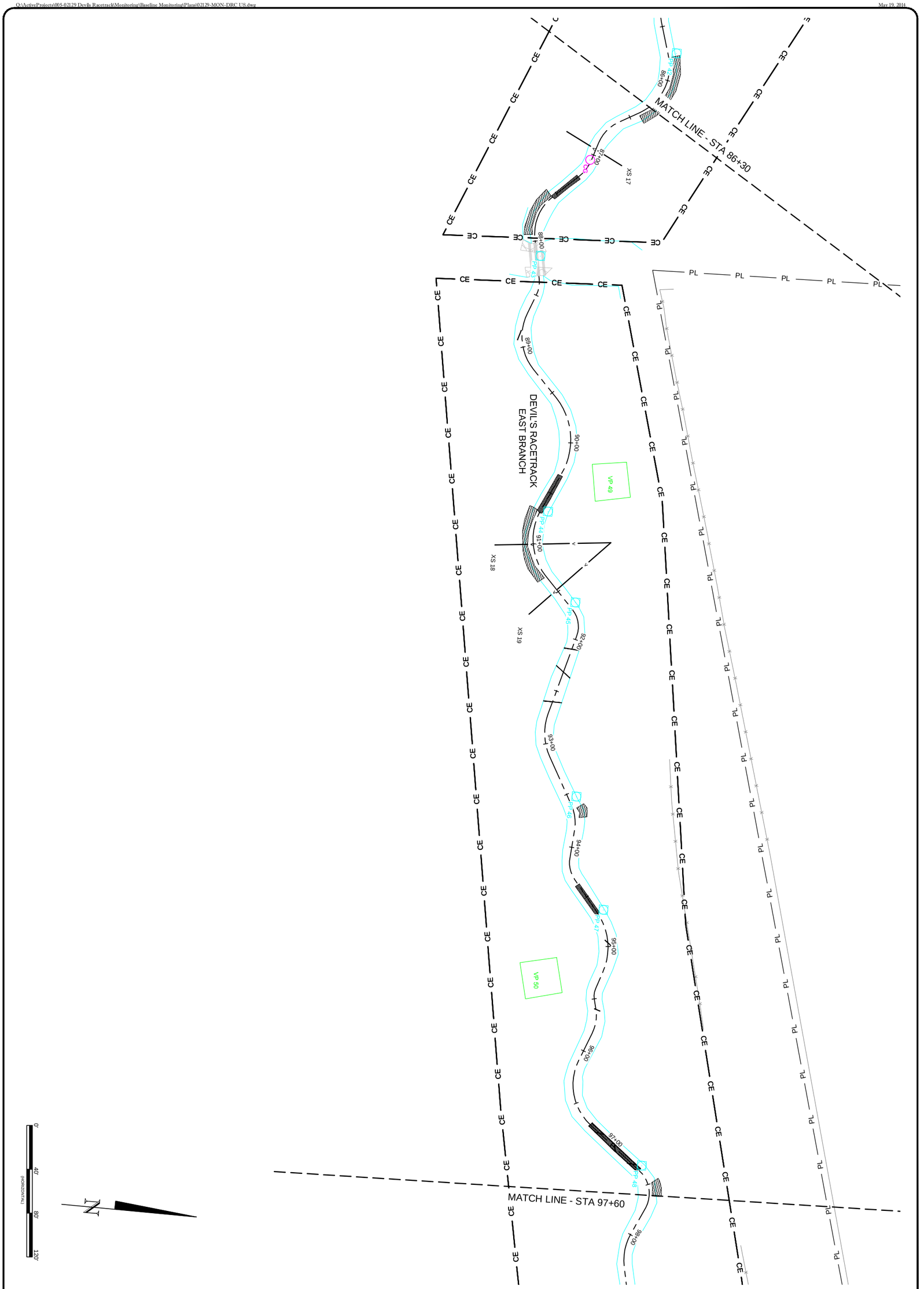

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek East
Base Line Plans

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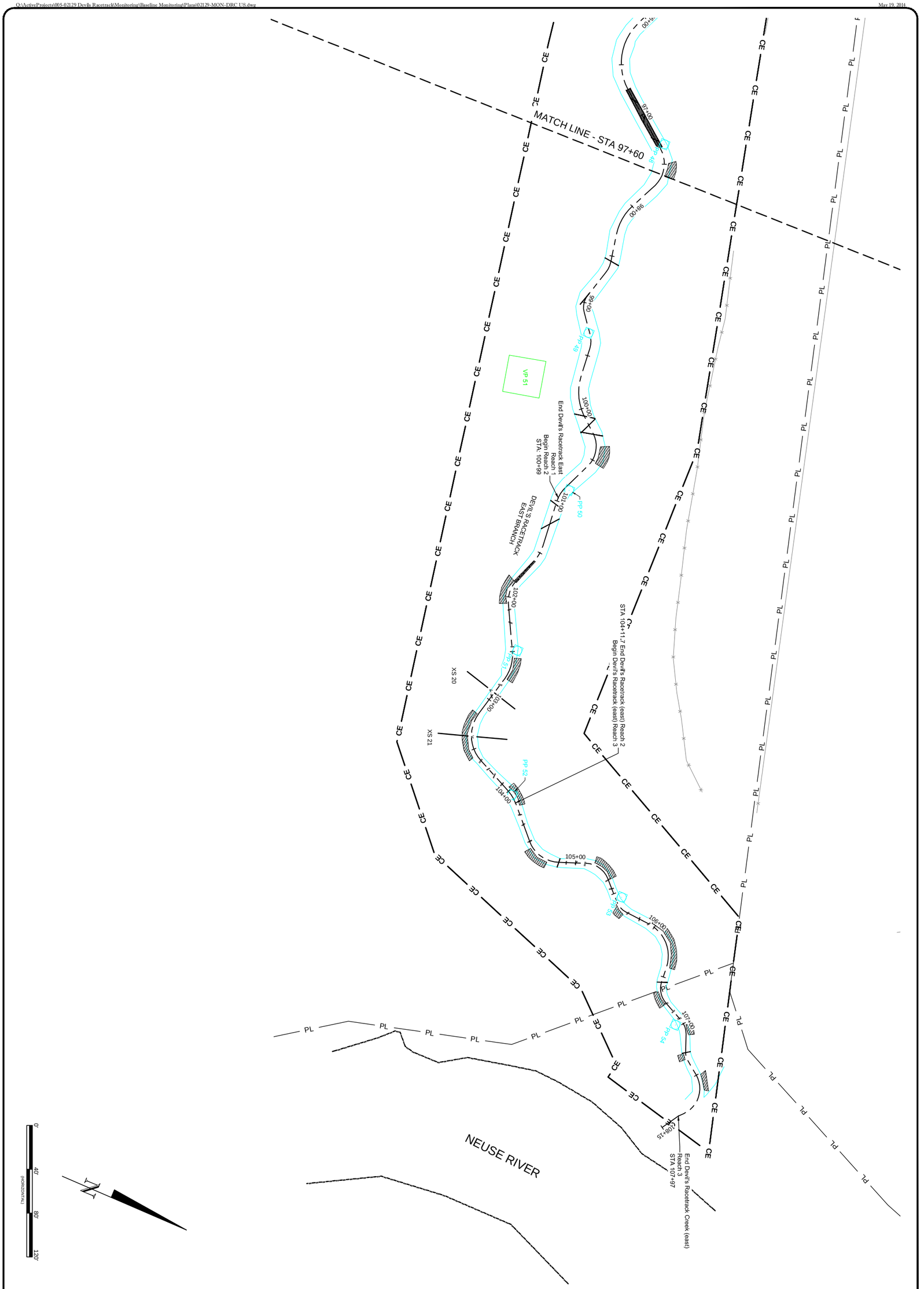

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

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Devil's Racetrack Mitigation Site
Guilford, North Carolina

Devil's Racetrack Creek East
Base Line Plans

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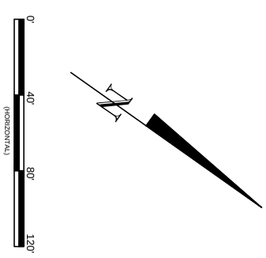

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Devil's Racetrack Mitigation Site
Guilford, North Carolina

