# MY0 MONITORING REPORT

## Wits End Stream and Wetland Mitigation Site

Union County, North Carolina
Yadkin River Basin
Cataloging Unit 03040105

DMS Project No. 100164
Full Delivery Contract No. 7968
DMS RFQ No. 16-032819-YD05 (Date of Issue: May 9, 2019)
USACE Action ID No. SAW-2020-00455
DWR Project No. 20200369

Data Collection: February 2023
Submission: April 2023

**Prepared for**:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
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**Response to DMS Comments**
DMS Project ID No. 100164
Full Delivery Contract No. 7968
USACE Action ID No. SAW-2020-00455
DWR Project No. 2020-0369
IFB 16-032819, RFQ 16-032819-YD05

Comments Received (Black Text) & Responses (Blue Text)

**General**

1. The assets requested in Table 1 are different than the approved Mitigation Plan. The total stream assets were reduced by 227.162 SMUs and the wetlands reduced by .053 WMUs. The majority of changes are due to a change in the alignment of UT3 during construction. The alignment change resulted in a change in approach level, reduction in wetland reestablishment, and changes to the buffer and benthic credit calculations. ATV paths and forded crossings were also not constructed and removed from conservation easement. Credit in these sections is now being requested. These changes will require a Mitigation Plan Addendum be submitted to the IRT for review and approval. Please provide this addendum with the revised MY0 along with comment responses behind the title page.
   Response: A Mitigation Plan Addendum will be submitted along with MY0 Report for IRT review.

**Title Page:**

1. Please change RFP to RFQ on the title page and second page and add (Date of Issue: May 9, 2019) after the RFQ number.
   Response: "RFP" was revised to "RFQ" and the date of issue was added.

2. Table of Contents: Please add section 2.2 Site Planting Effort to Table of Contents.
   Response: The table of contents was updated.

3. Table of Contents: Table 6C. Mitigation Plan Planting Plan and Asbuilt Planting Comparison is mislabeled. Table 6c in Appendix C is titled Permanent Seed Mix – March Treatments, Pools, Seeps. Please update.
   Response: The title of this table was updated in the list of Appendices.

4. Table of Contents: Appendix C section shows Table 9A-D and Table 10A-C. Appendix C on page 60 shows Table 9A-I and 10A-F. Please update for consistency.
   Response: Appendix C contains Tables 9A-I and 10A-F. The document was updated for consistency.

5. Table A: Recommend adding growing season dates to this table. There is a reference to 3/18 – 11/14, 241 days in the Mitigation Plan, but the groundwater gauge graphs show 3/1 – 10/22, 235 days. Please revise as necessary.
   Response: The growing season is modified and is described in detail in Section 8.1 of the approved mitigation plan. Proposed growing season dates are March 1 to November 14, with the March 1 start date to be confirmed by documentation of soil temperature greater than 41°F at 12 inches below the surface and bud burst of two or more different non-evergreen vascular plant species. Footnotes have been added to Table A- Project Success Criteria and Table E- Monitoring Summary. Additionally, preconstruction gauge graphs have been updated.

6. Page 6: Include installation date (July 28, 2022) to the discussion of the 440 1-gallon containerized plants. Please include plant list of 1-gallon plants in Appendix B with other planting lists.
   Response: The date of the containerized planting was added to the discussion, and Table 6A (Appendix B) was revised to include the species and quantities of containerized plantings.

7. Table 6A: Recommend including a % column.
   Response: Percent columns were added to the planted stem tables.

8. Table 6A: Tupelo Gum (Nyssa aquatica) was not on the approved mitigation planting list. Please revise.
   Response: A small quantity (500 stems) of Nyssa aquatica was planted in the original 2022 planting due to nursery availability, even though it was not on the approved mitigation plan planting list. No Nyssa aquatica was counted during MY0 for success.

9. Table 8: Mitigation Plan indicates common buttonbush (Cephalanthus occidentalis) and silky dogwood (Cornus amomum) are lives stake species. Lives stakes should not be included in vegetation monitoring plots. Please revise.
   Response: Silky dogwood plantings included both bare-root and live-staked stems. Only bare-root stems were counted in vegetation plots.

10. Table 8: Please add Indicator Status for mockernut hickory (Carya tomentosa).
    Response: Indicator status was added.

11. Cross sections: Please revise elevation axis labels to show decimal places. For example, XS3 has three entries for 579', five entries for 578', and four entries for 577'.
    Response: Elevations on the cross-section plots have been revised to show 1 decimal place.

12. UT1, UT2, UT3, UT4, UT5 and top of Waxhaw Branch profiles indicate no water is present in the channel. If flow gauge data has been collected in MY0, please include.
    Response: Available stream gauge data is included in Appendix D.

13. Table 11: Please add two lines below MY0 for Stream Survey and Vegetation Survey Dates. Please include the month/year that field work was completed for these tasks and include this information for future monitoring report submittals.
    Response: These rows were added.

14. Appendix A Photolog: Header for Task 5 Planting and Monitoring Devices: Devises is accidently misspelled in the header.
    Response: The misspelling was corrected.

15. The Asbuilt plan sheet profiles show the stream was constructed lower than the proposed design. Specifically, downstream sections of Waxhaw Branch, UT2, UT3, UT3A, UT4, and UT5. Were the deviations caused by site conditions during construction or was it a survey issue?
    Response: Deviations were not caused by site conditions during construction. Site channels visually appear correctly constructed, which is confirmed by the MY0 cross sections and profile. The deviations (approximately 2 – 4 inches) are likely caused by as-built surveyor conditions, and possible unconsolidated bed material post construction.

16. Please include PLS sealed asbuilt with digital submittal.
    Response: PLS sealed as-built is included with the digital submittal

**Digital Deliverable Review:**

17. Please provide updated shapefile or ID for the stream flow and crest gauge points below for inclusion in database.

| FID | Shape * | Id | Gauge Type | POINT_X | POINT_Y |
|---|---|---|---|---|---|
| 26 | Point | 0 | Stream Flow | 34.911724 | -80.448368 |
| 27 | Point | 0 | Stream Flow | 34.912925 | -80.447423 |
| 28 | Point | 0 | Stream Crest | 34.911705 | -80.444483 |
| 29 | Point | 0 | Stream Flow | 34.908282 | -80.44228 |
| 30 | Point | 0 | Stream Flow | 34.908944 | -80.444166 |
| 31 | Point | 0 | Stream Crest | 34.911899 | -80.442928 |
| 32 | Point | 0 | Stream Crest | 34.915294 | -80.44433 |
| 33 | Point | 0 | Stream Flow | 34.917624 | -80.442479 |

Response: The shapefile was revised to include ID labels for the stream flow and crest gauges.

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# 1 PROJECT SUMMARY

Restoration Systems, LLC (RS) has established the North Carolina Division of Mitigation Services (NCDMS) Wits End Stream and Wetland Mitigation Site (Site). The Site is on five contiguous parcels in the Carolina Slate Belt portion of the Southeastern Plains ecoregion of North Carolina. Located in the Yadkin River Basin, Cataloging Unit 03040105, the Site is in the Targeted Local Watershed (TLW) 03040105081020 and North Carolina Division of Water Resources [NCDWR] subbasin number 03-07-14. The Site is not located in a Local Watershed Plan (LWP), Regional Watershed Plan (RWP), or Targeted Resource Area (TRA). Site watersheds range from approximately 0.04 of a square mile (25 acres) on UT5 to 1.09 square miles (700 acres) at the Site's outfall.

## 1.1 Project Background, Components, and Structure

Located approximately 5 miles south of Wingate, NC, and seven miles north of the NC/SC state line, the Site encompasses 71.7 acres. Mitigation work within the Site included 1) stream restoration, 2) stream enhancement (Level I), 3) stream enhancement (Level II), 4) wetland reestablishment, 5) wetland enhancement, 6) wetland creation, 7) wetland preservation, and 8) vegetation planting. The Site is expected to provide 11,525.946 warm water stream credits and 24.163 riparian wetland credits by closeout (Table 1, Page 2). A conservation easement was granted to the State of North Carolina and recorded in the Union County Register of Deeds on September 30, 2021.

Before construction, land use at the Site was characterized by open water and maintained fields. Site design was completed on January 27, 2022; construction started on February 1, 2022, and ended with a final walkthrough on July 22, 2022. The Site was planted between April 7, 2022 and January 23, 2023. Completed project activities, reporting history, completion dates, and project contacts are summarized in Tables 11-12 (Appendix E).

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**Table 1. Wits End Mitigation Site (ID-100164) Project Mitigation Quantities and Credits**

| Project Segment | Original Mitigation Plan Ft/Ac | As-Built Ft/Ac | Original Mitigation Category | Original Restoration Level | Original Mitigation Ratio (X:1) | Credits | Comments |
|---|---|---|---|---|---|---|---|
| Stream | | | | | | | |
| Waxhaw Br Upstream R1 | 330 | 329 | Warm | EII* | 5.000 | 66.000 | |
| Waxhaw Br Upstream R2** | 42 | 52 | Warm | R | 1.000 | 52.000 | |
| Waxhaw Br Upstream R3 | 2547 | 2533 | Warm | R | 1.000 | 2,547.000 | 62 ft of piped crossing between R3 and R4 receives no credit |
| Waxhaw Br Upstream R4 | 1051 | 1042 | Warm | R | 1.000 | 1,051.000 | |
| Waxhaw Br Downstream | 1362 | 1368 | Warm | R | 1.000 | 1,362.000 | |
| UT 1 R1** | 2 | 14 | Warm | EII* | 5.000 | 2.800 | |
| UT 1 R2 | 96 | 97 | Warm | EII* | 5.000 | 19.200 | |
| UT 1 R3 | 78 | 77 | Warm | R | 1.000 | 78.000 | |
| UT 2 R1 | 583 | 579 | Warm | R | 1.000 | 583.000 | 49 ft of forded crossing between R1 and R2 receives no credit |
| UT 2 R2** | 36 | 46 | Warm | R | 1.000 | 46.000 | |
| UT 2 R3 | 562 | 560 | Warm | R | 1.000 | 562.000 | |
| UT 3A | 780 | 792 | Warm | R | 1.000 | 780.000 | |
| UT 3 Upstream R1 | 168 | 171 | Warm | EII* | 5.000 | 33.600 | |
| UT 3 Upstream R2 | 232 | 232 | Warm | EI | 1.500 | 154.667 | |
| UT 3 Upstream R3 | 770 | 757 | Warm | R | 1.000 | 770.000 | |
| UT 3 Downstream R1^ | 1459 | 41 | Warm | R | 1.000 | 41.000 | |
| UT 3 Downstream R2^ | NA | 292 | Warm | EII* | 5.000 | 58.400 | |
| UT 3 Downstream R3^ | NA | 1109 | Warm | R | 1.000 | 1,109.000 | |
| UT 4 | 1223 | 1215 | Warm | R | 1.000 | 1,223.000 | |
| UT 5 R1 | 73 | 73 | Warm | EII* | 5.000 | 14.600 | |
| UT 5 R2 | 119 | 118 | Warm | R | 1.000 | 119.000 | |
| | | | | | **Total:** | **10,672.267** | |
| Wetland | | | | | | | |
| Wetland Reestablish[@] | 22.886 | 22.833 | NA | REE | 1.000 | 22.833 | |
| Wetland Enhancement | 1.442 | 1.442 | NA | E | 2.000 | 0.721 | |
| Wetland Creation | 0.351 | 0.351 | R | P | 10.000 | 0.117 | |
| Wetland Preservation | 4.923 | 4.916 | R | C | 3.000 | 0.492 | |
| | | | | | **Total:** | **24.163** | |

**Project Credits**

| Restoration Level | Stream | | | Riparian | Non-Rip | Coastal |
|---|---|---|---|---|---|---|
| | Warm | Cool | Cold | Wetland | Wetland | Marsh |
| Restoration | 10,323.000 | | | | | |
| Re-establishment | | | | 22.833 | | |
| Rehabilitation | | | | | | |
| Enhancement | | | | 0.721 | | |
| Enhancement I | 154.667 | | | | | |
| Enhancement II | | | | | | |
| Enhancement II* | 194.600 | | | | | |
| Creation | | | | 0.117 | | |
| Preservation | | | | 0.492 | | |
| Benthics | 212.989 | | | | | |
| Wider Buffer[%] | 640.690 | | | | | |
| **Totals** | **11,525.946** | | | **24.163** | | |

**Total Stream Credit** **11,525.946**
**Total Wetland Credit** **24.163**

* Enhancement at reduced ratio
** The ATV paths and forded crossings proposed in the Mitigation Plan were legally abandoned and were not constructed
^ UT 3 channel realigned during construction back into old channel. This reach (R2) is now Enhancement (level II) at 5:1 with 2 smaller reaches of Restoration above and below (R1 and R3).
[@] Wetland reestablishment credit reduced due to UT 3 realignment
[%] Wider buffer credit updated due to UT 3 channel realignment

**Wetland Mitigation Category**

| | |
|---|---|
| CM | Coastal Marsh |
| R | Riparian |
| NR | Non-Riparian |

**Restoration Level**

| | |
|---|---|
| HQP | High Quality Preservation |
| P | Preservation |
| E | Wetland Enhancement - Veg and Hydro |
| EII | Stream Enhancement II |
| EI | Stream Enhancement I |
| C | Wetland Creation |
| RH | Wetland Rehabilitation - Veg and Hydro |
| REE | Wetland Re-establishment Veg and Hydro |
| R | Restoration |

**Table 2. Summary: Goals, Performance, and Results**

| Goals | Objectives | Success Criteria |
|---|---|---|
| **(1) HYDROLOGY** | | |
| Restore proper hydrodynamics to the Site and downstream receiving waters. | • Construct new channels at historic floodplain elevation to restore overbank flows<br>• Remove impoundment and restore valley topography<br>• Plant woody riparian buffer 150' from stream and wetland features<br>• Deep rip floodplain soils to reduce compaction and increase soil surface roughness<br>• Protect riparian buffers with a perpetual conservation easement | • BHR not to exceed 1.2<br>• < 10% change in BHR in any given year<br>• Document four overbank events in separate monitoring years<br>• Attain Wetland Hydrology Success Criteria<br>• Attain Vegetation Success Criteria<br>• Cross-section measurements indicate a stable channel with the appropriate substrate<br>• Visual documentation of stable channels and structures |
| **(1) WATER QUALITY** | | |
| Remove direct nutrient and pollutant inputs from the Site and reduce contributions to downstream waters. | • Plant a woody riparian buffer 150 feet off 90% of the Site's streams and wetlands and a 100-foot buffer on the Site's ephemeral streams.<br>• Re-establish and enhance jurisdictional wetlands<br>• Provide surface roughness and reduce compaction through deep ripping/plowing.<br>• Restore overbank flooding by constructing channels at historic floodplain elevation.<br>• Enhance existing wetlands by removing stressors and returning existing wetlands back to appropriate hydroperiods. | • Attain Wetland Hydrology Success Criteria<br>• Attain Vegetation Success Criteria |
| **(1) HABITAT** | | |
| Improve instream and stream-side habitat. | • Construct stable channels with the appropriate substrate and at historic floodplain elevations to restore overbank flows.<br>• Remove impoundment & restore the Waxhaw Branch FEMA floodplain to historic conditions.<br>• Plant woody riparian buffer to provide organic matter and shade<br>• Re-establish and enhance existing jurisdictional wetlands<br>• Provide large-woody debris in floodplain wetlands and project buffers to historic conditions.<br>• Re-establish and enhance existing jurisdictional wetlands | • Cross-section measurement indicates a stable channel with the appropriate substrate<br>• Visual documentation of stable channels and in-stream structures<br>• Attain Wetland Hydrology Success Criteria<br>• Attain Vegetation Success Criteria |

| Table 3. Project Attribute Table | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project Name | Wits End Site | | | | | | | | |
| County | Union County, North Carolina | | | | | | | | |
| Project Area (acres) | 71.7 | | | | | | | | |
| Project Coordinates (latitude and longitude decimal degrees) | 34.913353, -80.442090 | | | | | | | | |
| **Project Watershed Summary Information** | | | | | | | | | |
| Physiographic Province | Carolina Slate Belt | | | | | | | | |
| River Basin | Yadkin | | | | | | | | |
| USGS Hydrologic Unit 8-digit | 03040105 | | | | | | | | |
| DWR Sub-basin | 03-07-14 | | | | | | | | |
| Project Drainage Area (acres) | 700 | | | | | | | | |
| Project Drainage Area Percentage of Impervious Area | <2% | | | | | | | | |
| Land Use Classification | Managed Herbaceous Cover | | | | | | | | |
| **Reach Summary Information** | | | | | | | | | |
| **Parameters** | **Waxhaw Br** | **UT1** | **UT2** | **UT3** | **UT3A** | **UT4** | **UT5** | | |
| Pre-project length (feet) | 3047 | 133 | 696 | 2371 | 734 | 818 | 161 | | |
| Post-project (feet) | 5386 | 188 | 1234 | 2602 | 792 | 1215 | 191 | | |
| Valley confinement (Confined, moderately confined, | Moderate | Confined | Confined | Confined | Confined | Confined | Confined | | |
| Drainage area (acres) | 700 | 32 | 59 | 161 | 61 | 66 | 25 | | |
| Perennial, Intermittent, Ephemeral | Per | Int | Int | Per/Int | Int | Int | Int | | |
| NCDWR Water Quality Classification | WS-V | | | | | | | | |
| Dominant Stream Classification (existing) | Eg 4/5 | Eg 4 | E 6 | G 4/5 | G 4 | Cg & D 4/5 | Eg 4 | | |
| Dominant Stream Classification (proposed) | Ce 3/4 | Ce 3/4 | Ce 3/4 | Ce 3/4 | Ce 3/4 | Ce 3/4 | Ce 3/4 | | |
| Dominant Evolutionary class (Simon) if applicable | III | III | III | III/IV | III/IV | V | III | | |
| **Wetland Summary Information** | | | | | | | | | |
| **Parameters** | **Wetlands** | | | | | | | | |
| Pre-project (acres) | 25.4 acre drained & 6.38 acre degraded | | | | | | | | |
| Post-project (acres) | 29.602 (Total) | | | | | | | | |
| Wetland Type (non-riparian, riparian) | Riparian | | | | | | | | |
| Mapped Soil Series | Cid channery silt loam and Goldston-Badin complex, and field verified Secrest-Cid complex Variant | | | | | | | | |
| Soil Hydric Status | Nonhydric and Nonhydric-Nonhydric | | | | | | | | |
| **Regulatory Considerations** | | | | | | | | | |
| **Parameters** | **Applicable?** | **Resolved?** | **Supporting Docs?** | | | | | | |
| Water of the United States - Section 404 | Yes | Yes | Section 404 Permit | | | | | | |
| Water of the United States - Section 401 | Yes | Yes | Section 401 | | | | | | |
| Endangered Species Act | Yes | Yes | CE Document | | | | | | |
| Historic Preservation Act | Yes | Yes | CE Document | | | | | | |
| Coastal Zone Management Act (CZMA or CAMA) | No | N/A | N/A | | | | | | |
| Essential Fisheries Habitat | No | N/A | N/A | | | | | | |

## 1.2 Project Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives identified from on-site NC SAM and NC WAM data collection. From a mitigation perspective, several goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving success criteria. Table A summarizes Site success criteria.