Middle Branch
Base Line Plans

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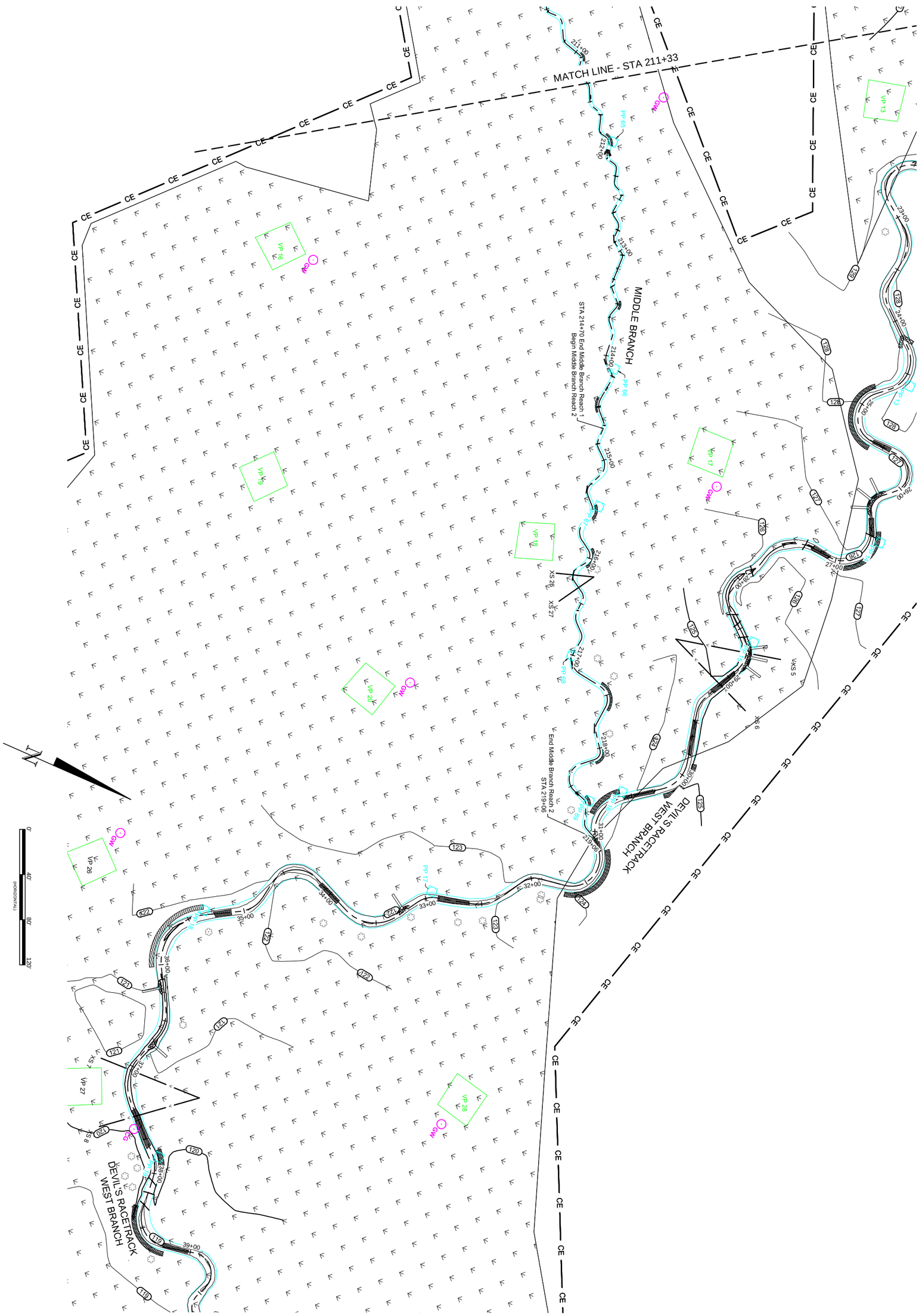

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Devil's Racetrack Mitigation Site
Guilford, North Carolina

Middle Branch
Base Line Plans

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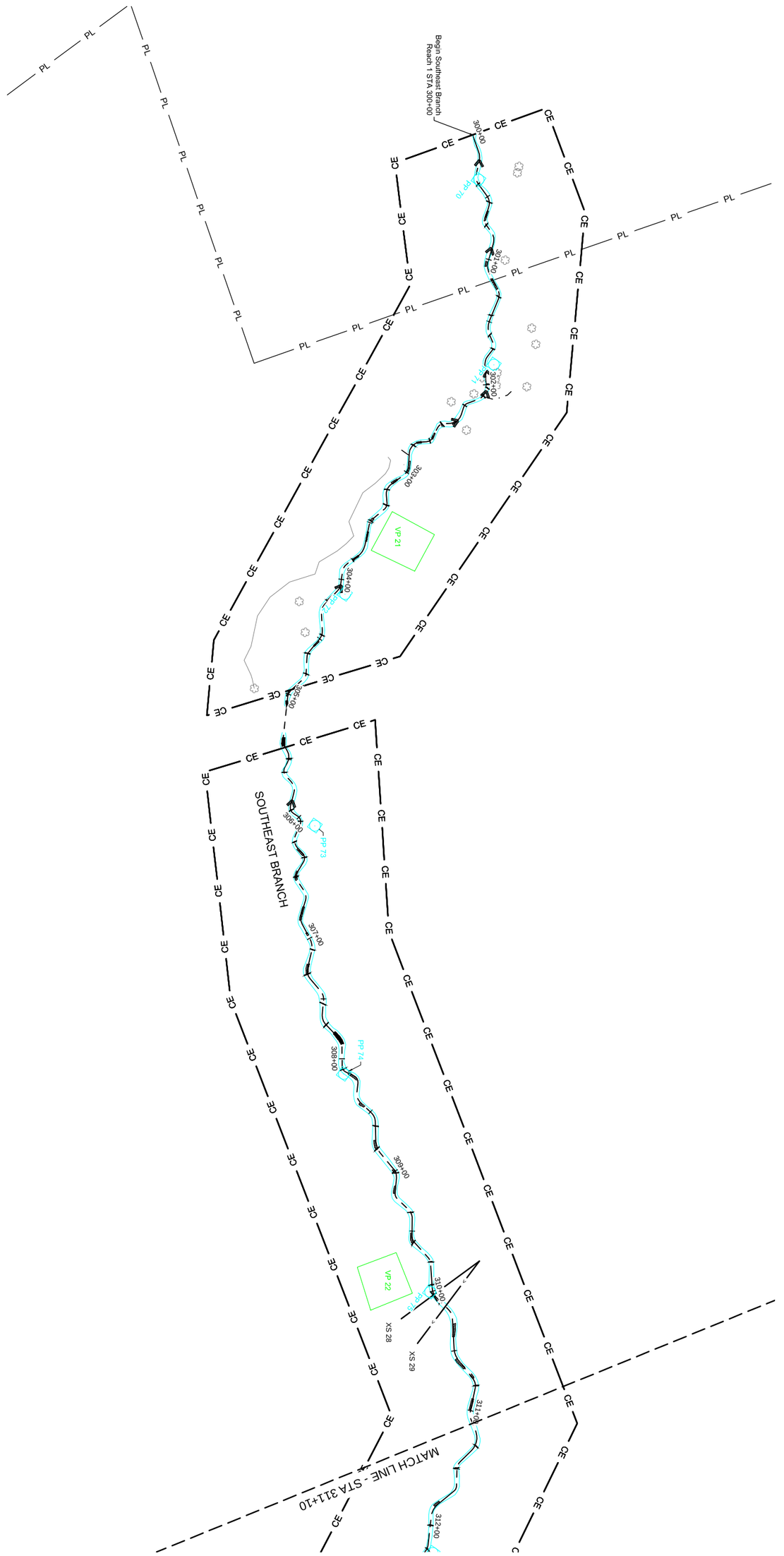

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Revisions:

Devil's Racetrack Mitigation Site
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Southeast Branch
Base Line Plans