**Table A. Project Success Criteria**

| Streams |
|---|
| • All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05.<br>• Continuous surface flow in each intermittent tributary should occur each year for at least 30 consecutive days.<br>• Bank height ratio (BHR) cannot exceed 1.2 at any measured cross-section over the monitoring period.<br>• BHR at any measure riffle cross-section should not change by more than 10% from baseline condition during any single monitoring year.<br>• The stream project shall remain stable, and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1-7. |
| **Wetland Hydrology & Soils** |
| • During average climatic conditions, saturation or inundation within the upper 12 inches of the soil surface for 8 percent of the growing season*.<br>• Soil profile descriptions must meet one of the hydric soil indicators identified in the Field Indicators of Hydric Soils in the United States, Version 8.2 (USDA 2018) in monitoring years 4 and 7. |
| **Vegetation** |
| • Within planted portions of the Site, a minimum of 320 stems per acre must be present at year 3, a minimum of 260 stems per acre must be present at year 5, and a minimum of 210 stems per acre must be present at year 7.<br>• Trees must average 7 feet in height at year 5 and 10 feet at year 7.<br>• Planted and volunteer stems are counted, provided they are included in the approved planting list for the Site; natural recruits not on the planting list may be considered by the IRT on a case-by-case basis.<br>• Any single species can only account for up to 50% of the required number of stems within any vegetation plot. |

* The growing season is defined as March 1 to November 14, with the March 1 start date to be confirmed by documentation of soil temperature greater than 41°F at 12 inches below the surface and bud burst of two or more different non-evergreen vascular plant species (Section 8.1, Mitigation Plan).

# 2 AS-BUILT CONDITION (BASELINE)

Site construction started on February 1, 2022, and ended with a final walkthrough on July 22, 2022. The Site was planted between April 7, 2022 and January 23, 2023. As-built and MY0 data collection occurred in between June 2022 and February 2023.

In general, no significant issues arose during the construction of the Site. A sealed half-size set of record drawings are provided in Appendix G, which includes the post-construction survey, alignments, structures, and monitoring features. These include redlines for any significant field adjustments made during construction that differ from the design plans. Where needed, adjustments were made during construction based on field evaluations/landowner constraints. These modifications are detailed in Table B.

**Table B. Deviations from Construction Plans**

| Location | Deviation | Explanation |
|---|---|---|
| Waxhaw Br sta. 29+58 to 29+70 | Bridge installed in place of culvert | Improvement of crossings for landowner use, hydraulics, and aquatic life passage |
| Waxhaw Br sta. 3+75 to 3+85 | Forded ATV crossing not constructed | Paths legally abandoned (Appendix F) |
| UT-1 sta. 0+02 to 0+14 | Forded ATV crossing not constructed | Paths legally abandoned (Appendix F) |
| UT-2 sta. 5+70 | Log cross vane location adjusted | Moved upstream to be inside the easement |
| UT-2 sta. 7+70 to 7+80 | Forded ATV crossing not constructed | Paths legally abandoned (Appendix F) |
| UT-2 sta. 12+35 | Log cross vane not constructed | Slope in field conditions did not require structure |
| UT-3 sta. 11+08 to 16+03 | Stream channel was left in its existing channel location. Drop structure was installed, and all designed structures within the reach were not constructed. One additional log cross vane was installed near the downstream extent of the reach (sta. 15+75). | Landowner request – See Section 2.1 |

Additional activities that occurred at the Site included the following.

- Planting 58 acres of the Site with 75,769 stems between April 7, 2023 and January 23, 2023 – planted species are included in Table 6A (Appendix B).
- Planting an additional 520 1-gallon containerized trees on July 28, 2022 along the old road access near the Waxhaw Branch bridge crossing and along the southern easement boundary adjacent to UT-3.
- Applying a permanent seed mix at 2 lbs per acre across the Site, with an additional seed mix applied at 5 lbs per acre in marsh treatment areas, pools, and seeps. Species lists are included in Tables 6B and 6C (Appendix B).

## 2.1 Project Modifications

Waxhaw Branch Crossing Modification:

Due to inflation and general supply/availability of the engineered Waxhaw Branch aluminum, wing-walled box culvert, it became clear in late April 2022 that a modification of the crossing from an aluminum box culvert to a spanned bridge would have to occur. RS worked with Sungate (engineer of record) and the civil engineering firm CGM3 to design a bridge crossing to meet the Union County FEMA requirements. Those requirements mandated that the bridge allow a 100-year storm event to pass without impounding water and emergency vehicle access during such an event. In an abundance of caution, RS expanded the bridge's capacity by adding four 36-inch and two 24-inch floodplain pipes to the crossing. This modification occurred in a non-credit generating area outside the conservation easement.

Removal of ATV Paths/Crossings:

The layout of the Conservation Easement bisected portions of the original fee-simple property, and legally, RS had to provide access to the isolated portion. As detailed in the Mitigation Plan, RS accomplished this

by adding internal ATV crossings/trails. Between approval of the Mitigation Plan and completion of construction, RS was able to sell the isolated portion of the parcel to the adjacent neighbor. As a result, the internal ATV trails and crossings were no longer necessary, and RS did not construct the ATV crossings/trails. RS worked with Blane Rice at the State Property Office to remove the trails/crossings from the conservation easement. This effort was completed on July 22, 2022, by recording a Release and Removal document at the Union County Register of Deeds (attached). Stream credit was added to the footprint of the forded ATV crossings, where credit was initially removed: Waxhaw Branch – Restoration at 1:1, UT 1 – Enhancement Level II at 5:1, and UT 2 – Restoration at 1:1. Additionally, the footprint of the ATV paths, which were removed from the wider buffer calculation, were added into a revised wider buffer calculation Appendix F – Other Data.

Modification of UT 3:

The husband of the fee-simple landowner of UT 3, where the modification occurred, passed in 2021. The modified area of UT 3 and the adjacent floodplain is a "sacred" place for her, with many memories of her late husband. During construction, it became clear to RS that disturbing this area would cause her significant and, in our opinion, unneeded stress and anxiety. To maintain positive, long-term relations with her, RS decided to keep this portion of UT 3 in its current location. This portion of the UT 3 has bedrock control, has an existing mature buffer on its right bank, and is laterally stable. RS tied the newly constructed (restored) UT 3 into the existing bedrock. Credit within this area was converted from Restoration at 1:1 to Enhancement Level II at 5:1, and a revised wider buffer calculation was conducted based on the as-built location of the stream, Appendix F – Other Data.

**Image 1 & 2 – UT 3 Drop Structure into Enhancement 2 Reach & UT 3 Enhancement 2 Reach Bedrock**

## 2.2 Site Planting Effort

Planting of the Site occurred in stages as construction was completed and as evaluations were made regarding planted stem viability. Ample rain and cooler temperatures helped during the latter 2022 planting efforts. Before the May 2022 planting efforts, bare roots were kept in a refrigerated truck to prevent budburst, and live stakes were kept submerged in water. However, after inspection in late 2022, it was determined that an additional planting effort would help ensure Site vegetative success. Table C details site planting efforts.

**Table C. Wits End Planting Dates:**

| Type / Date | Planting Location | Notes |
|---|---|---|
| **Bare root** | | |
| Thursday, April 7, 2022 | - UT-1, UT-2, Waxhaw Branch (within the old pond bed down to the confluence with UT-3), UT-4 to the Waxhaw Branch floodplain | Temperature Range: 60°F - 80°F<br>Week of Precipitation: +/- 1.46 inches |
| Tuesday, May 24, 2022 | - UT-3, from its confluence of Waxhaw Branch to where UT-3 enters the Site, and the origin point of UT-3A<br>- Streamside and wetland areas along Waxhaw Branch starting at the confluence of UT3 (the forested portion of Waxhaw Branch) down to Snyder Store Road (Site outfall) | Temperature Range: 62°F - 75°F<br><br>The previous night, the Site received +/- 0.64 inches of rain, and a light drizzle occurred during the morning of May 24 |
| Monday, January 23, 2023 | - Sitewide | Temperature Range: 33°F - 54°F<br>Previous day rain: +/- 0.82 inches |
| **1-gallon containerized planting** | | |
| Thursday, July 28, 2022 | - Waxhaw Branch – old road access and construction area for Waxhaw Branch bridge.<br>- UT-3 southern easement edge<br>- 520 1-gal. | Temperature Range: 77°F - 96°F<br><br>A trace amount of rainfall occurred on July 29 |
| **Live stakes** | | |
| Monday, March 21, 2022 | - Waxhaw Branch to the confluence with UT-2, UT-1, UT-2, and UT-4 down to Waxhaw Branch floodplain | Temperature Range: 38°F - 71°F<br>Week of Precipitation: +/- 0.85 inches |
| Thursday, April 7, 2022 | - Marsh treatment areas, Waxhaw Branch from UT-2 confluence down to UT-3 confluence | Temperature Range: 60°F – 80°F<br>Week of Precipitation: +/- 1.46 inches |
| Sunday, May 15, 2022 | - UT-3/3A to its confluence with Waxhaw Branch and down to Snyder Store Road (Site outfall) | Planting occurred in the morning, with temperatures ranging from 66°F to 82°F. +/- 0.25 inches of rain fell that afternoon after planting |

## 3 PROJECT MONITORING – METHODS

Monitoring will be conducted by Axiom Environmental, Inc. Annual monitoring reports of the data collected will be submitted to the NCDMS by Restoration Systems no later than December 31 of each monitoring year data is collected. The monitoring schedule is summarized in Table D.

**Table D. Monitoring Schedule**

| Resource | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 |
|---|---|---|---|---|---|---|---|
| Streams | x | x | x | | x | | x |
| Wetlands | x | x | x | x | x | x | x |
| Vegetation | x | x | x | | x | | x |
| Macroinvertebrates | | | x | | x | | x |
| Visual Assessment | x | x | x | x | x | x | x |
| Report Submittal | x | x | x | x | x | x | x |

### 3.1 Monitoring

The monitoring parameters are summarized in Table E.

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**Table E. Monitoring Summary**

| Stream Parameters | | | | |
|---|---|---|---|---|
| **Parameter** | **Method** | **Schedule/Frequency** | **Number/Extent** | **Data Collected/Reported** |
| Stream Profile | Full longitudinal survey | As-built (unless otherwise required) | All restored stream channels | Graphic and tabular data. |
| Stream Dimension | Cross-sections | Years 1, 2, 3, 5, and 7 | Total of 28 cross-sections on restored channels | Graphic and tabular data. |
| Channel Stability | Visual Assessments | Yearly | All restored stream channels | Areas of concern depicted on the plan view figure with a written assessment and photograph of the area included in the report |
| | Additional Cross-sections | Yearly | Only if instability is documented during monitoring | Graphic and tabular data. |
| Stream Hydrology | Continuous monitoring surface water gauges and/or trail camera | Continuous recording through the monitoring period | 5 surface water gauges on UT 2, 3A, 3, 4, and 5 | Surface water data for each monitoring period |
| Bankfull Events | Continuous monitoring surface water gauges and/or trail camera | Continuous recording through the monitoring period | 3 crest gauges (pressure transducers on Waxhaw Br up-and downstream, and UT 3 | Surface water data for each monitoring period |
| | Visual/Physical Evidence | Continuous through the monitoring period | Visual monitoring and photographic evidence as needed | Visual evidence, photo documentation, and/or rain data. |
| Benthic Macroinvertebrates | "Qual 4" method described in *Standard Operating Procedures for Collection and Analysis of Benthic Macroinvertebrates, Version 5.0* (NCDWR 2016) | Pre-construction, Years 3, 5, and 7 during the "index period" referenced in *Small Streams Biocriteria Development* (NCDWQ 2009) | 2 stations (on Waxhaw Br upstream and UT 3 downstream); however, the exact locations will be determined at the time pre-construction benthics are collected | Results will be presented on a site-by-site basis. They will include a list of taxa collected, an enumeration of *Ephemeroptera, Plecoptera, Tricopetera* taxa, and Biotic Index values. * |
| **Wetland Parameters** | | | | |
| **Parameter** | **Method** | **Schedule/Frequency** | **Number/Extent** | **Data Collected/Reported** |
| Wetland Restoration | Groundwater gauges | Years 1, 2, 3, 4, 5, 6, and 7 throughout the year, with the modified growing season** as defined in the approved Site mitigation plan | 27 gauges spread throughout restored wetlands | Soil temperature and bud burst of two woody species at the beginning of each monitoring period to verify the start of the modified growing season, groundwater and rain data for each monitoring period |
| | Soil profile descriptions | As-built and Years 3, 5, and 7 | 27 soil profile descriptions, one at each groundwater gauge | Soil profile descriptions completed to assess the development of hydric soil morphologic features |
| **Vegetation Parameters** | | | | |
| **Parameter** | **Method** | **Schedule/Frequency** | **Number/Extent** | **Data Collected/Reported** |
| Vegetation establishment and vigor | Permanent vegetation plots 0.0247 acres (100 square meters) in size | As-built, Years 1, 2, 3, 5, and 7 | 37 plots spread across the Site | Species, height, planted vs. volunteer, stems/acre |
| | Annual random vegetation plots, 0.0247 acres (100 square meters) in size | As-built, Years 1, 2, 3, 5, and 7 | 12 plots randomly selected each year | Species and height |

* Benthic Macroinvertebrate sampling data will not be tied to success criteria; however, the data may be used to observe positive gains to in-stream habitat.

** The growing season is defined as March 1 to November 14, with the March 1 start date to be confirmed by documentation of soil temperature greater than 41°F at 12 inches below the surface and bud burst of two or more different non-evergreen vascular plant species (Section 8.1, Mitigation Plan).

# 4 MONITORING YEAR 0 – DATA ASSESSMENT

Annual monitoring and site visits were conducted between June 2022 and February 2023 to assess the condition of the project. Stream, wetland, and vegetation criteria for the Site follow the approved success criteria presented in the Mitigation Plan and summarized in Section 1.2; monitoring methods are detailed in Section 3.0.

## 4.1 Stream Assessment

Morphological surveys for MY0 were conducted on June 2, 2022. All streams within the Site are stable and functioning as designed. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data. No stream areas of concern were identified during MY0.

## 4.2 Hydrology Assessment

28 groundwater monitoring gauges were installed throughout the Site's wetlands. Hydrologic data will be collected and reported during MY1 (2023).

## 4.3 Vegetative Assessment

The MY0 vegetative survey was completed in February 2023. Vegetation monitoring resulted in a sitewide stem density average of 426 planted stems per acre permanent plot average (413 stems per acre/sitewide average), above the interim requirement of 320 stems per acre required at MY3. Additionally, 31 of the 37 fixed vegetation plots and 7 of the 12 temporary plots met the interim success criteria. Please refer to Appendix A for Vegetation Plot Photographs, the Vegetation Condition Assessment Table, and Appendix B for Vegetation Plot Data.

## 4.4 Monitoring Year 0 Summary

Overall, the Site looks good, is performing as intended, and is on track to meet success criteria. Site vegetation is trending toward exceeding the MY3 interim requirement of 320 planted stems per acre, and all streams within the Site are stable and are meeting project goals.

## 5 REFERENCES


Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

North Carolina Ecosystem Enhancement Program (NCEEP 2009). Lower Yadkin/Pee-Dee River Basin Restoration Priorities 2009 (online). Available: https://deq.nc.gov/about/divisions/mitigation-services/dms-planning/watershed-planning-documents/yadkin-river-basin

North Carolina Stream Functional Assessment Team. (NC SFAT 2015). N.C. Stream Assessment Method (NC SAM) User Manual. Version 2.1.

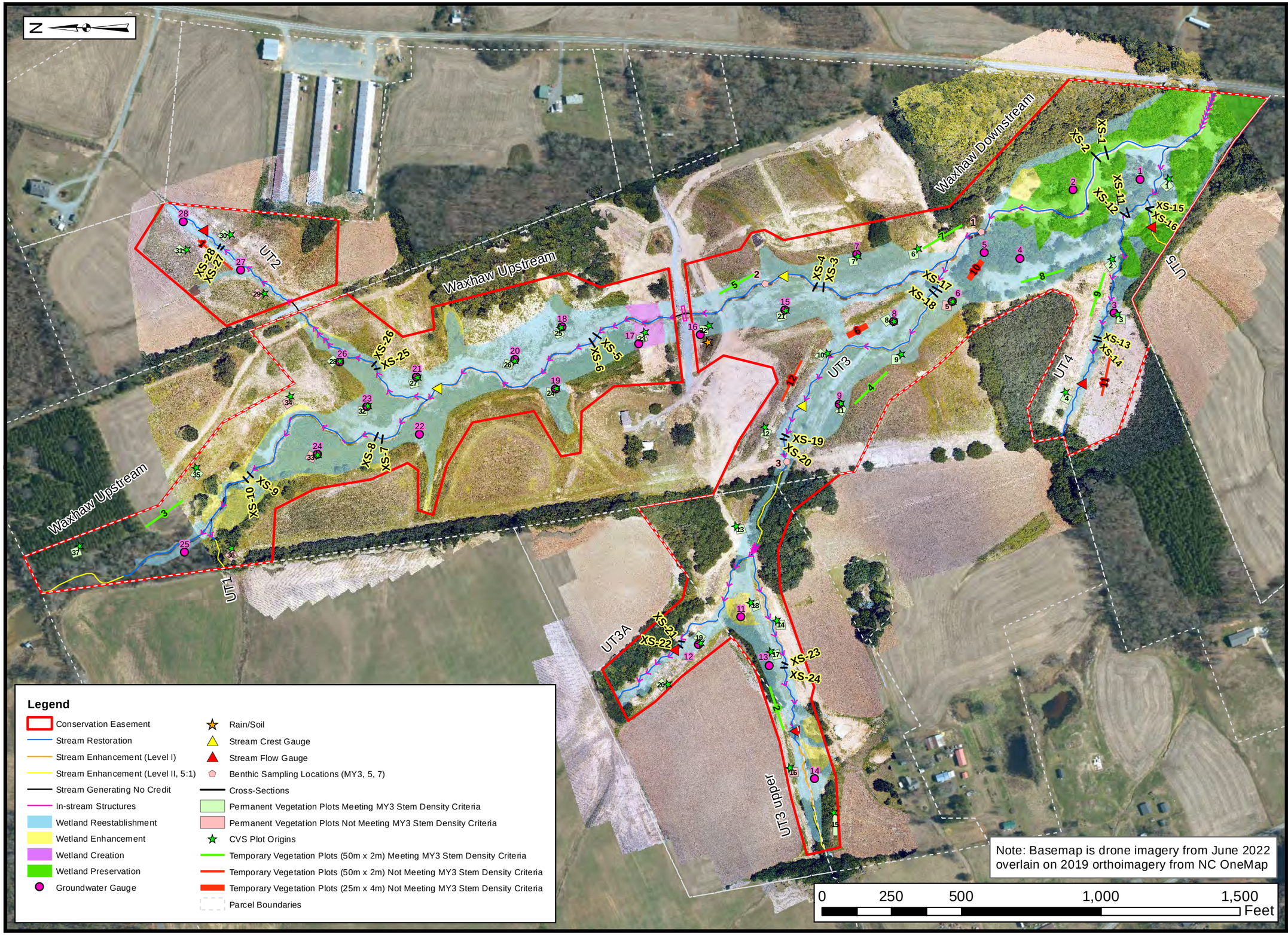
North Carolina Wetland Functional Assessment Team. (NC WFAT 2010). N.C. Wetland Assessment Method (NC WAM) User Manual. Version 4.1.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology (Publisher). Pagosa Springs, Colorado

Simon A, Hupp CR. 1986. Geomorphic and Vegetative Recovery Processes Along Modified Tennessee Streams: An Interdisciplinary Approach to Disturbed Fluvial Systems. Forest Hydrology and Watershed Management. IAHS-AISH Publ.167.