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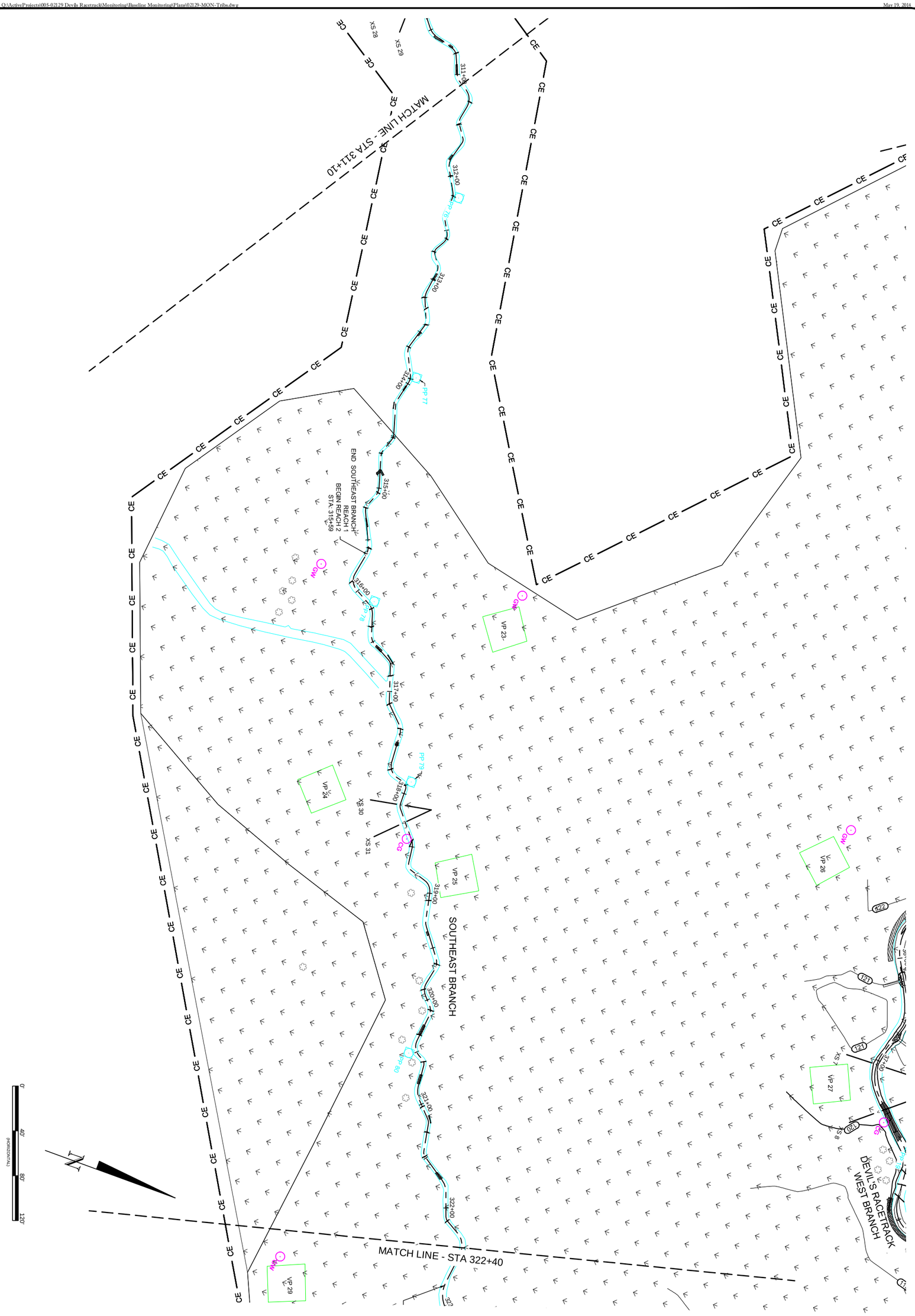

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Drawn By:	JCK
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Southeast Branch
Base Line Plans

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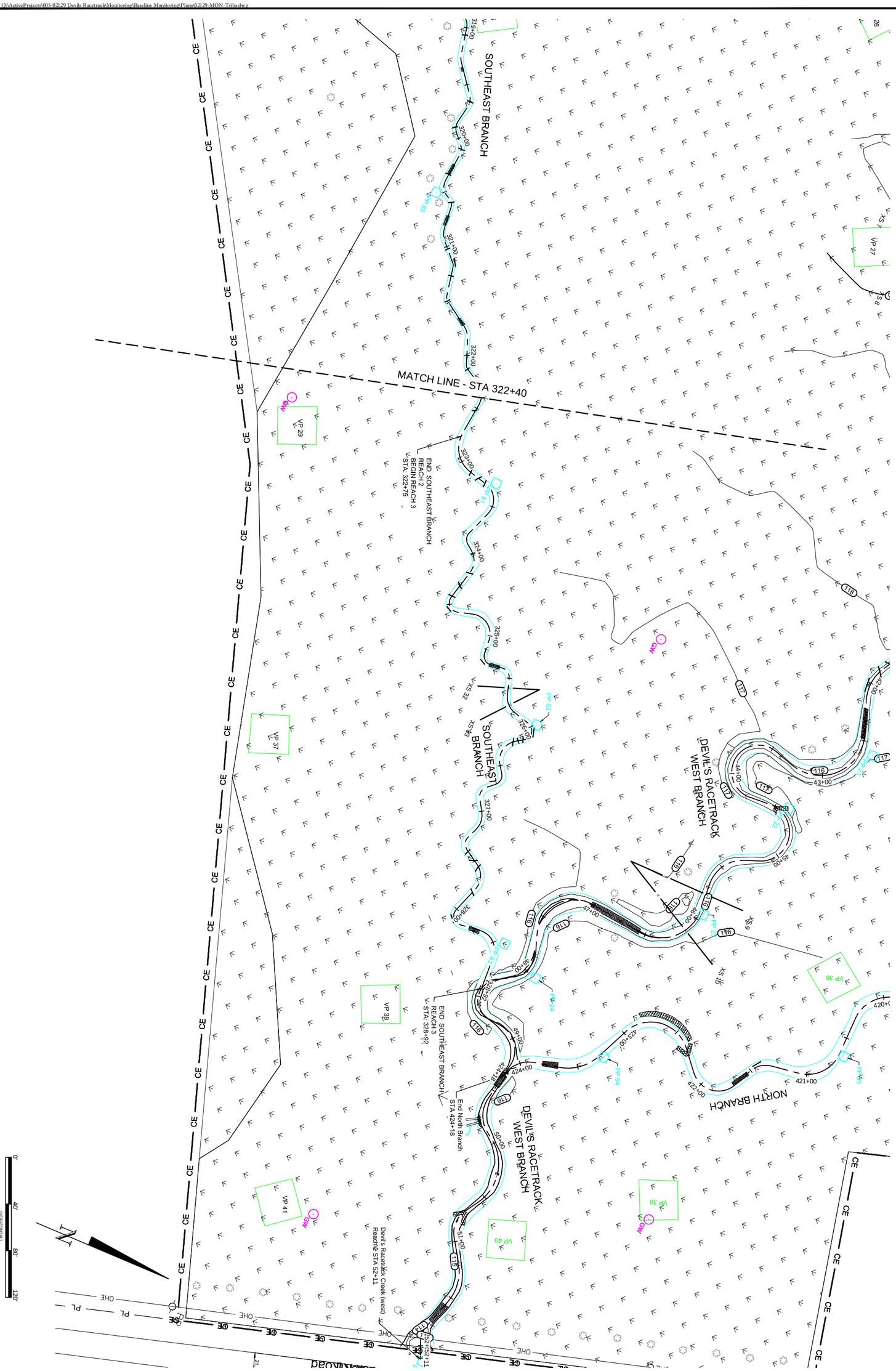

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Revisions:

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Southeast Branch
Base Line Plans

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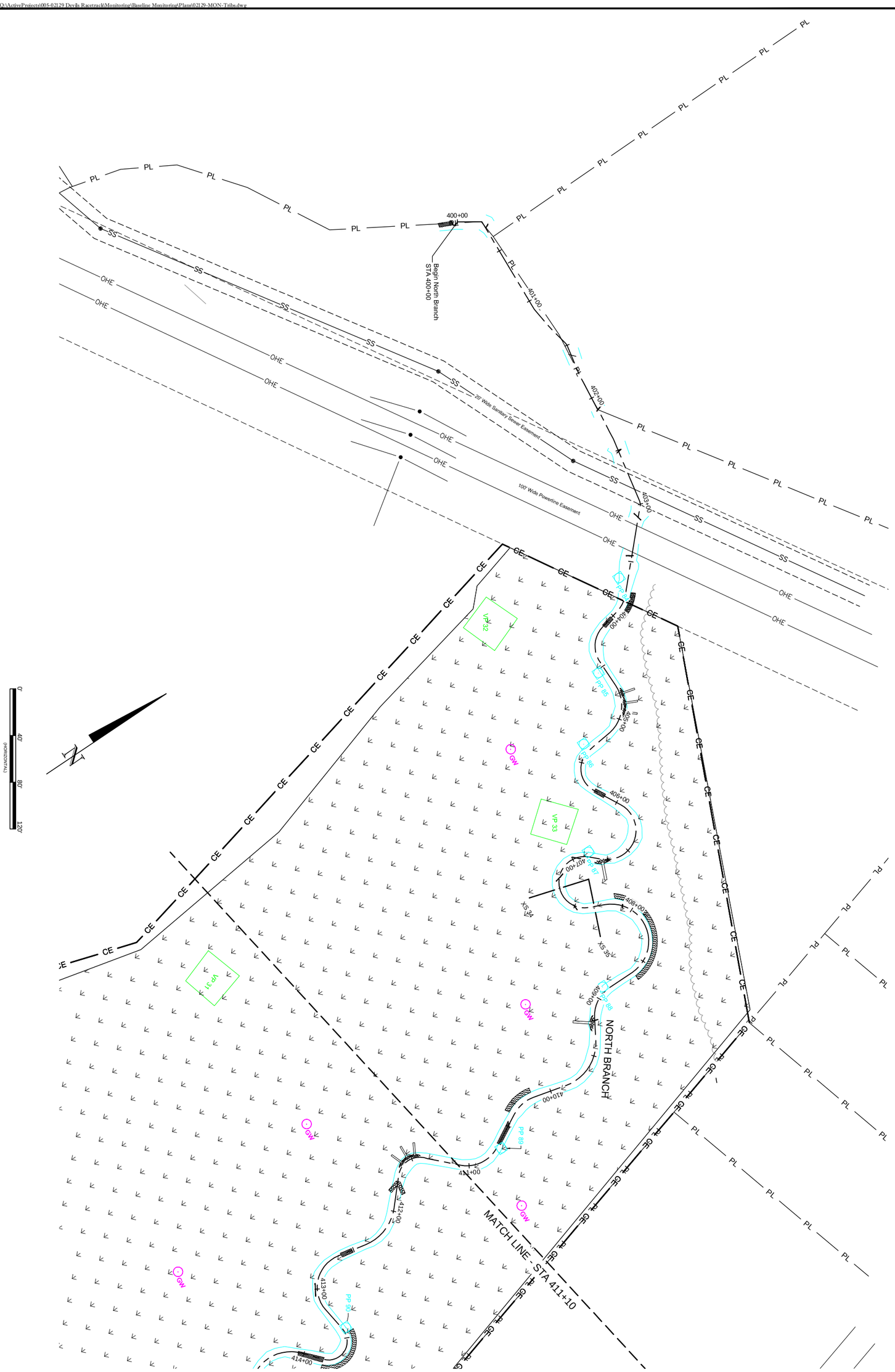