## Appendix A: Visual Assessment Data

Figure 1. Current Conditions Plan View
Tables 4A-H. Stream Visual Stability Assessment
Table 5. Visual Vegetation Assessment
Vegetation Plot Photographs
Site Photo Log




Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

**WITS END**

Union County, NC

Title:

**CURRENT CONDITIONS PLAN VIEW**

Drawn by: KRJ

Date: Mar 2023

Scale: 1:3900

Project No.: 20-011

FIGURE

**1**

Table 4A. Visual Stream Stability Assessment

Reach: Waxhaw Branch
Assessed Stream Length: 5386
Assessed Bank Length: 10772
Survey Date: June 22, 2022

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 26 | 26 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 26 | 26 | | 100% |

Table 4B. Visual Stream Stability Assessment

Reach UT 1

Assessed Stream Length 188 Survey Date: June 22, 2022

Assessed Bank Length 376

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 1 | 1 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 1 | 1 | | 100% |

Table 4C. Visual Stream Stability Assessment

Reach UT 2

Assessed Stream Length 1234 Survey Date: June 22, 2022

Assessed Bank Length 2468

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 12 | 12 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 12 | 12 | | 100% |

Table 4D. Visual Stream Stability Assessment

Reach UT 3 Lower

Assessed Stream Length 1442 Survey Date: June 22, 2022

Assessed Bank Length 2884

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 11 | 11 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 11 | 11 | | 100% |

Table 4E. Visual Stream Stability Assessment

Reach UT 3 Upper

Assessed Stream Length 1160 Survey Date: June 22, 2022

Assessed Bank Length 2320

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 7 | 7 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 7 | 7 | | 100% |

Table 4F. Visual Stream Stability Assessment

Reach UT 3A

Assessed Stream Length 792 Survey Date: June 22, 2022

Assessed Bank Length 1584

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 9 | 9 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 9 | 9 | | 100% |

Table 4G. Visual Stream Stability Assessment

Reach UT 4

Assessed Stream Length 1215 Survey Date: June 22, 2022

Assessed Bank Length 2430

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 8 | 8 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 8 | 8 | | 100% |

Table 4H. Visual Stream Stability Assessment

Reach UT 5

Assessed Stream Length 191 Survey Date: June 22, 2022

Assessed Bank Length 382

| Major Channel Category | | Metric | Number Stable, Performing as Intended | Total Number in As-built | Amount of Unstable Footage | % Stable, Performing as Intended |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Bank** | **Surface Scour/Bare Bank** | Bank lacking vegetative cover resulting simply from poor growth and/or surface scour | | | 0 | 100% |
| | **Toe Erosion** | Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat. | | | 0 | 100% |
| | **Bank Failure** | Fluvial and geotechnical - rotational, slumping, calving, or collapse | | | 0 | 100% |
| **Totals** | | | | | 0 | 100% |
| **Structure** | **Grade Control** | Grade control structures exhibiting maintenance of grade across the sill. | 0 | 0 | | 100% |
| | **Bank Protection** | Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document) | 0 | 0 | | 100% |

**Visual Vegetation Assessment**

**Planted acreage** **58**

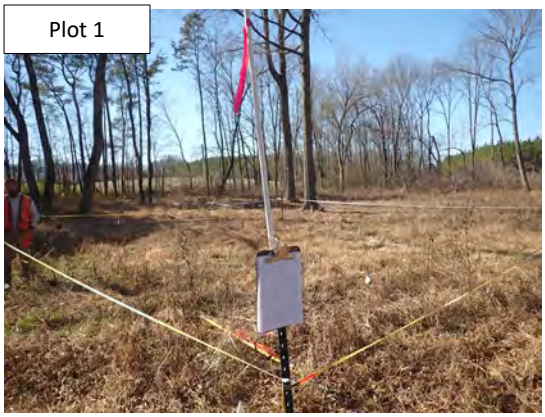
| Vegetation Category | Definitions | Mapping Threshold | Combined Acreage | % of Planted Acreage |
|---|---|---|---|---|
| Bare Areas | Very limited cover of both woody and herbaceous material. | 0.10 acres | 0.00 | 0.0% |
| Low Stem Density Areas | Woody stem densities clearly below target levels based on current MY stem count criteria. | 0.10acres | 0.00 | 0.0% |
| | **Total** | | 0.00 | 0.0% |
| Areas of Poor Growth Rates | Planted areas where average height is not meeting current MY Performance Standard. | 0.10 acres | 0.00 | 0.0% |
| | **Cumulative Total** | | 0.00 | 0.0% |

**Easement Acreage** **71.7**

| Vegetation Category | Definitions | Mapping Threshold | Combined Acreage | % of Easement Acreage |
|---|---|---|---|---|
| Invasive Areas of Concern | Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary. | 0.10 acres | 0.00 | 0.0% |
| | | | | |
| Easement Encroachment Areas | Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area. | none | 0 Encroachments noted | |

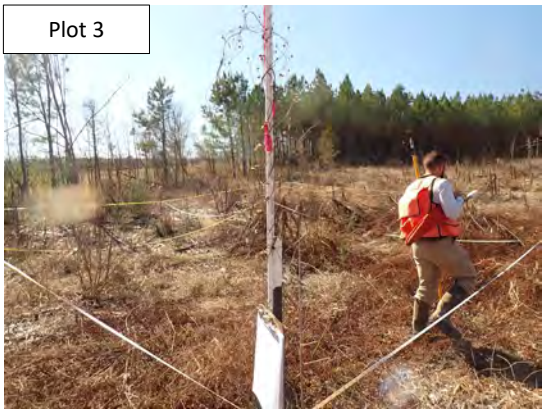
**Wits End Stream and Wetland Mitigation Site**
**MY0 (2022) Vegetation Monitoring Photographs (taken February 6-10, 2023)**

Plot 1

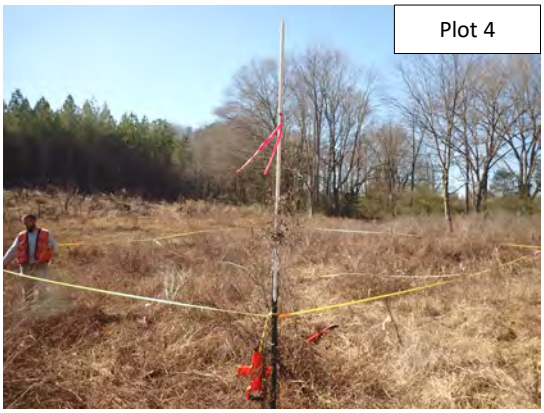


Plot 2

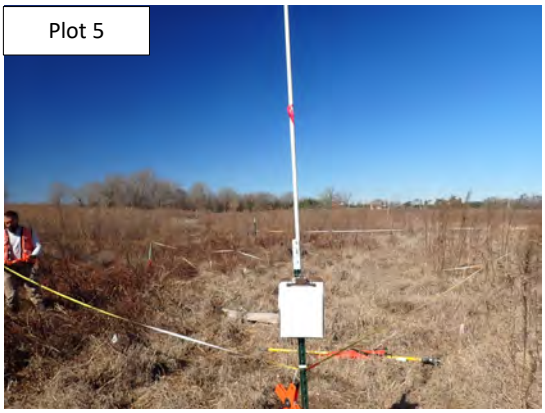
Plot 3



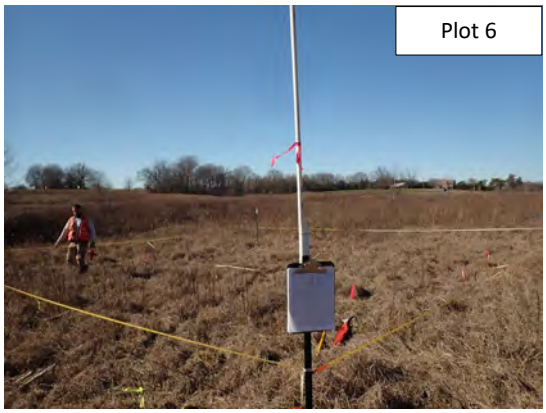
Plot 4



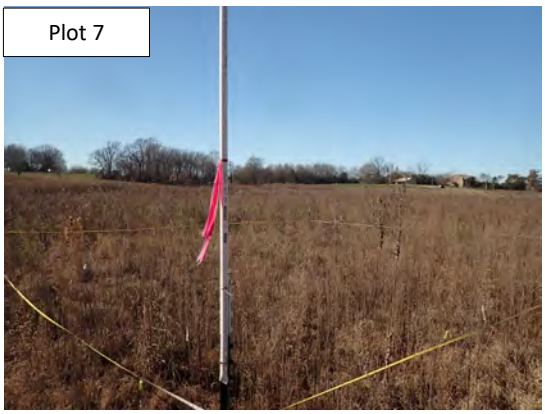
Plot 5



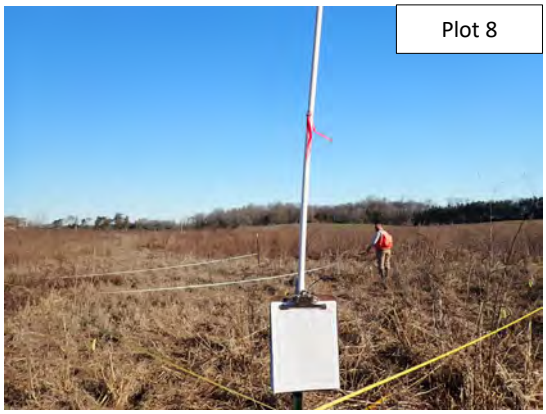
Plot 6



Plot 7

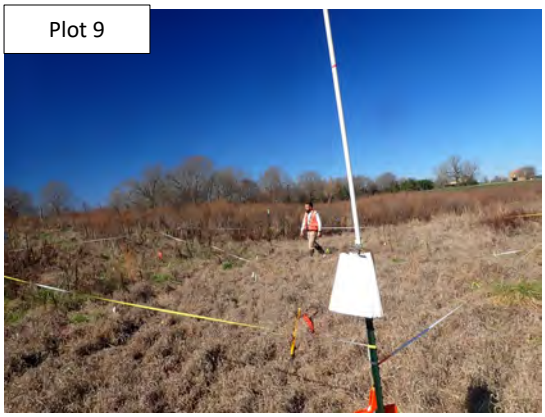


Plot 8

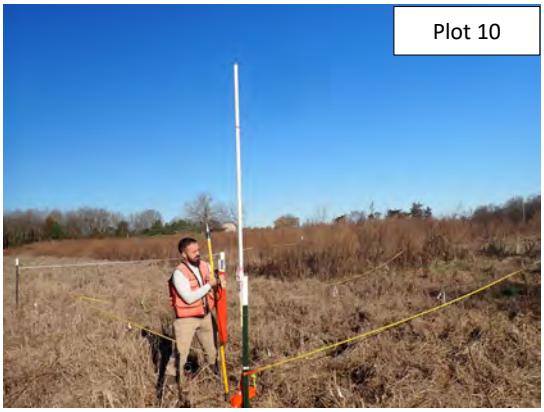


**Wits End Stream and Wetland Mitigation Site**
**MY0 (2022) Vegetation Monitoring Photographs (taken February 6-10, 2023)**

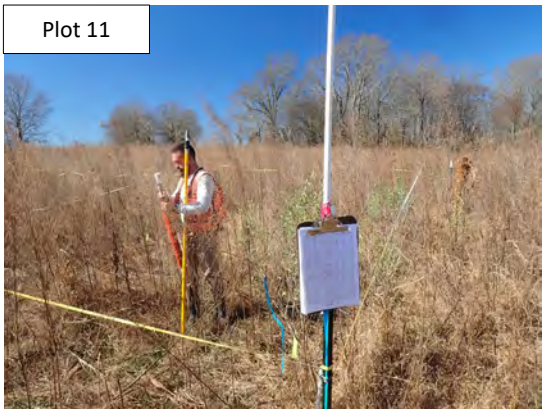
Plot 9



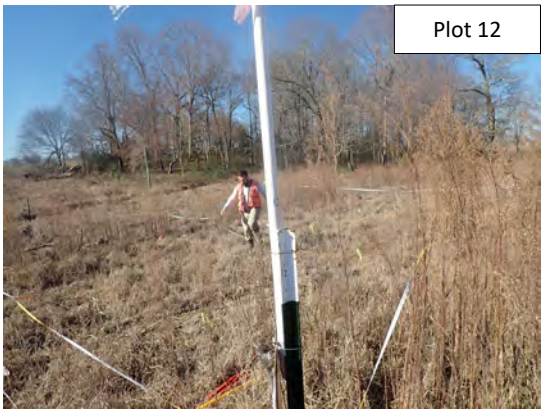
Plot 10



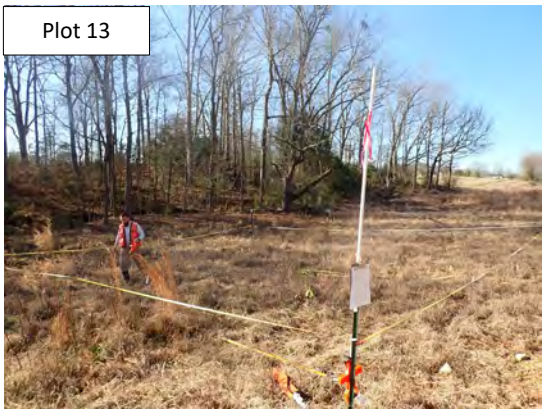
Plot 11



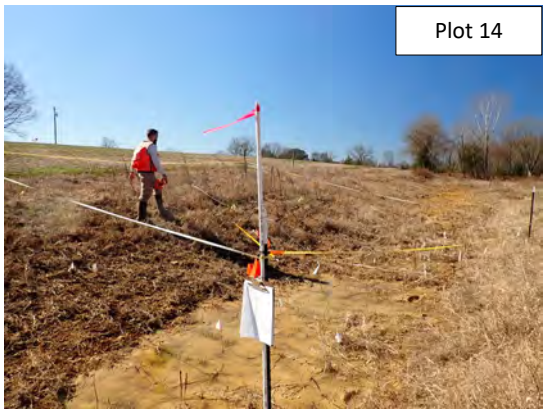
Plot 12



Plot 13

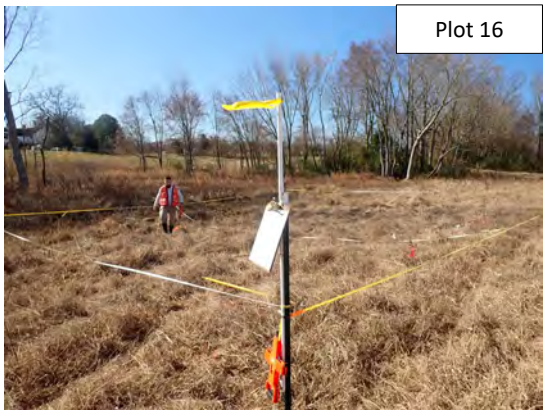


Plot 14



Plot 15

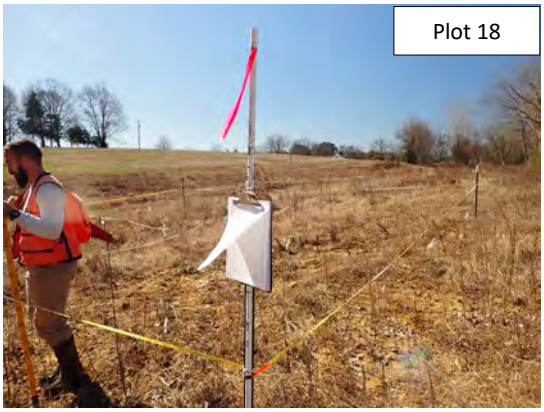
Plot 16



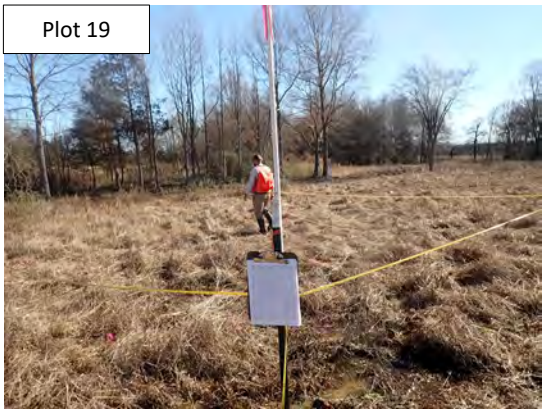
**Wits End Stream and Wetland Mitigation Site**
**MY0 (2022) Vegetation Monitoring Photographs (taken February 6-10, 2023)**

Plot 17

Plot 18

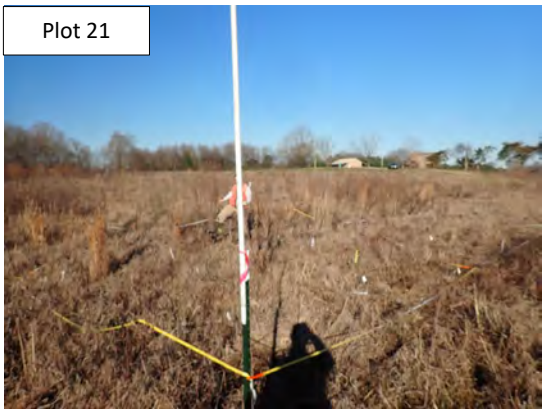


Plot 19

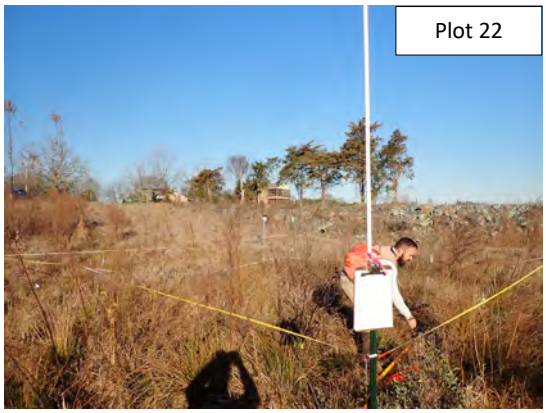


Plot 20

Plot 21

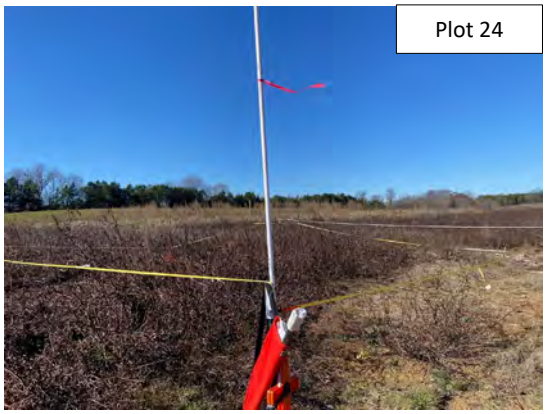


Plot 22



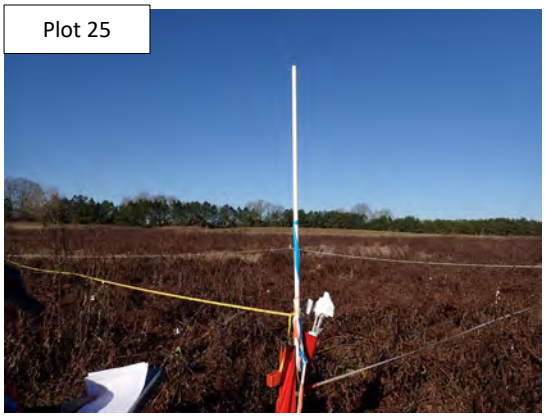
Plot 23

Plot 24

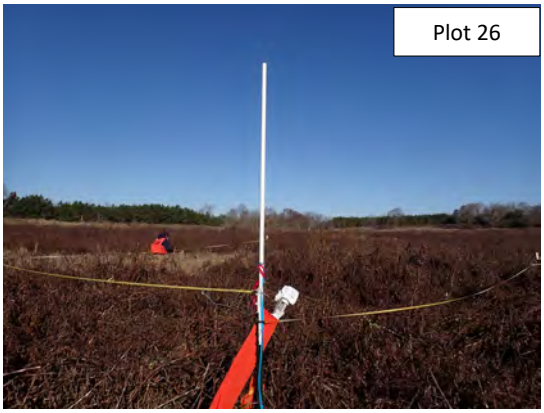


**Wits End Stream and Wetland Mitigation Site**
**MY0 (2022) Vegetation Monitoring Photographs (taken February 6-10, 2023)**