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
Checked By:	KG

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Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

North Branch
Base Line Plans

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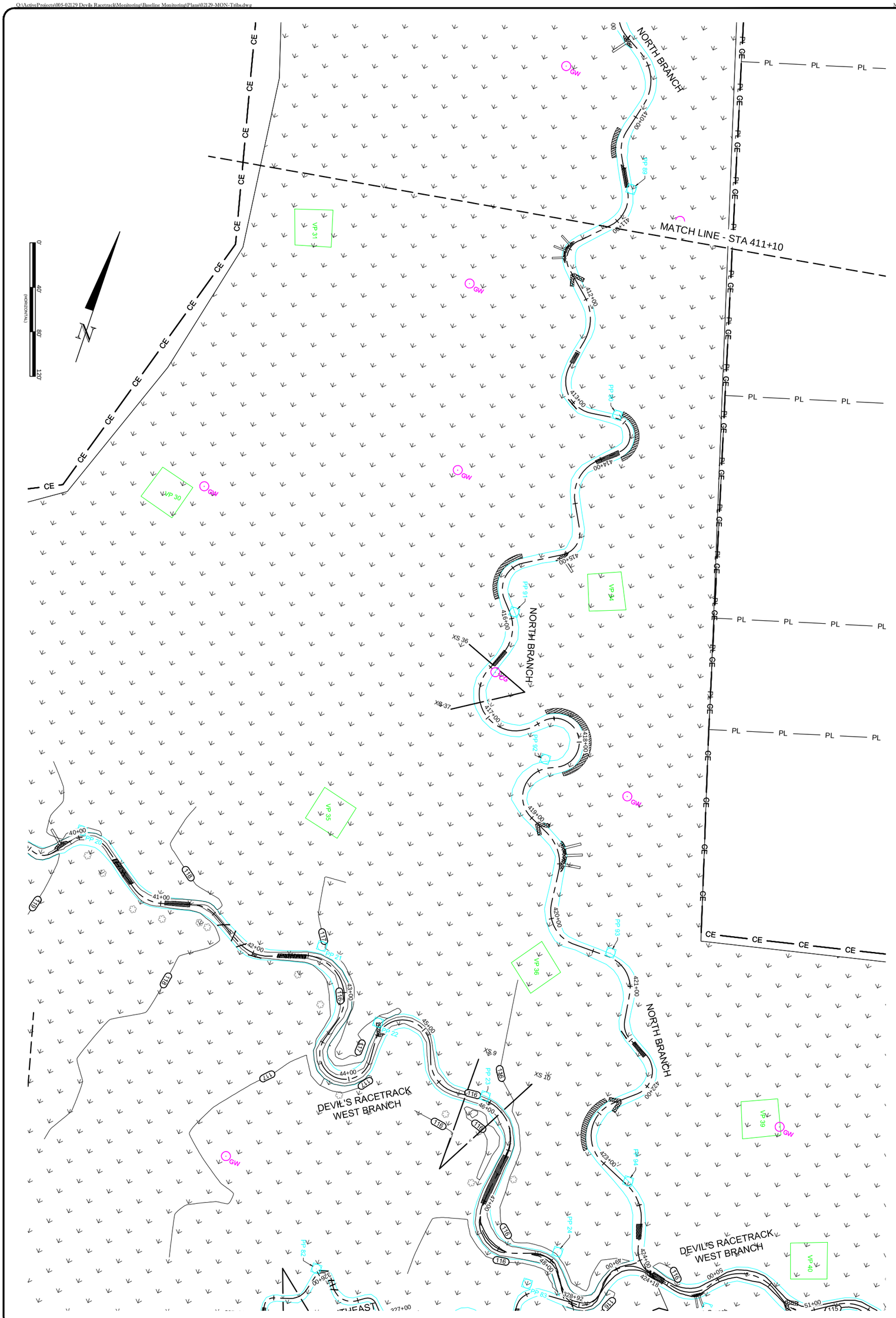