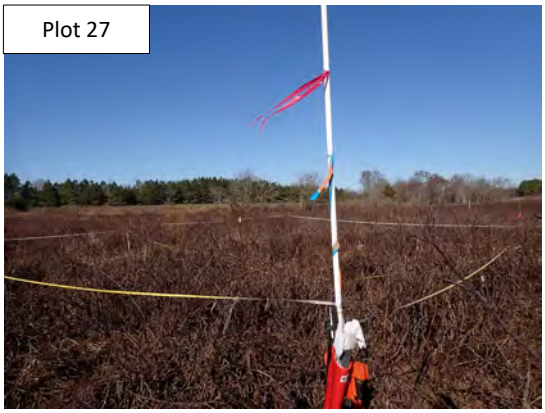
Plot 25



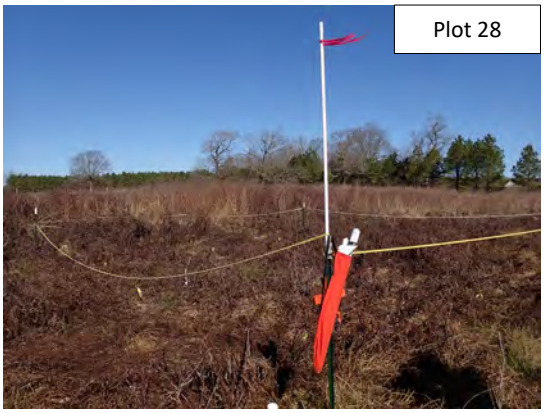
Plot 26



Plot 27

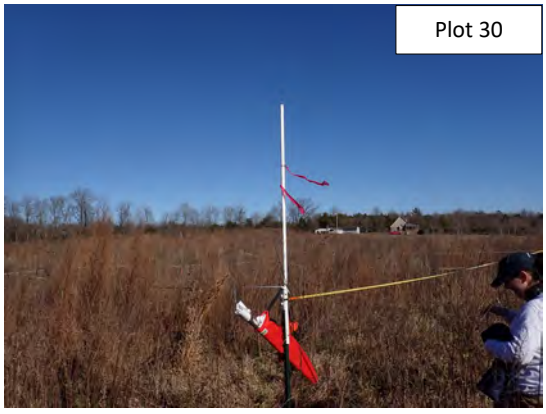


Plot 28

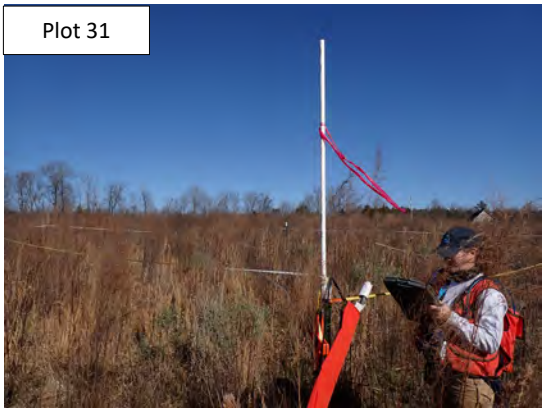


Plot 29

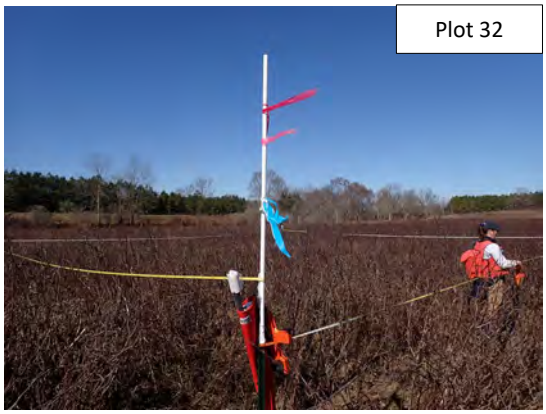
Plot 30



Plot 31

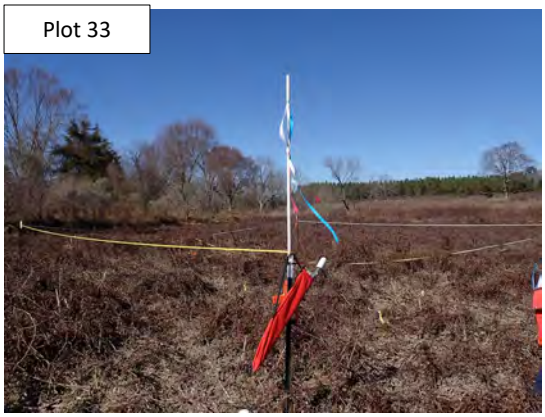


Plot 32

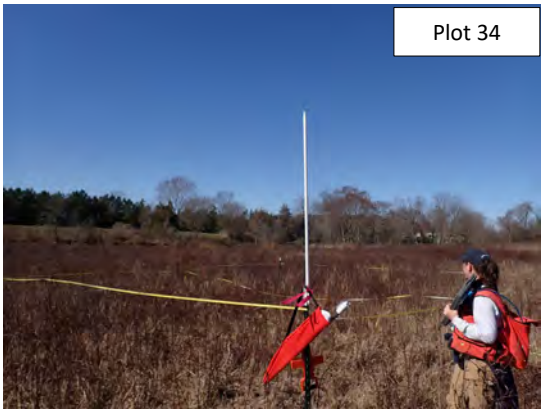


**Wits End Stream and Wetland Mitigation Site**
**MY0 (2022) Vegetation Monitoring Photographs (taken February 6-10, 2023)**

Plot 33



Plot 34



Plot 35

Plot 36

Plot 37

**Wits End Stream and Wetland Mitigation Site**
**Photo Log**

Bridge Crossing on Waxhaw Branch, taken July 15, 2022

Forded Crossing UT 2, taken May 13, 2022

Old Road Removed, New Road Build, taken July 22, 2022

Site Outfall and Drop Structure, taken July 15, 2022

UT 4, taken March 2, 2022

UT4 and 5 Confluence, taken July 15, 2022

Upper UT 3, taken May 13, 2022

UT 3, taken July 15, 2022

Waxhaw Branch in Old Pond Bed, taken July 15, 2022

Lower Waxhaw Branch, taken May 13, 2022

Live stake planting, Waxhaw Branch, 04/07/2022

Live stake planting, UT2 Marsh Treatment Area, 04/07/2022

Live stake planting & bare root planting, UT 2, 04/07/2022

Live stake planting, Waxhaw Branch ephemeral draws/wetlands, 04/07/2022

Bare root planting, old pond bed, 04/07/2022

Live stake planting, UT3, 05/14/2022

Live stake planting, UT3, 05/14/2022

Bare root planting, UT3 / 3A, 05/24/2022

Bare root planting, Waxhaw Branch, 05/24/2022

Bare root planting, Waxhaw Branch & UT 3 confluence, 05/24/2022

1-gallon containerized planting, Waxhaw Branch, old access road/bridge construction area, 07/28/2022

1-gallon containerized planting, Waxhaw Branch, old access road/bridge construction area, 07/28/2022

1-gallon containerized planting, Waxhaw Branch, old access road/bridge construction area, 07/28/2022

1-gallon containerized planting, UT3, right bank easement edge, 07/28/2022


Plot 2

Plot 6


Plot 17

Plot 35

Vegetation transect 2


Vegetation transect 11


Stream cross-section 1, Waxhaw Branch


Stream cross-section 5, Waxhaw Branch


Stream cross-section 9, Waxhaw Branch


Stream cross-section 11, UT4


Stream cross-section 15, UT5

Stream cross-section 20, UT3


Ground water gauge 12

Ground water gauge 5

## Appendix B: Vegetation Data

Table 6A. Planted Woody Vegetation
Table 6B. Permanent Seed Mix – Sitewide
Table 6C. Permanent Seed Mix – Marsh Treatments, Pools, Seeps
Table 7. Vegetation Plot Counts and Densities
Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

**Table 6A. Planted Woody Vegetation**
**Wits End Stream and Wetland Mitigation Site**

| Bare-Root Planting | | |
|---|---|---|
| **Species** | **Total** | **Percent** |
| **Acres** | **58** | **%** |
| American Elm (*Ulmus americana*) | 3,000 | 4.0 |
| American Holly (*Ilex opaca*) | 2,220 | 2.9 |
| Birch River (*Betula nigra*) | 6,300 | 8.3 |
| Black Gum (*Nyssa sylvatica*) | 5,049 | 6.7 |
| Hackberry (*Celtis occidentalis*) | 2,900 | 3.8 |
| Hickory Mockernut (*Carya tomentosa*) | 1,500 | 2.0 |
| Hickory Shagbark (*Carya ovata*) | 3,500 | 4.6 |
| Oak Red (*Quercus rubra*) | 4,000 | 5.3 |
| Oak Swamp Chestnut (*Quercus michauxii*) | 1,700 | 2.2 |
| Oak Water (*Quercus nigra*) | 12,200 | 16.1 |
| Oak White (*Quercus alba*) | 4,850 | 6.4 |
| Oak Willow (*Quercus phellos*) | 1,400 | 1.8 |
| Persimmon (*Diospyros virginiana*) | 4,250 | 5.6 |
| Red Bud (*Cercis canadensis*) | 1,900 | 2.5 |
| Silky Dogwood (*Cornus amomum*) | 7,550 | 10.0 |
| Sycamore (*Platanus occidentalis*) | 7,900 | 10.4 |
| Tulip Poplar (*Liriodendron tulipifera*) | 5,050 | 6.7 |
| Tupelo Gum (*Nyssa aquatica*) | 500 | 0.7 |
| **TOTALS** | **75,769** | **100** |
| **Average Stems/Acre** | **1306** | |
| **1-Gallon Containerized Planting** | | |
| **Species** | **Total** | **Percent** |
| **Acres** | **1.5** | **%** |
| American Elm (*Ulmus americana*) | 40 | 7.7 |
| Birch River (*Betula nigra*) | 40 | 7.7 |
| Black Gum (*Nyssa sylvatica*) | 70 | 13.5 |
| Oak Red (*Quercus rubra*) | 60 | 11.5 |
| Oak Water (*Quercus nigra*) | 90 | 17.3 |
| Oak White (*Quercus alba*) | 90 | 17.3 |
| Red Bud (*Cercis canadensis*) | 60 | 11.5 |
| Sycamore (*Platanus occidentalis*) | 30 | 5.8 |
| Tulip Poplar (*Liriodendron tulipifera*) | 40 | 7.7 |
| **TOTALS** | **520** | **100** |
| **Average Stems/Acre** | **347** | |

**Table 6B. Permanent Seed Mix - Sitewide**
**Wits End Stream and Wetland Mitigation Site**

| Species* | % | Species* | % |
|---|---|---|---|
| Common Yarrow (*Achillea millefolium*) | 0.98 | Boneset (*Eupatorium perfoliatum*) | 0.25 |
| Redtop (*Agrostis gigantea*) | 14.98 | Perennial Gaillardia (Blanketflower) (*Gaillardia perennial*) | 0.49 |
| Winter Bentgrass (*Agrostis hyemalis*) | 4.90 | Narrowleaf Sunflower (*Helianthus angustifolius*) | 0.50 |
| Autumn Bentgrass (*Agrostis perennans*) | 4.97 | Oxeye Sunflower (*Heliopsis helianthoides*) | 0.50 |
| Creeping Bentgrass (*Agrostis stolonifera*) | 4.98 | Crimsoneyed Rosemallow (*Hibiscus moscheutos*) | 0.50 |
| Blue False Indigo (*Baptisia australis*) | 2.00 | Path Rush (*Juncus tenuis*) | 0.45 |
| Fox Sedge (*Carex vulpinoidea*) | 0.94 | Roundhead Lespedeza (*Lespedeza capitata*) | 0.50 |
| Partridge Pea (*Chamaecrista fasciculata*) | 1.00 | Marsh Blazing Star (*Liatris spicata*) | 0.49 |
| Sensitive Pea (*Chamaecrista nictitans*) | 1.00 | Wild Bergamot (*Monarda fistulosa*) | 0.50 |
| Oxeye Daisy (*Leucanthemum vulgare*) | 4.98 | Beaked Panicgrass (*Panicum anceps*) | 0.46 |
| Shasta Daisy (*Leucanthemum superbum*) | 2.99 | Deertongue, Tioga (*Dichanthelium clandestinum*) | 4.95 |
| Lanceleaf Coreopsis (*Coreopsis lanceolata*) | 3.96 | Tall White Beardtongue (*Penstemon digitalis*) | 0.99 |
| Plains Coreopsis (*Coreopsis tinctoria*) | 3.95 | Clasping Coneflower (*Dracopis amplexicaulis*) | 1.00 |
| Cosmos (*Cosmos bipinnatus*) | 1.00 | Blackeyed Susan (*Rudbeckia hirta*) | 2.99 |
| Rocket Larkspur (*Consolida ajacis*) | 1.99 | Wild Senna (*Senna hebecarpa*) | 0.50 |
| Showy Ticktrefoil (*Desmodium canadense*) | 0.98 | Purpletop (*Tridens flavus*) | 16.76 |
| Purple Coneflower (*Echinacea purpurea*) | 4.75 | Blue Vervain (*Verbena hastata*) | 1.00 |
| Virginia Wildrye (*Elymus virginicus*) | 4.06 | | |
| | | | **Total = 100%** |

* This seed mix was applied at 2 lbs per acre sitewide.

**Table 6C. Permanent Seed Mix – Marsh Treatments, Pools, Seeps**
**Wits End Stream and Wetland Mitigation Site**

| Species* | % | Species* | % |
|---|---|---|---|
| Switchgrass (*Panicum rigidulum*) | 36 | Virginia Wildrye (*Elymus virginicus*) | 6 |
| Bearded Beggarticks (*Bidens aristosa*) | 20 | Soft Rush (*Juncus effusus*) | 5 |
| Narrowleaf Sunflower (*Helianthus angustifolius*) | 18 | Common Hop Sedge (*Carex lupulina*) | 5 |
| Greenwhite sedge (*Carex albolutescens*) | 8 | Fox Sedge (*Carex vulpinoidea*) | 2 |
| | | | **Total = 100%** |

* This seed mix was applied at 5 lbs per acre in marsh treatment areas, pools, and seeps.

**Table 7. Planted Vegetation Totals**
**Wits End Stream and Wetland Mitigation Site**

| Plot # | Planted Stems/Acre | Success Criteria Met? |
|---|---|---|
| **1** | 405 | Yes |
| **2** | 324 | Yes |
| **3** | 405 | Yes |
| **4** | 486 | Yes |
| **5** | 283 | No |
| **6** | 486 | Yes |
| **7** | 729 | Yes |
| **8** | 445 | Yes |
| **9** | 526 | Yes |
| **10** | 607 | Yes |
| **11** | 405 | Yes |
| **12** | 324 | Yes |
| **13** | 486 | Yes |
| **14** | 810 | Yes |
| **15** | 405 | Yes |
| **16** | 283 | No |
| **17** | 526 | Yes |
| **18** | 607 | Yes |
| **19** | 526 | Yes |
| **20** | 364 | Yes |
| **21** | 688 | Yes |
| **22** | 405 | Yes |
| **23** | 648 | Yes |
| **24** | 324 | Yes |
| **25** | 324 | Yes |
| **26** | 324 | Yes |
| **27** | 364 | Yes |
| **28** | 405 | Yes |
| **29** | 283 | No |
| **30** | 324 | Yes |
| **31** | 405 | Yes |
| **32** | 486 | Yes |
| **33** | 283 | No |
| **34** | 162 | No |
| **35** | 445 | Yes |
| **36** | 40 | No |
| **37** | 405 | Yes |

**Table 7. Planted Vegetation Totals (Continued)**
**Wits End Stream and Wetland Mitigation Site**

| Plot # | Planted Stems/Acre | Success Criteria Met? |
|---|---|---|
| **T-1** | 162 | No |
| **T-2** | 1417 | Yes |
| **T-3** | 486 | Yes |
| **T-4** | 364 | Yes |
| **T-5** | 364 | Yes |
| **T-6** | 81 | No |
| **T-7** | 364 | Yes |
| **T-8** | 405 | Yes |
| **T-9** | 405 | Yes |
| **T-10** | 202 | No |
| **T-11** | 81 | No |
| **T-12** | 162 | No |
| **Average Planted Stems/Acre** | **413** | **Yes** |

**Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool**

| | |
|---|---|
| Planted Acreage | 58 |
| Date of Initial Plant | 2023-01-23 |
| Date(s) of Supplemental Plant(s) | NA |
| Date(s) Mowing | NA |
| Date of Current Survey | 2023-02-10 |
| Plot size (ACRES) | 0.0247 |

| | Scientific Name | Common Name | Tree/Shrub | Indicator Status | Veg Plot 1 F | | Veg Plot 2 F | | Veg Plot 3 F | | Veg Plot 4 F | | Veg Plot 5 F | | Veg Plot 6 F | | Veg Plot 7 F | | Veg Plot 8 F | | Veg Plot 9 F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total |
| Species Included in Approved Mitigation Plan | Betula nigra | river birch | Tree | FACW | 4 | 4 | 1 | 1 | | | | | 1 | 1 | 3 | 3 | 4 | 4 | | | 2 | 2 |
| | Carya ovata | shagbark hickory | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Celtis occidentalis | common hackberry | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Cercis canadensis | eastern redbud | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Cornus amomum | silky dogwood | Shrub | FACW | 1 | 1 | 1 | 1 | | | 1 | 1 | 2 | 2 | 3 | 3 | | | | | 2 | 2 |
| | Diospyros virginiana | common persimmon | Tree | FAC | | | 1 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 | | | | | 1 | 1 |
| | Liriodendron tulipifera | tuliptree | Tree | FACU | 1 | 1 | | | 2 | 2 | 1 | 1 | | | | | | | | | | |
| | Nyssa sylvatica | blackgum | Tree | FAC | | | | | | | 1 | 1 | | | | | | | | | 1 | 1 |
| | Platanus occidentalis | American sycamore | Tree | FACW | | | | 7 | | 3 | 4 | 7 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | | |
| | Quercus alba | white oak | Tree | FACU | | | | | | | | | | | | | 2 | 2 | | | | |
| | Quercus michauxii | swamp chestnut oak | Tree | FACW | | | | | | | | | | | | | | | 4 | 4 | | |
| | Quercus nigra | water oak | Tree | FAC | 2 | 2 | | | 1 | 1 | 1 | 1 | | | | | 10 | 10 | 2 | 2 | 3 | 3 |
| | Quercus phellos | willow oak | Tree | FAC | | | | | 2 | 2 | 1 | 1 | | | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Quercus rubra | northern red oak | Tree | FACU | | | | | 1 | 1 | | | | | | | | | | | 2 | 2 |
| | Quercus sp. | | | | 2 | 2 | | | 1 | 1 | | | | | | | | | 1 | 1 | | |
| | Ulmus americana | American elm | Tree | FACW | | | | | | | | | 2 | 2 | | | | | | | 1 | 1 |
| Sum | Performance Standard | | | | 10 | 10 | 3 | 10 | 7 | 10 | 10 | 13 | 7 | 7 | 12 | 12 | 19 | 19 | 11 | 11 | 13 | 13 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | | 10 | | 10 | | 13 | | 7 | | 12 | | 19 | | 11 | | 13 |
| | Stems/Acre | | | | | 405 | | 324 | | 405 | | 486 | | 283 | | 486 | | 729 | | 445 | | 526 |
| | Species Count | | | | | 5 | | 4 | | 6 | | 7 | | 5 | | 5 | | 5 | | 5 | | 8 |
| | Dominant Species Composition (%) | | | | | 40 | | 70 | | 30 | | 54 | | 29 | | 33 | | 53 | | 36 | | 23 |
| | Average Plot Height (ft.) | | | | | 2 | | 3 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Post Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | | 10 | | 10 | | 13 | | 7 | | 12 | | 19 | | 11 | | 13 |
| | Stems/Acre | | | | | 405 | | 324 | | 405 | | 486 | | 283 | | 486 | | 729 | | 445 | | 526 |
| | Species Count | | | | | 5 | | 4 | | 6 | | 7 | | 5 | | 5 | | 5 | | 5 | | 8 |
| | Dominant Species Composition (%) | | | | | 40 | | 70 | | 30 | | 54 | | 29 | | 33 | | 53 | | 36 | | 23 |
| | Average Plot Height (ft.) | | | | | 2 | | 3 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

**Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)**

| | |
|---|---|
| Planted Acreage | 58 |
| Date of Initial Plant | 2023-01-23 |
| Date(s) of Supplemental Plant(s) | NA |
| Date(s) Mowing | NA |
| Date of Current Survey | 2023-02-10 |
| Plot size (ACRES) | 0.0247 |

| | Scientific Name | Common Name | Tree/Shrub | Indicator Status | Veg Plot 10 F | | Veg Plot 11 F | | Veg Plot 12 F | | Veg Plot 13 F | | Veg Plot 14 F | | Veg Plot 15 F | | Veg Plot 16 F | | Veg Plot 17 F | | Veg Plot 18 F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total |
| Species Included in Approved Mitigation Plan | Betula nigra | river birch | Tree | FACW | 1 | 1 | 1 | 1 | | | 2 | 2 | 2 | 2 | 2 | 2 | | | 2 | 2 | 5 | 5 |
| | Carya ovata | shagbark hickory | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Celtis occidentalis | common hackberry | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Cercis canadensis | eastern redbud | Tree | FACU | | | | | | | | | | | 2 | 2 | | | | | | |
| | Cornus amomum | silky dogwood | Shrub | FACW | 7 | 7 | | | 2 | 2 | 1 | 1 | 3 | 3 | | | | | 1 | 1 | 2 | 2 |
| | Diospyros virginiana | common persimmon | Tree | FAC | | | | | | | | | | | | | | | | | | |
| | Liriodendron tulipifera | tuliptree | Tree | FACU | | | | | 3 | 3 | | | | | | | | | | | | |
| | Nyssa sylvatica | blackgum | Tree | FAC | | | | | | | | | 1 | 1 | | | | | 1 | 1 | 10 | 10 |
| | Platanus occidentalis | American sycamore | Tree | FACW | | | | | | | | | 6 | 6 | 3 | 3 | | | 9 | 9 | | |
| | Quercus alba | white oak | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Quercus michauxii | swamp chestnut oak | Tree | FACW | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | | | | | 1 | 1 | | | | |
| | Quercus nigra | water oak | Tree | FAC | 2 | 2 | 1 | 1 | | | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | | |
| | Quercus phellos | willow oak | Tree | FAC | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | 1 | | |
| | Quercus rubra | northern red oak | Tree | FACU | | | 4 | 4 | | | 3 | 3 | | | | | | | | | | |
| | Quercus sp. | | | | 1 | 1 | 1 | 1 | | | 1 | 1 | 2 | 2 | | | 2 | 2 | | | | |
| | Ulmus americana | American elm | Tree | FACW | | | | | 1 | 1 | | | 3 | 3 | 2 | 2 | 1 | 1 | | | | |
| Sum | Performance Standard | | | | 15 | 15 | 10 | 10 | 8 | 8 | 12 | 12 | 20 | 20 | 10 | 10 | 7 | 7 | 15 | 15 | 17 | 17 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 15 | | 10 | | 8 | | 12 | | 20 | | 10 | | 7 | | 15 | | 17 |
| | Stems/Acre | | | | | 607 | | 405 | | 324 | | 486 | | 810 | | 405 | | 283 | | 526 | | 607 |
| | Species Count | | | | | 6 | | 6 | | 5 | | 7 | | 8 | | 5 | | 5 | | 6 | | 3 |
| | Dominant Species Composition (%) | | | | | 47 | | 40 | | 38 | | 25 | | 30 | | 30 | | 29 | | 60 | | 59 |
| | Average Plot Height (ft.) | | | | | 2 | | 2 | | 1 | | 1 | | 2 | | 1 | | 1 | | 2 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Post Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 15 | | 10 | | 8 | | 12 | | 20 | | 10 | | 7 | | 15 | | 17 |
| | Stems/Acre | | | | | 607 | | 405 | | 324 | | 486 | | 810 | | 405 | | 283 | | 526 | | 607 |
| | Species Count | | | | | 6 | | 6 | | 5 | | 7 | | 8 | | 5 | | 5 | | 6 | | 3 |
| | Dominant Species Composition (%) | | | | | 47 | | 40 | | 38 | | 25 | | 30 | | 30 | | 29 | | 60 | | 59 |
| | Average Plot Height (ft.) | | | | | 2 | | 2 | | 1 | | 1 | | 2 | | 1 | | 1 | | 2 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

**Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)**

| | |
|---|---|
| Planted Acreage | 58 |
| Date of Initial Plant | 2023-01-23 |
| Date(s) of Supplemental Plant(s) | NA |
| Date(s) Mowing | NA |
| Date of Current Survey | 2023-02-10 |
| Plot size (ACRES) | 0.0247 |

| | Scientific Name | Common Name | Tree/Shrub | Indicator Status | Veg Plot 19 F | | Veg Plot 20 F | | Veg Plot 21 F | | Veg Plot 22 F | | Veg Plot 23 F | | Veg Plot 24 F | | Veg Plot 25 F | | Veg Plot 26 F | | Veg Plot 27 F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total |
| Species Included in Approved Mitigation Plan | Betula nigra | river birch | Tree | FACW | 1 | 1 | 1 | 1 | 7 | 7 | | | 9 | 9 | | | 5 | 5 | 1 | 1 | 2 | 2 |
| | Carya ovata | shagbark hickory | Tree | FACU | | | | | | | | | 1 | 1 | 1 | 1 | 2 | 2 | | | | |
| | Celtis occidentalis | common hackberry | Tree | FACU | | | | | | | | | | | | | | | | | 1 | 1 |
| | Cercis canadensis | eastern redbud | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Cornus amomum | silky dogwood | Shrub | FACW | 4 | 4 | | | | | 2 | 2 | | | | | | | 3 | 3 | 1 | 1 |
| | Diospyros virginiana | common persimmon | Tree | FAC | | | | | | | 1 | 1 | | | | | 1 | 1 | | | | |
| | Liriodendron tulipifera | tuliptree | Tree | FACU | | | | | | | | | | | 2 | 2 | 1 | 1 | | | | |
| | Nyssa sylvatica | blackgum | Tree | FAC | 4 | 4 | 2 | 2 | 1 | 1 | | | | | | | | | | | 3 | 3 |
| | Platanus occidentalis | American sycamore | Tree | FACW | | | | | 7 | 7 | | | | | | | | | | | 2 | 2 |
| | Quercus alba | white oak | Tree | FACU | | | | | | | | | 6 | 6 | 2 | 2 | | | | | | |
| | Quercus michauxii | swamp chestnut oak | Tree | FACW | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | |
| | Quercus nigra | water oak | Tree | FAC | | | 2 | 2 | | | 2 | 2 | 1 | 1 | 3 | 3 | | | 4 | 4 | | |
| | Quercus phellos | willow oak | Tree | FAC | | | | | | | 3 | 3 | | | | | | | | | | |
| | Quercus rubra | northern red oak | Tree | FACU | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | |
| | Quercus sp. | | | | 2 | 2 | 1 | 1 | | | | | | | | | | | | | | |
| | Ulmus americana | American elm | Tree | FACW | | | 2 | 2 | | | | | | | | | | | | | | |
| Sum | Performance Standard | | | | 13 | 13 | 9 | 9 | 17 | 17 | 10 | 10 | 17 | 17 | 8 | 8 | 9 | 9 | 8 | 8 | 9 | 9 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 13 | | 9 | | 17 | | 10 | | 17 | | 8 | | 9 | | 8 | | 9 |
| | Stems/Acre | | | | | 526 | | 364 | | 688 | | 405 | | 648 | | 324 | | 324 | | 324 | | 364 |
| | Species Count | | | | | 5 | | 6 | | 5 | | 6 | | 4 | | 4 | | 4 | | 3 | | 5 |
| | Dominant Species Composition (%) | | | | | 31 | | 22 | | 41 | | 30 | | 53 | | 38 | | 56 | | 50 | | 33 |
| | Average Plot Height (ft.) | | | | | 1 | | 2 | | 2 | | 2 | | 2 | | 1 | | 1 | | 2 | | 3 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Post Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 13 | | 9 | | 17 | | 10 | | 17 | | 8 | | 9 | | 8 | | 9 |
| | Stems/Acre | | | | | 526 | | 364 | | 688 | | 405 | | 648 | | 324 | | 324 | | 324 | | 364 |
| | Species Count | | | | | 5 | | 6 | | 5 | | 6 | | 4 | | 4 | | 4 | | 3 | | 5 |
| | Dominant Species Composition (%) | | | | | 31 | | 22 | | 41 | | 30 | | 53 | | 38 | | 56 | | 50 | | 33 |
| | Average Plot Height (ft.) | | | | | 1 | | 2 | | 2 | | 2 | | 2 | | 1 | | 1 | | 2 | | 3 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

**Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)**

| | |
|---|---|
| Planted Acreage | 58 |
| Date of Initial Plant | 2023-01-23 |
| Date(s) of Supplemental Plant(s) | NA |
| Date(s) Mowing | NA |
| Date of Current Survey | 2023-02-10 |
| Plot size (ACRES) | 0.0247 |

| | Scientific Name | Common Name | Tree/Shrub | Indicator Status | Veg Plot 28 F | | Veg Plot 29 F | | Veg Plot 30 F | | Veg Plot 31 F | | Veg Plot 32 F | | Veg Plot 33 F | | Veg Plot 34 F | | Veg Plot 35 F | | Veg Plot 36 F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total | Planted | Total |
| Species Included in Approved Mitigation Plan | Betula nigra | river birch | Tree | FACW | 1 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | | | | | 1 | 1 | 2 | 2 |
| | Carya ovata | shagbark hickory | Tree | FACU | 4 | 4 | 1 | 1 | | | 1 | 1 | 1 | 1 | | | | | 1 | 1 | | |
| | Celtis occidentalis | common hackberry | Tree | FACU | 1 | 1 | | | | | | | | | | | | | | | | |
| | Cercis canadensis | eastern redbud | Tree | FACU | | | | | | | | | | | | | | | | | | |
| | Cornus amomum | silky dogwood | Shrub | FACW | 4 | 4 | | | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | | | 2 | 2 | | |
| | Diospyros virginiana | common persimmon | Tree | FAC | | | | | | | | | | | | | | | | | | |
| | Liriodendron tulipifera | tuliptree | Tree | FACU | | | | | 2 | 2 | | | | | | | | | | | | |
| | Nyssa sylvatica | blackgum | Tree | FAC | | | | | | | 2 | 2 | | | | | | | | | | |
| | Platanus occidentalis | American sycamore | Tree | FACW | | | 1 | 1 | | | | | | | | | | | | | | |
| | Quercus alba | white oak | Tree | FACU | | | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| | Quercus michauxii | swamp chestnut oak | Tree | FACW | | | | | | | | | | | | | | | | | | |
| | Quercus nigra | water oak | Tree | FAC | | | 1 | 1 | 2 | 2 | 5 | 5 | 2 | 2 | 8 | 8 | | | 1 | 1 | | |
| | Quercus phellos | willow oak | Tree | FAC | | | 1 | 1 | | | | | | | | | 1 | 1 | | | | |
| | Quercus rubra | northern red oak | Tree | FACU | | | | | | | | | 3 | 3 | | | 3 | 3 | 1 | 1 | | |
| | Quercus sp. | | | | | | | | | | | | | | | | | | | | | |
| | Ulmus americana | American elm | Tree | FACW | | | 1 | 1 | | | | | | | | | | | 3 | 3 | | |
| Sum | Performance Standard | | | | 10 | 10 | 7 | 7 | 8 | 8 | 10 | 10 | 12 | 12 | 10 | 10 | 5 | 5 | 11 | 11 | 2 | 2 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | | 7 | | 8 | | 10 | | 12 | | 10 | | 5 | | 11 | | 2 |
| | Stems/Acre | | | | | 405 | | 283 | | 324 | | 405 | | 486 | | 283 | | 162 | | 445 | | 40 |
| | Species Count | | | | | 4 | | 7 | | 5 | | 5 | | 6 | | 3 | | 3 | | 7 | | 1 |
| | Dominant Species Composition (%) | | | | | 40 | | 14 | | 25 | | 50 | | 25 | | 80 | | 60 | | 27 | | 100 |
| | Average Plot Height (ft.) | | | | | 1 | | 1 | | 1 | | 2 | | 2 | | 2 | | 2 | | 1 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| | | | | | | | | | | | | | | | | | | | | | | |
| Post Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | | 7 | | 8 | | 10 | | 12 | | 10 | | 5 | | 11 | | 2 |
| | Stems/Acre | | | | | 405 | | 283 | | 324 | | 405 | | 486 | | 283 | | 162 | | 445 | | 40 |
| | Species Count | | | | | 4 | | 7 | | 5 | | 5 | | 6 | | 3 | | 3 | | 7 | | 1 |
| | Dominant Species Composition (%) | | | | | 40 | | 14 | | 25 | | 50 | | 25 | | 80 | | 60 | | 27 | | 100 |
| | Average Plot Height (ft.) | | | | | 1 | | 1 | | 1 | | 2 | | 2 | | 2 | | 2 | | 1 | | 2 |
| | % Invasives | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

**Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)**

| | |
|---|---|
| Planted Acreage | 58 |
| Date of Initial Plant | 2023-01-23 |
| Date(s) of Supplemental Plant(s) | NA |
| Date(s) Mowing | NA |
| Date of Current Survey | 2023-02-10 |
| Plot size (ACRES) | 0.0247 |

| | Scientific Name | Common Name | Tree/Shrub | Indicator Status | Veg Plot 37 F | | Veg Plot 1 R | Veg Plot 2 R | Veg Plot 3 R | Veg Plot 4 R | Veg Plot 5 R | Veg Plot 6 R | Veg Plot 7 R | Veg Plot 8 R | Veg Plot 9 R | Veg Plot 10 R | Veg Plot 11 R | Veg Plot 12 R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Planted | Total | Total | Total | Total | Total | Total | Total | Total | Total | Total | Total | Total | Total |
| Species Included in Approved Mitigation Plan | Betula nigra | river birch | Tree | FACW | 1 | 1 | | 3 | 4 | 3 | 2 | | | 1 | 1 | | | |
| | Carya ovata | shagbark hickory | Tree | FACU | | | | 1 | | | | | | 9 | | | | |
| | Celtis occidentalis | common hackberry | Tree | FACU | | | | 1 | | 1 | | | | | | | | 1 |
| | Cercis canadensis | eastern redbud | Tree | FACU | | | | | | | | | | | | | | |
| | Cornus amomum | silky dogwood | Shrub | FACW | | | 1 | 17 | 2 | 2 | | | | | 3 | 2 | 1 | 1 |
| | Diospyros virginiana | common persimmon | Tree | FAC | 4 | 4 | | 1 | | | | | 2 | | | | | |
| | Liriodendron tulipifera | tuliptree | Tree | FACU | | | | | | | | | | | | | | |
| | Nyssa sylvatica | blackgum | Tree | FAC | | | | 2 | 3 | | | | 1 | | 1 | | | |
| | Platanus occidentalis | American sycamore | Tree | FACW | | | | | 1 | 3 | 1 | | | | 4 | 4 | | |
| | Quercus alba | white oak | Tree | FACU | | | | | | | | | | 2 | | | | 1 |
| | Quercus michauxii | swamp chestnut oak | Tree | FACW | | | 1 | | | | 1 | | | | | | | |
| | Quercus nigra | water oak | Tree | FAC | 4 | 4 | 2 | 9 | 2 | | | | 3 | 1 | | | | 1 |
| | Quercus phellos | willow oak | Tree | FAC | | | | | | | 3 | 1 | 2 | | | | | |
| | Quercus rubra | northern red oak | Tree | FACU | 1 | 1 | | | | | 1 | 1 | | | | | | |
| | Quercus sp. | | | | | | | | | | 1 | | 1 | | 1 | | | |
| | Ulmus americana | American elm | Tree | FACW | | | | 1 | | | | | | | | | 1 | |
| Sum | Performance Standard | | | | 10 | 10 | 4 | 35 | 12 | 9 | 9 | 2 | 9 | 13 | 10 | 6 | 2 | 4 |
| | | | | | | | | | | | | | | | | | | |
| Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | 4 | 35 | 12 | 9 | 9 | 2 | 9 | 13 | 10 | 6 | 2 | 4 |
| | Stems/Acre | | | | | 405 | 162 | 1417 | 486 | 364 | 364 | 81 | 364 | 405 | 405 | 202 | 81 | 162 |
| | Species Count | | | | | 4 | 3 | 8 | 5 | 4 | 6 | 2 | 5 | 4 | 5 | 2 | 2 | 4 |
| | Dominant Species Composition (%) | | | | | 40 | 50 | 49 | 33 | 33 | 33 | 50 | 33 | 69 | 40 | 67 | 50 | 25 |
| | Average Plot Height (ft.) | | | | | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 1 |
| | % Invasives | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | | | | | | | | |
| Post Mitigation Plan Performance Standard | Current Year Stem Count | | | | | 10 | 4 | 35 | 12 | 9 | 9 | 2 | 9 | 13 | 10 | 6 | 2 | 4 |
| | Stems/Acre | | | | | 405 | 162 | 1417 | 486 | 364 | 364 | 81 | 364 | 405 | 405 | 202 | 81 | 162 |
| | Species Count | | | | | 4 | 3 | 8 | 5 | 4 | 6 | 2 | 5 | 4 | 5 | 2 | 2 | 4 |
| | Dominant Species Composition (%) | | | | | 40 | 50 | 49 | 33 | 33 | 33 | 50 | 33 | 69 | 40 | 67 | 50 | 25 |
| | Average Plot Height (ft.) | | | | | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 1 |
| | % Invasives | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

## Appendix C: Stream Geomorphology Data

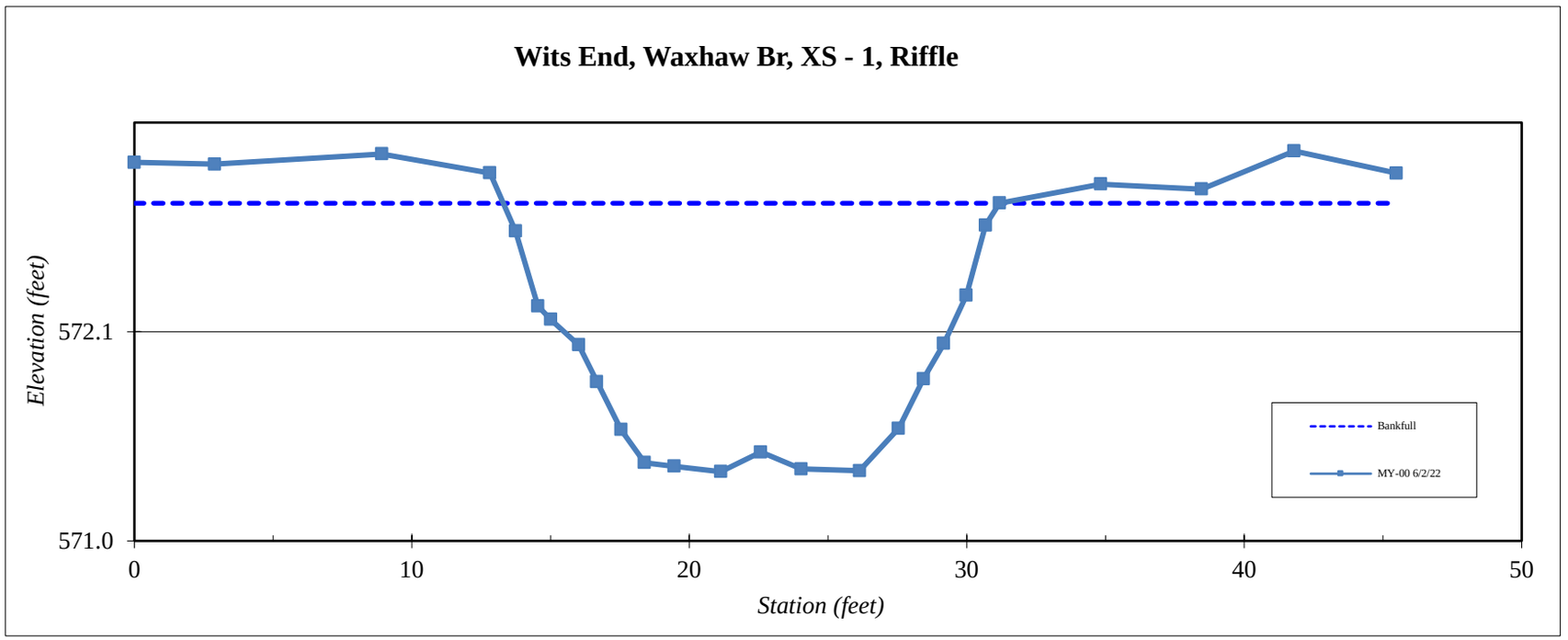
Cross-Sections with Annual Overlays
Longitudinal Profile
Table 9A-I. Baseline Stream Data Summary Tables
Table 10A-F. Cross-Section Morphology Monitoring Summary

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -1 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.0 |
| 2.9 | 573.0 |
| 8.9 | 573.0 |
| 12.8 | 572.9 |
| 13.7 | 572.6 |
| 14.5 | 572.2 |
| 15.0 | 572.1 |
| 16.0 | 572.0 |
| 16.7 | 571.8 |
| 17.5 | 571.6 |
| 18.4 | 571.4 |
| 19.5 | 571.4 |
| 21.1 | 571.3 |
| 22.6 | 571.4 |
| 24.0 | 571.3 |
| 26.1 | 571.3 |
| 27.5 | 571.6 |
| 28.4 | 571.8 |
| 29.2 | 572.0 |
| 30.0 | 572.3 |
| 30.7 | 572.66 |
| 31.2 | 572.8 |
| 34.8 | 572.9 |
| 38.5 | 572.9 |
| 41.8 | 573.1 |
| 45.5 | 572.9 |
| | |
| | |
| | |
| | |
| | |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.78 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 571.33 |
| **LTOB Elevation:** | 572.78 |
| **LTOB Max Depth:** | 1.45 |
| **LTOB Cross Sectional Area:** | 19.0 |

| | |
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -2 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.4 |
| 4.6 | 573.4 |
| 9.8 | 573.2 |
| 12.8 | 573.1 |
| 14.6 | 572.8 |
| 15.6 | 572.3 |
| 17.1 | 571.5 |
| 17.9 | 571.0 |
| 19.6 | 570.7 |
| 20.8 | 570.4 |
| 22.5 | 570.3 |
| 23.4 | 570.5 |
| 24.7 | 570.7 |
| 25.8 | 571.0 |
| 27.0 | 571.2 |
| 28.5 | 571.5 |
| 29.9 | 571.7 |
| 31.1 | 572.1 |
| 33.3 | 572.5 |
| 35.4 | 573.0 |
| 38.7 | 572.89 |
| 42.2 | 573.0 |
| 45.9 | 572.9 |
| | |
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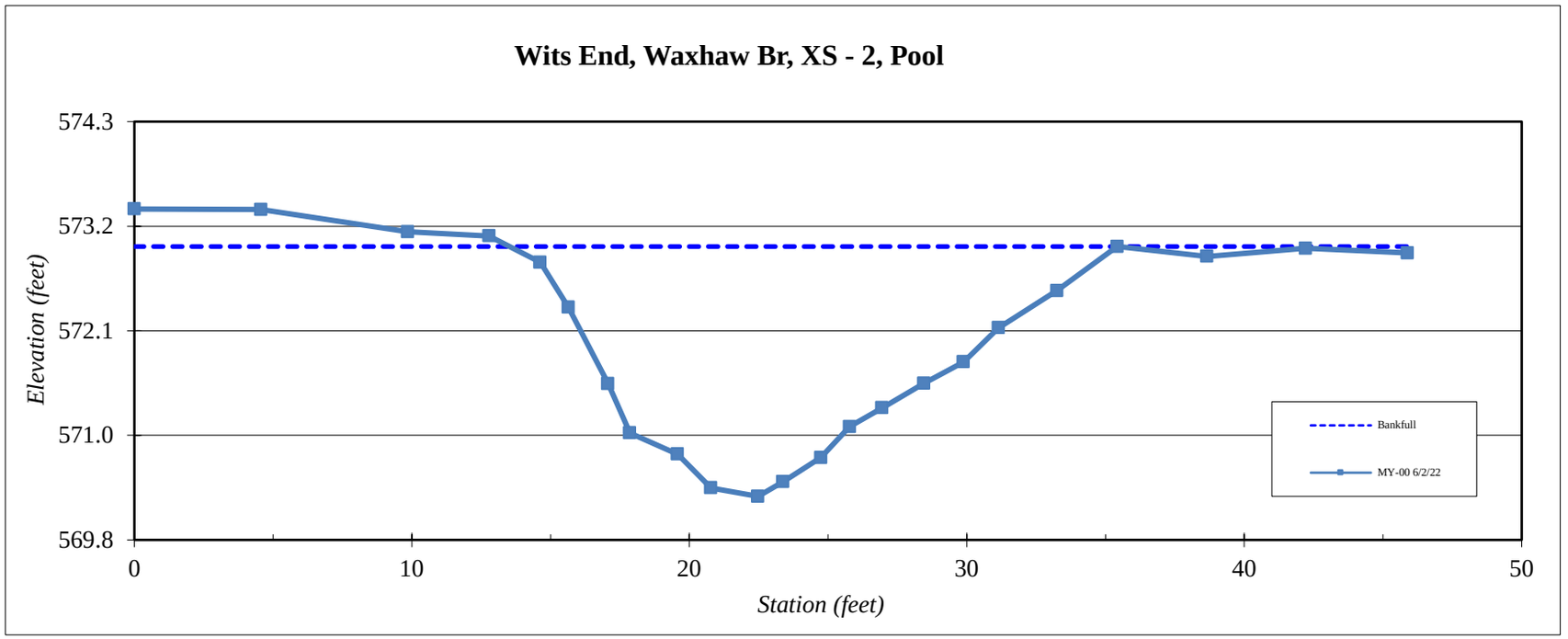
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.99 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 570.29 |
| **LTOB Elevation:** | 572.99 |
| **LTOB Max Depth:** | 2.70 |
| **LTOB Cross Sectional Area:** | 32.2 |


| | |
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -3 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.7 |
| 4.4 | 578.4 |
| 7.4 | 578.4 |
| 8.7 | 578.3 |
| 9.4 | 578.1 |
| 10.3 | 577.5 |
| 11.7 | 577.1 |
| 14.1 | 577.3 |
| 16.1 | 577.4 |
| 18.4 | 577.3 |
| 20.1 | 577.6 |
| 21.0 | 577.8 |
| 22.1 | 578.3 |
| 23.2 | 578.5 |
| 25.5 | 578.4 |
| 28.8 | 578.2 |
| 30.9 | 578.3 |
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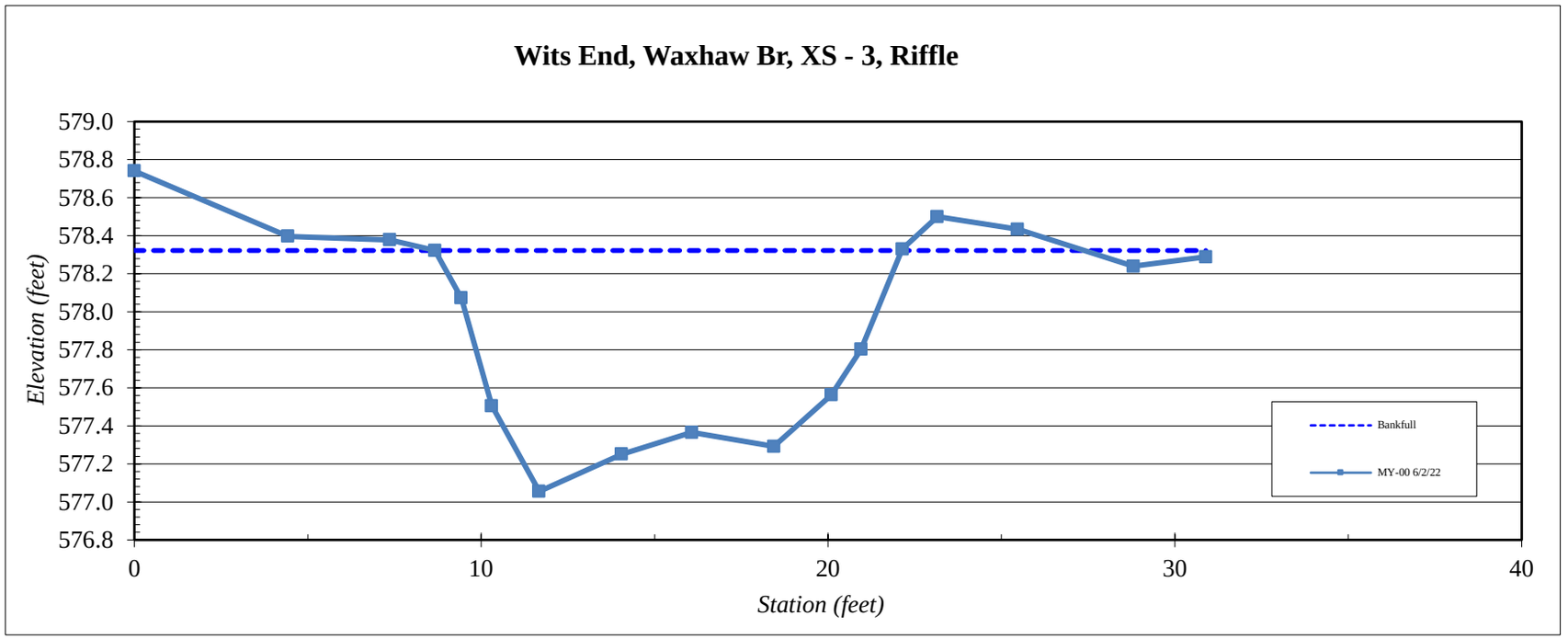
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 578.32 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 577.06 |
| **LTOB Elevation:** | 578.32 |
| **LTOB Max Depth:** | 1.27 |
| **LTOB Cross Sectional Area:** | 11.5 |

| | |
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -4 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.5 |
| 3.9 | 578.5 |
| 6.4 | 578.4 |
| 8.1 | 578.0 |
| 9.3 | 577.7 |
| 9.6 | 577.5 |
| 10.4 | 577.0 |
| 11.8 | 576.5 |
| 12.7 | 576.6 |
| 13.8 | 576.6 |
| 15.8 | 576.4 |
| 16.8 | 576.5 |
| 17.7 | 576.7 |
| 18.4 | 576.8 |
| 19.1 | 577.1 |
| 19.4 | 577.4 |
| 20.5 | 578.0 |
| 21.2 | 578.3 |
| 22.0 | 578.5 |
| 23.9 | 578.6 |
| 26.2 | 578.35 |
| 29.3 | 578.5 |
| 31.3 | 578.5 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 578.36 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 576.45 |
| **LTOB Elevation:** | 578.36 |
| **LTOB Max Depth:** | 1.92 |
| **LTOB Cross Sectional Area:** | 18.6 |

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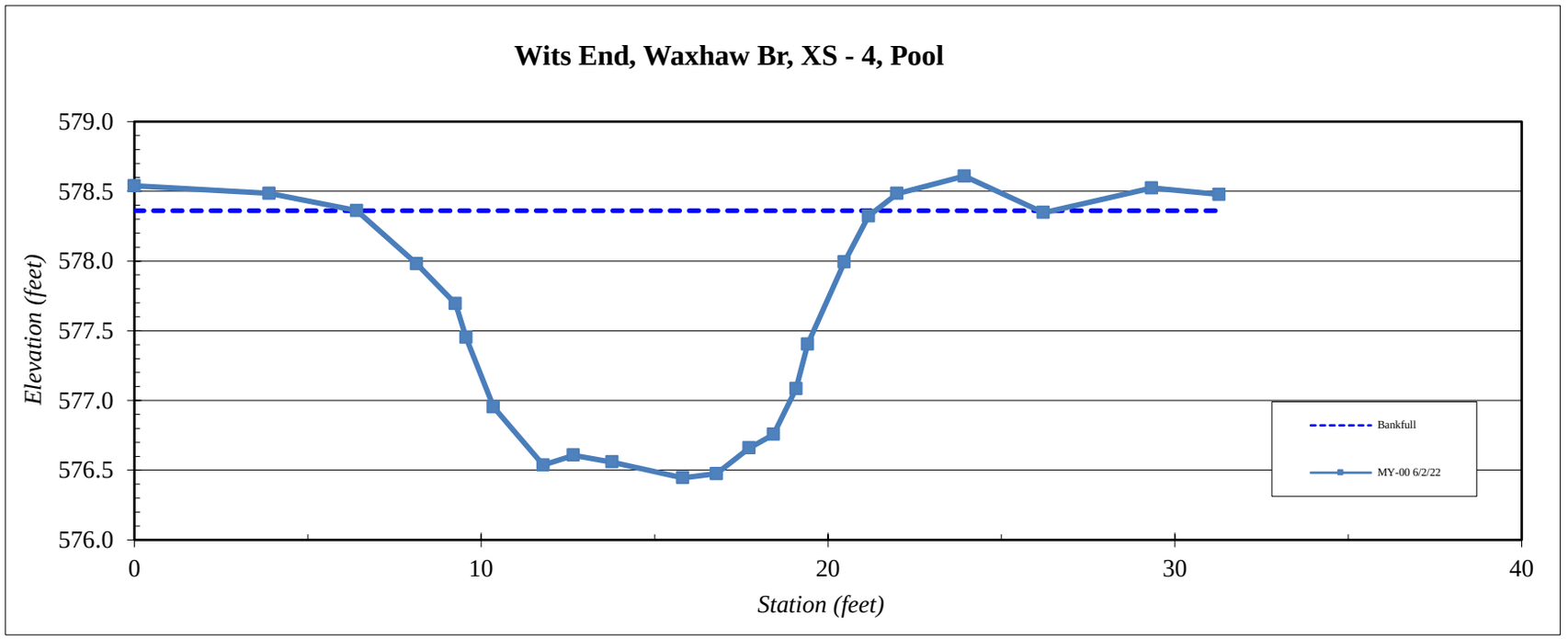
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -5 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.9 |
| 4.0 | 584.0 |
| 7.1 | 584.1 |
| 9.3 | 584.0 |
| 10.4 | 583.6 |
| 11.0 | 583.3 |
| 11.6 | 583.1 |
| 12.7 | 582.7 |
| 15.0 | 582.7 |
| 16.9 | 582.6 |
| 18.8 | 582.6 |
| 20.6 | 582.6 |
| 21.8 | 582.8 |
| 22.6 | 582.9 |
| 23.5 | 583.2 |
| 24.4 | 583.6 |
| 25.6 | 584.1 |
| 28.4 | 583.9 |
| 31.1 | 583.9 |
| 33.6 | 583.7 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 583.96 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 582.57 |
| **LTOB Elevation:** | 583.96 |
| **LTOB Max Depth:** | 1.39 |
| **LTOB Cross Sectional Area:** | 16.3 |