Date:	May 5, 2014
Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Revisions:

Devil's Racetrack Mitigation Site
Guilford, North Carolina

North Branch
Base Line Plans

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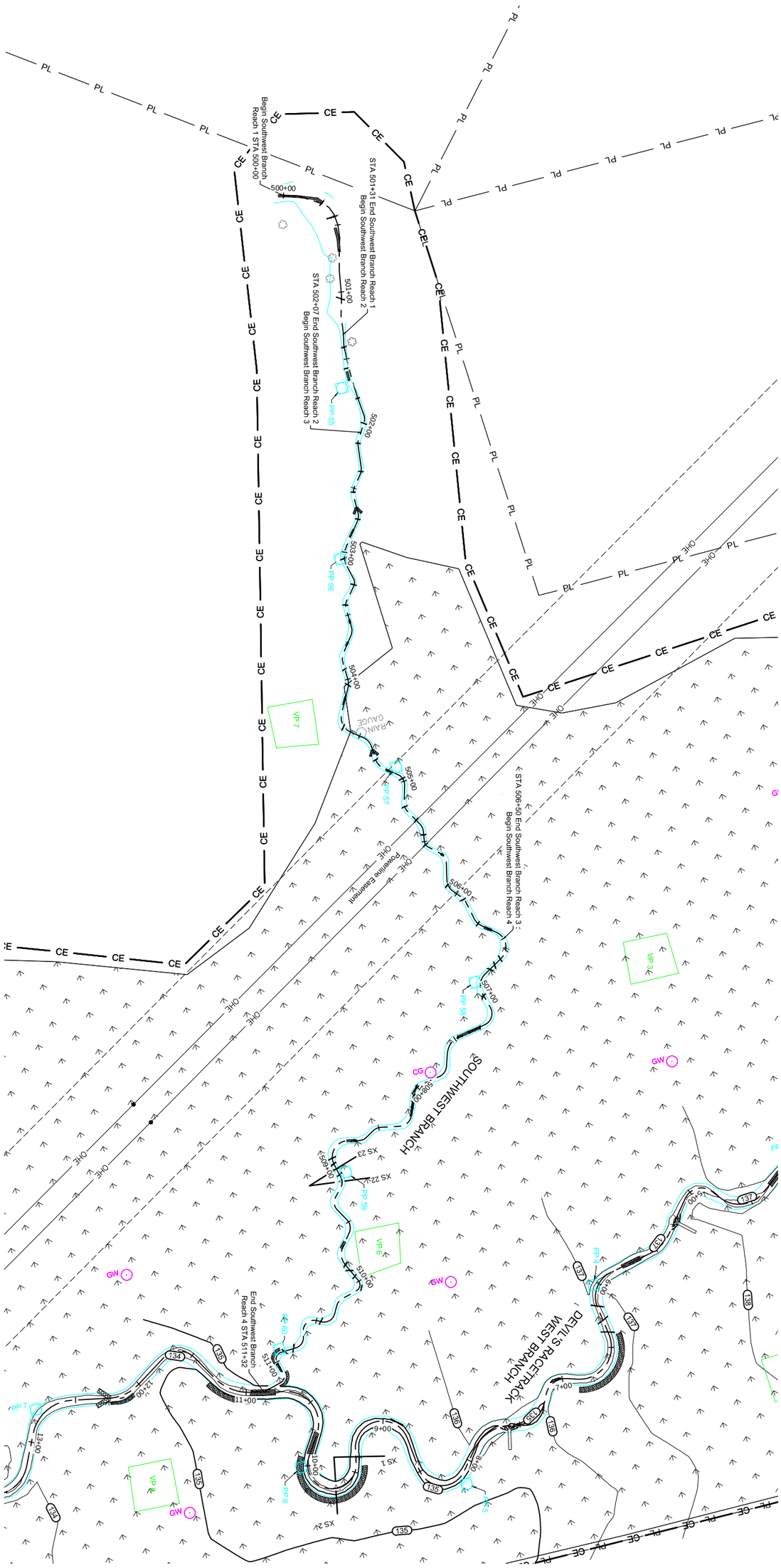

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Job Number:	005-02129
Project Engineer:	JK
Drawn By:	JCK
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Revisions:

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