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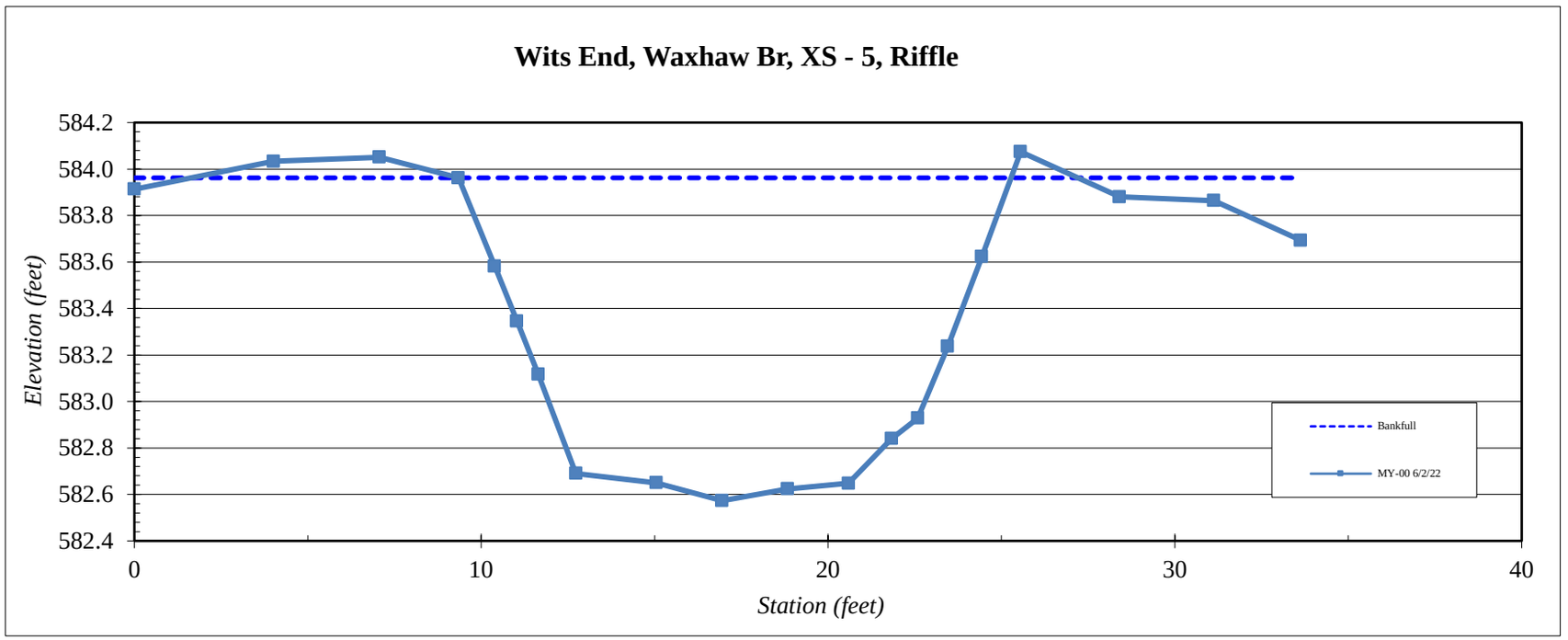
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -6 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 584.0 |
| 3.3 | 584.0 |
| 6.4 | 583.9 |
| 8.4 | 583.9 |
| 9.8 | 583.5 |
| 11.3 | 583.1 |
| 12.5 | 582.7 |
| 13.4 | 582.4 |
| 14.4 | 582.1 |
| 15.6 | 581.8 |
| 16.4 | 581.8 |
| 17.5 | 582.0 |
| 18.5 | 582.0 |
| 19.7 | 581.9 |
| 20.3 | 582.0 |
| 21.5 | 581.9 |
| 21.9 | 582.1 |
| 22.4 | 582.9 |
| 23.1 | 583.0 |
| 24.4 | 583.3 |
| 25.2 | 583.77 |
| 26.4 | 584.1 |
| 28.3 | 584.2 |
| 30.7 | 583.9 |
| 33.4 | 583.7 |
| 35.3 | 583.7 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 583.94 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.80 |
| **LTOB Elevation:** | 583.94 |
| **LTOB Max Depth:** | 2.14 |
| **LTOB Cross Sectional Area:** | 23.5 |

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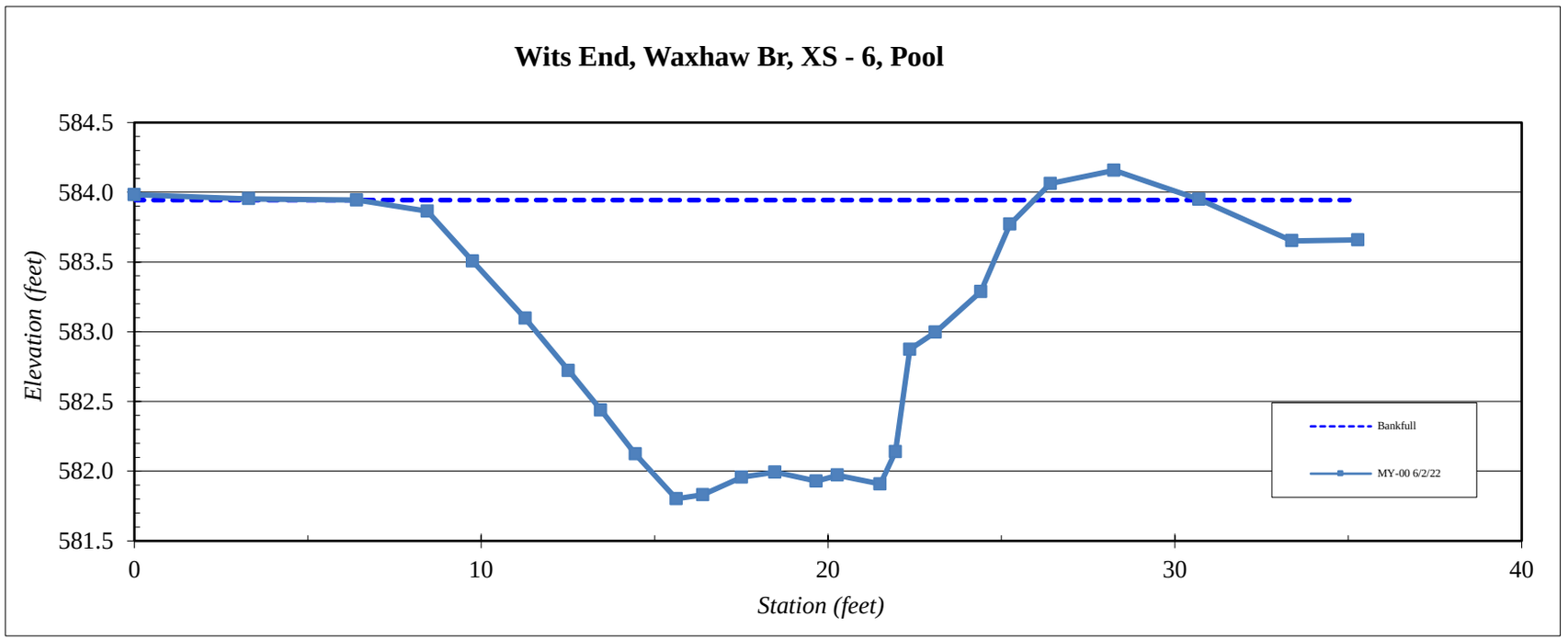
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -7 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 587.9 |
| 3.5 | 587.9 |
| 5.0 | 588.0 |
| 6.4 | 587.7 |
| 7.7 | 587.2 |
| 9.3 | 587.1 |
| 10.1 | 586.7 |
| 11.1 | 586.6 |
| 12.4 | 586.4 |
| 13.7 | 586.2 |
| 15.0 | 586.3 |
| 16.6 | 586.0 |
| 17.4 | 586.1 |
| 18.1 | 586.6 |
| 18.8 | 587.1 |
| 19.7 | 587.3 |
| 21.3 | 588.0 |
| 22.8 | 588.0 |
| 25.7 | 588.1 |
| 29.1 | 588.2 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 587.97 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.03 |
| **LTOB Elevation:** | 587.97 |
| **LTOB Max Depth:** | 1.93 |
| **LTOB Cross Sectional Area:** | 18.2 |

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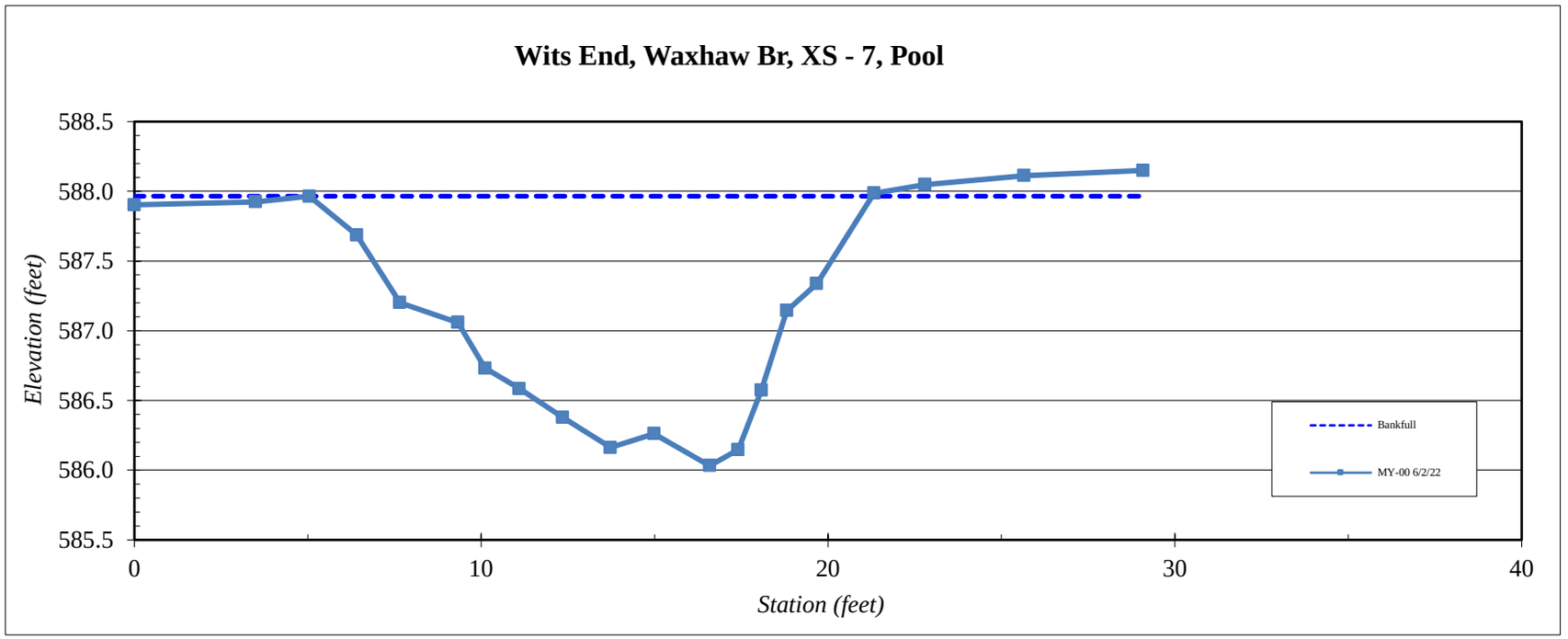
|---|---|
| **Stream Type** | C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -8 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.0 |
| 3.7 | 588.1 |
| 5.8 | 588.0 |
| 7.1 | 587.9 |
| 8.2 | 587.6 |
| 8.7 | 587.4 |
| 10.4 | 587.0 |
| 12.5 | 586.9 |
| 14.2 | 587.0 |
| 15.7 | 587.0 |
| 17.1 | 586.8 |
| 18.5 | 587.2 |
| 19.6 | 587.4 |
| 20.4 | 587.7 |
| 21.6 | 587.9 |
| 24.3 | 587.9 |
| 29.3 | 588.2 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 587.88 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.78 |
| **LTOB Elevation:** | 587.88 |
| **LTOB Max Depth:** | 1.10 |
| **LTOB Cross Sectional Area:** | 10.0 |

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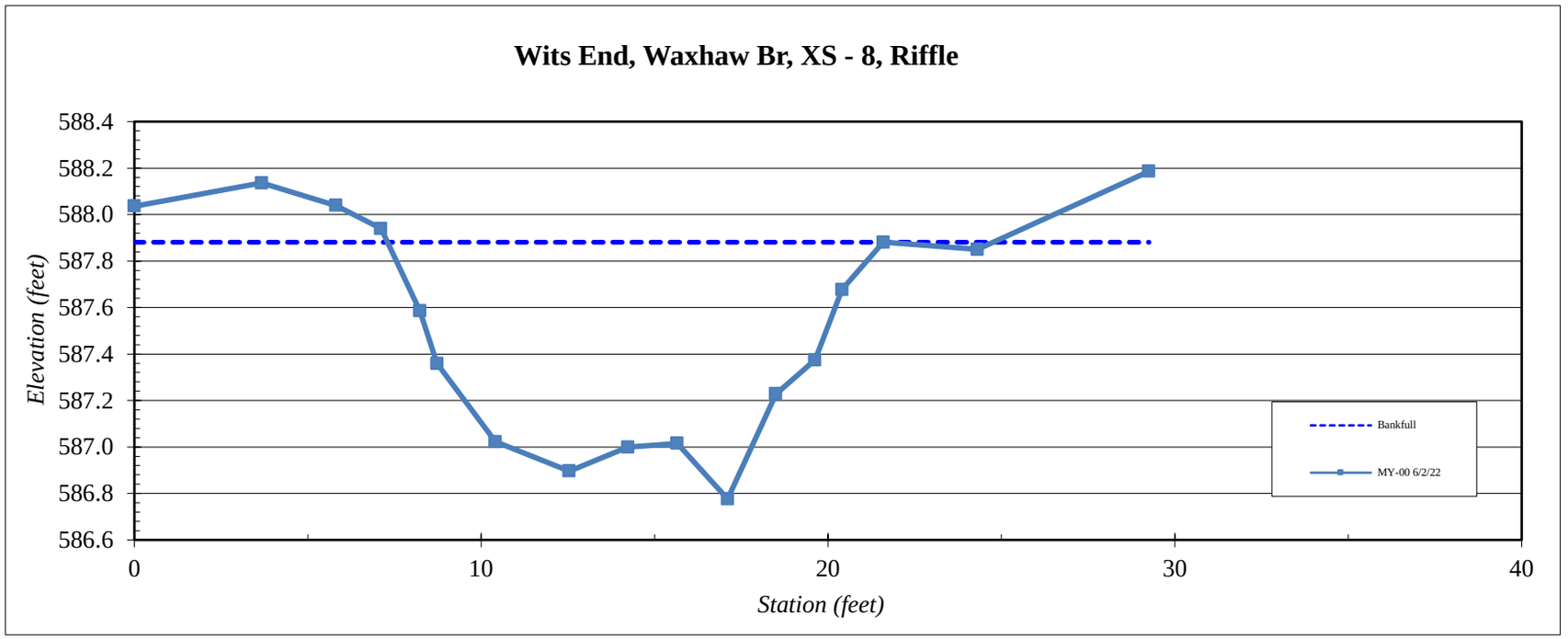
|---|---|
| **Stream Type** | C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -9 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.0 |
| 3.2 | 590.1 |
| 5.1 | 590.0 |
| 6.3 | 589.7 |
| 7.3 | 589.2 |
| 8.2 | 589.1 |
| 9.1 | 588.9 |
| 10.9 | 588.7 |
| 12.5 | 588.6 |
| 14.1 | 588.5 |
| 15.3 | 588.6 |
| 16.2 | 588.8 |
| 17.5 | 589.1 |
| 18.3 | 589.6 |
| 19.8 | 590.0 |
| 20.6 | 590.1 |
| 22.3 | 590.3 |
| 24.6 | 590.1 |
| 26.9 | 590.2 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.98 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.56 |
| **LTOB Elevation:** | 589.98 |
| **LTOB Max Depth:** | 1.42 |
| **LTOB Cross Sectional Area:** | 13.9 |

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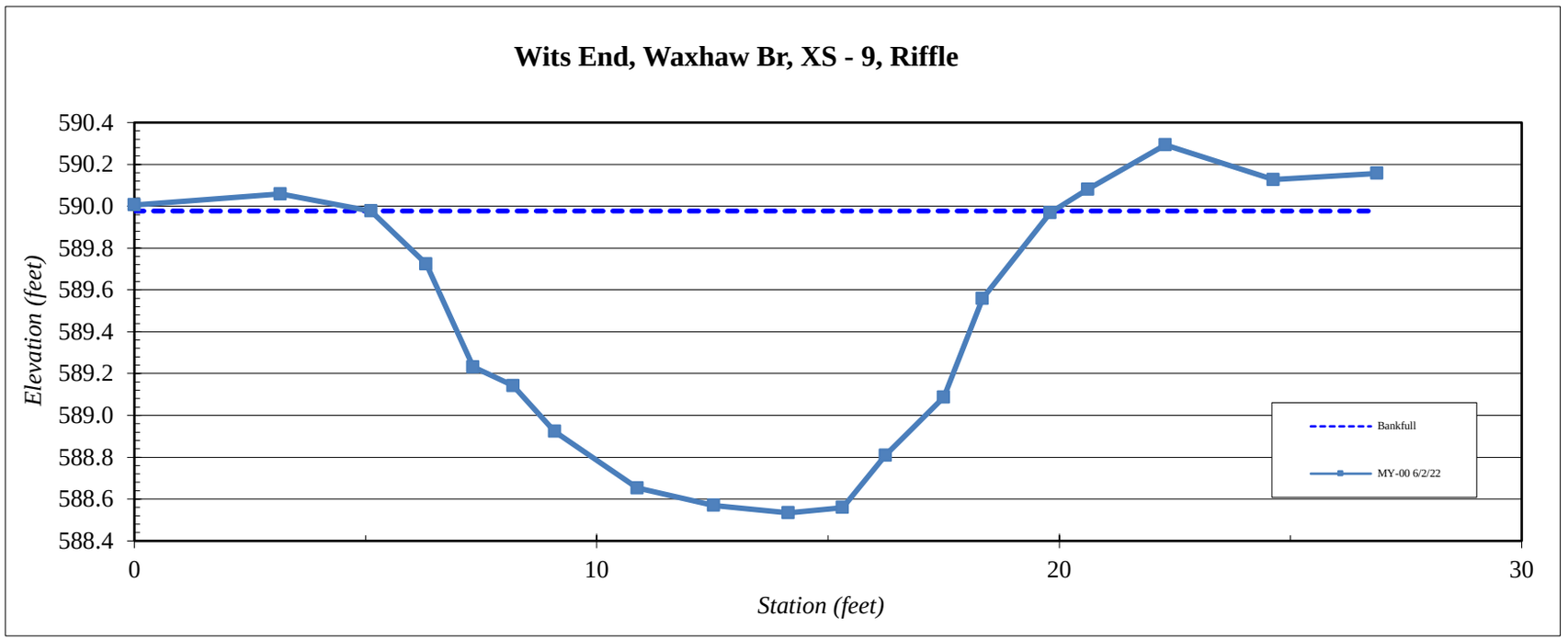
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -10 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.4 |
| 5.8 | 589.9 |
| 7.4 | 589.6 |
| 8.7 | 589.3 |
| 9.7 | 589.2 |
| 10.3 | 588.8 |
| 11.0 | 588.5 |
| 12.1 | 588.1 |
| 13.1 | 587.9 |
| 14.1 | 588.0 |
| 15.2 | 588.0 |
| 16.2 | 588.1 |
| 17.0 | 588.3 |
| 17.7 | 588.4 |
| 17.9 | 588.8 |
| 18.2 | 589.2 |
| 18.7 | 589.5 |
| 19.8 | 589.7 |
| 20.6 | 590.1 |
| 21.4 | 590.1 |
| 22.8 | 590.06 |
| 24.4 | 590.1 |
| 26.6 | 590.2 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.92 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 587.92 |
| **LTOB Elevation:** | 589.92 |
| **LTOB Max Depth:** | 2.00 |
| **LTOB Cross Sectional Area:** | 16.3 |


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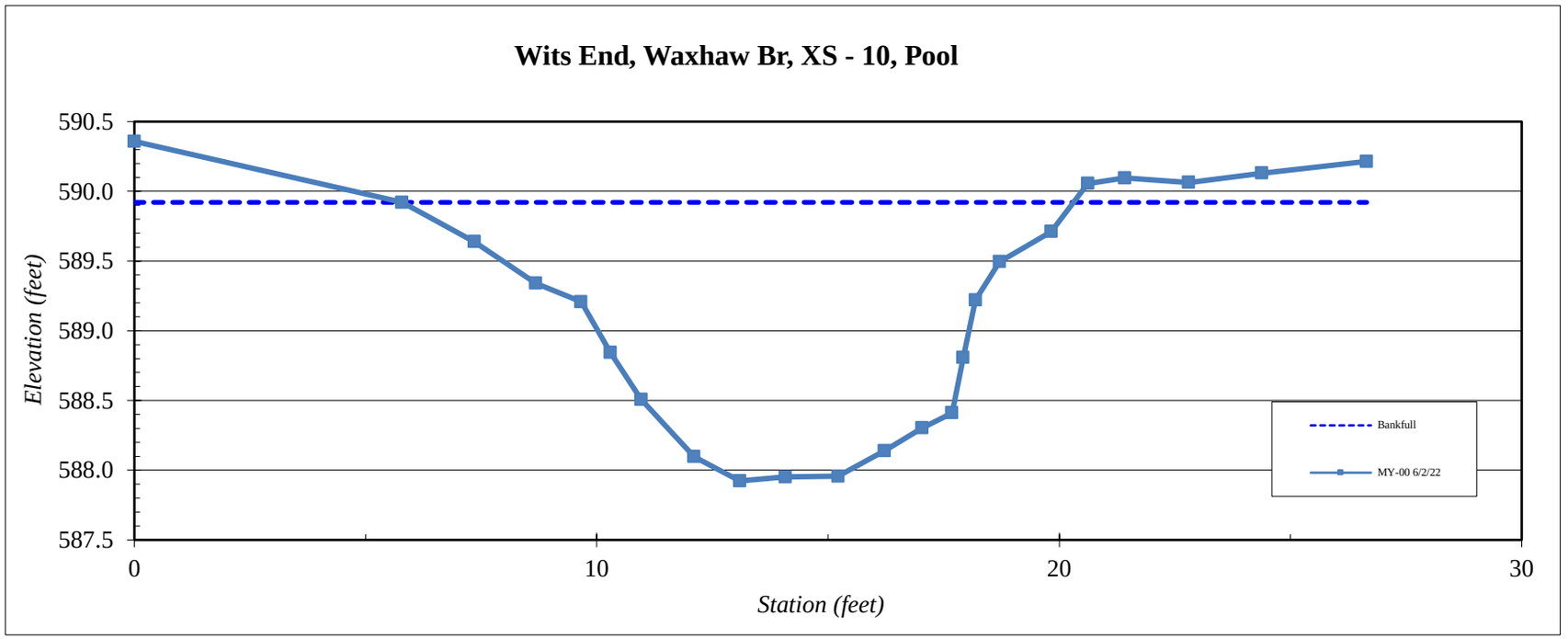
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -11 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.4 |
| 2.1 | 573.5 |
| 3.7 | 573.5 |
| 5.0 | 573.3 |
| 6.0 | 572.8 |
| 6.7 | 572.5 |
| 7.6 | 572.3 |
| 8.1 | 572.2 |
| 9.2 | 572.2 |
| 10.2 | 572.2 |
| 11.0 | 572.3 |
| 11.6 | 572.6 |
| 12.5 | 573.1 |
| 13.1 | 573.3 |
| 13.7 | 573.4 |
| 14.9 | 573.4 |
| 17.7 | 573.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 573.37 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.21 |
| **LTOB Elevation:** | 573.37 |
| **LTOB Max Depth:** | 1.16 |
| **LTOB Cross Sectional Area:** | 6.7 |

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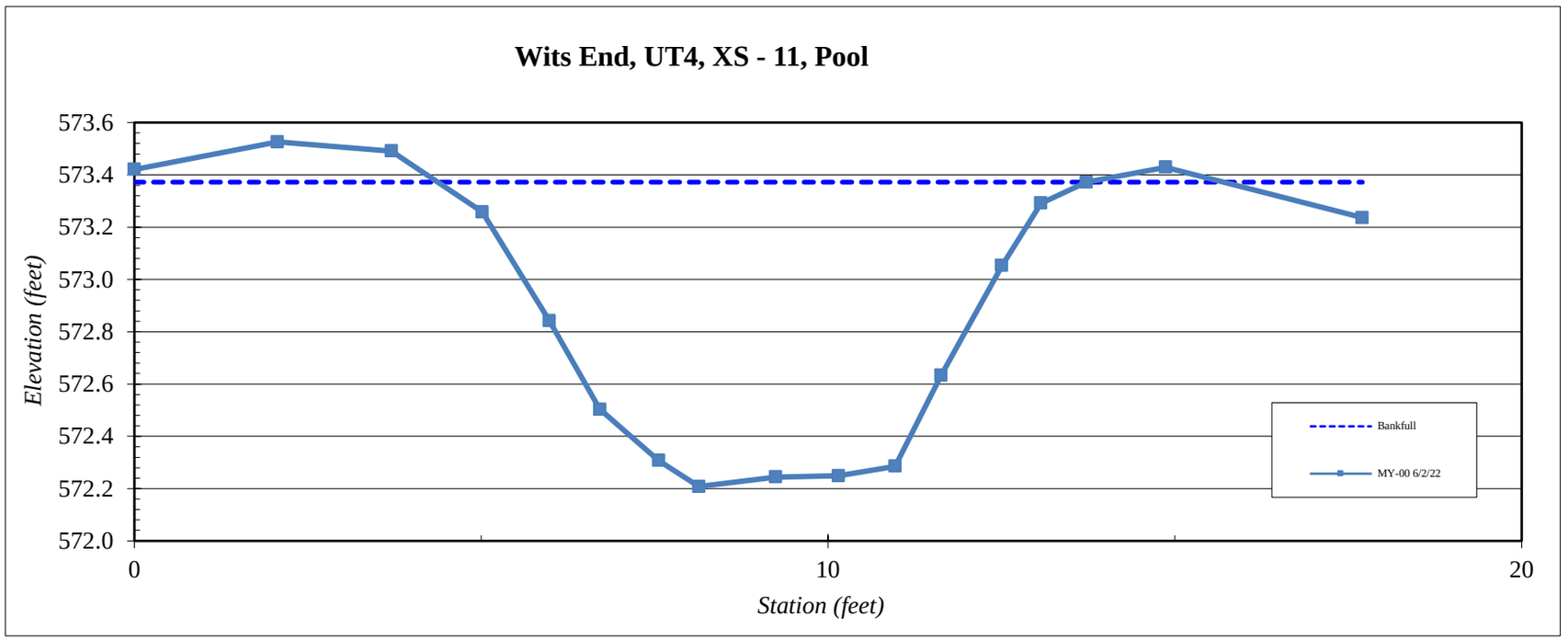
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -12 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.5 |
| 1.6 | 573.4 |
| 3.2 | 573.5 |
| 4.5 | 573.5 |
| 5.1 | 573.2 |
| 5.8 | 572.9 |
| 6.5 | 572.9 |
| 7.4 | 572.7 |
| 8.6 | 572.7 |
| 9.9 | 572.8 |
| 10.8 | 572.7 |
| 11.8 | 572.9 |
| 12.3 | 573.0 |
| 12.6 | 573.4 |
| 13.8 | 573.4 |
| 15.5 | 573.5 |
| 16.9 | 573.5 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 573.37 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.72 |
| **LTOB Elevation:** | 573.37 |
| **LTOB Max Depth:** | 0.65 |
| **LTOB Cross Sectional Area:** | 4.0 |

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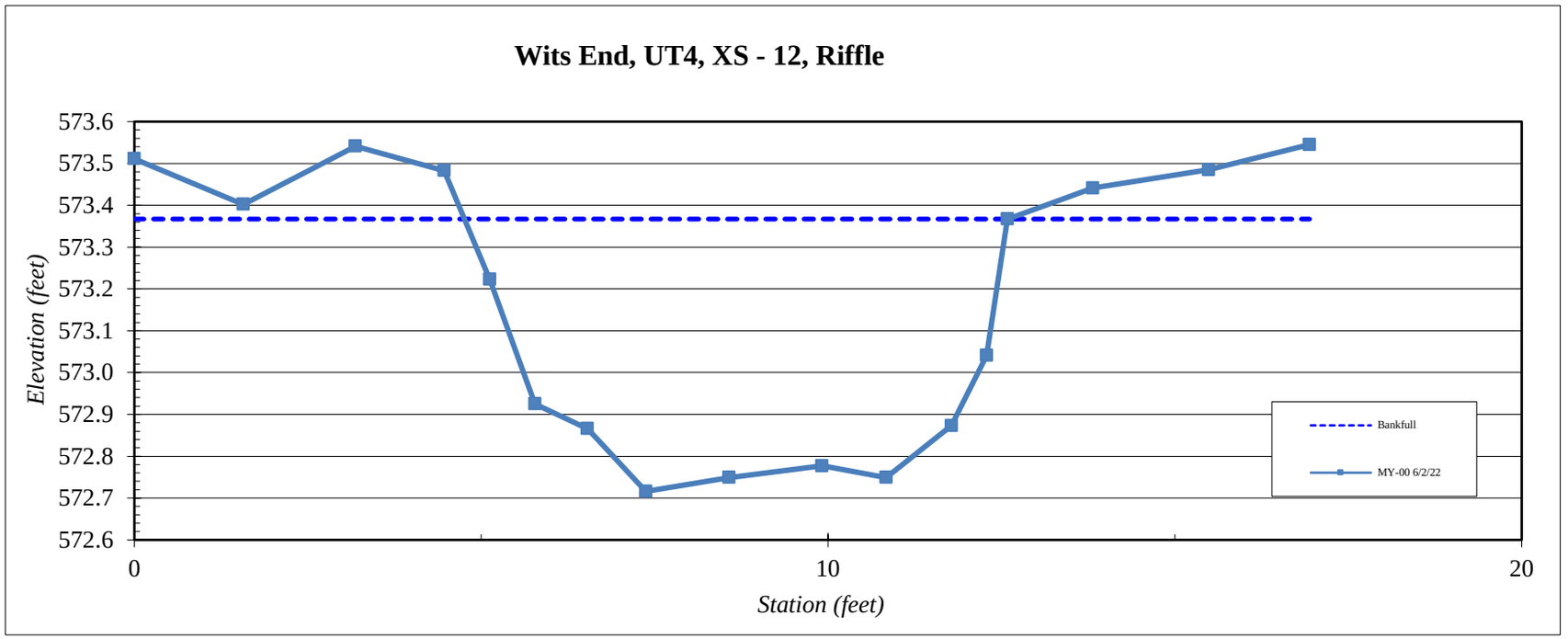
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -13 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 576.6 |
| 3.3 | 576.6 |
| 6.4 | 576.5 |
| 8.1 | 576.3 |
| 9.1 | 576.3 |
| 9.7 | 576.0 |
| 10.4 | 575.5 |
| 11.0 | 575.2 |
| 11.9 | 575.0 |
| 12.6 | 574.9 |
| 13.2 | 574.9 |
| 13.8 | 575.0 |
| 14.5 | 575.4 |
| 15.5 | 575.6 |
| 16.0 | 576.0 |
| 17.0 | 576.3 |
| 17.9 | 576.6 |
| 19.3 | 576.7 |
| 20.7 | 576.6 |
| 23.4 | 576.6 |
| 25.5 | 576.73 |
| 27.6 | 576.8 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 576.28 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 574.88 |
| **LTOB Elevation:** | 576.28 |
| **LTOB Max Depth:** | 1.39 |
| **LTOB Cross Sectional Area:** | 6.4 |

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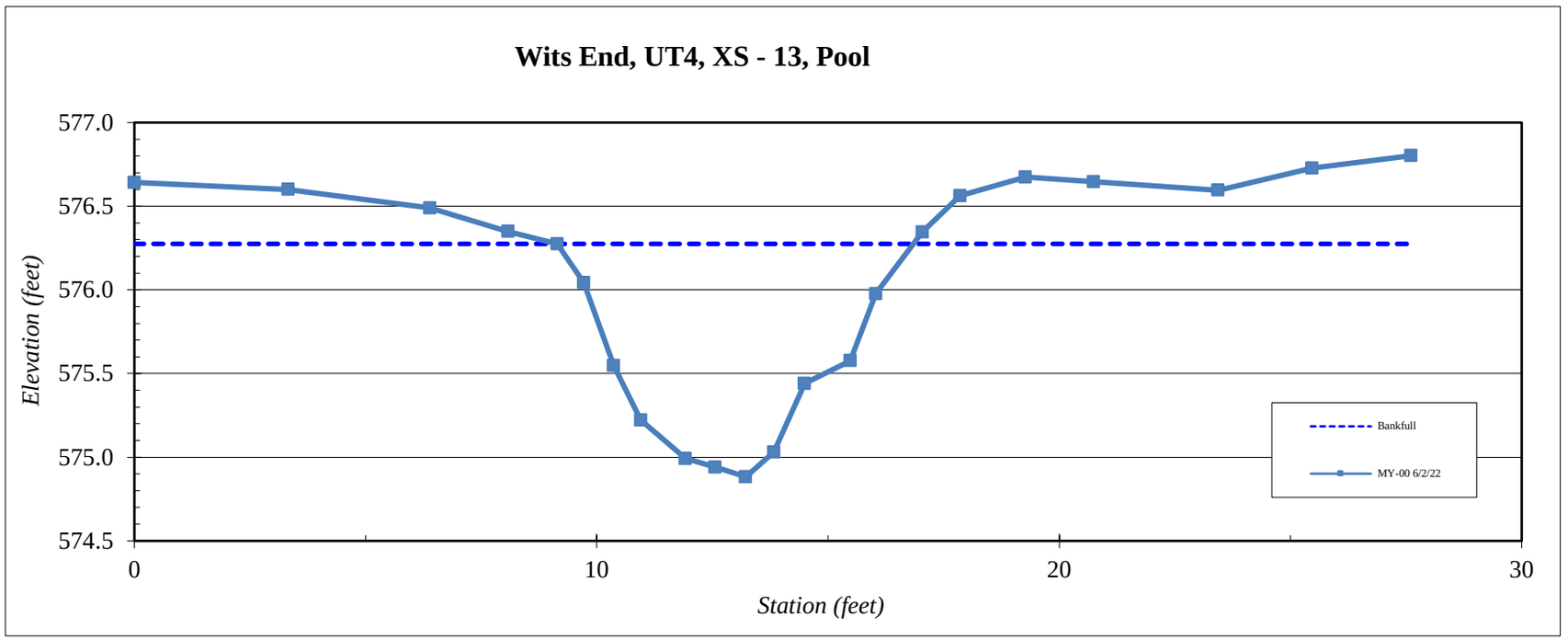
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -14 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 576.5 |
| 3.7 | 576.6 |
| 5.9 | 576.5 |
| 9.0 | 576.6 |
| 10.5 | 576.5 |
| 11.3 | 576.2 |
| 11.9 | 576.0 |
| 13.0 | 575.8 |
| 14.2 | 575.9 |
| 15.2 | 576.0 |
| 16.2 | 576.1 |
| 17.1 | 576.2 |
| 17.8 | 576.5 |
| 18.4 | 576.7 |
| 19.0 | 576.8 |
| 21.7 | 576.7 |
| 24.7 | 576.8 |
| 27.0 | 576.9 |
| 28.6 | 576.8 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 576.50 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 575.81 |
| **LTOB Elevation:** | 576.50 |
| **LTOB Max Depth:** | 0.69 |
| **LTOB Cross Sectional Area:** | 3.2 |

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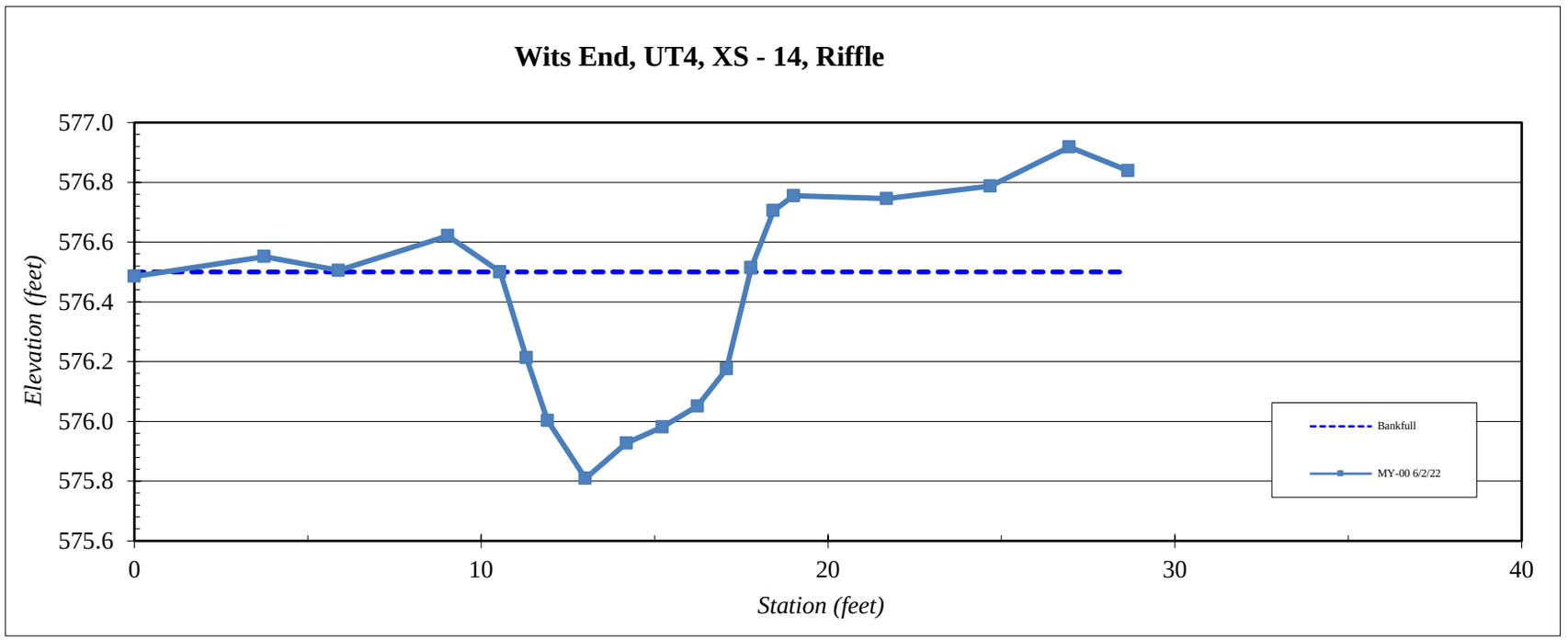
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT5, XS -15 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.0 |
| 2.0 | 573.0 |
| 3.8 | 572.8 |
| 5.3 | 572.5 |
| 6.2 | 572.3 |
| 6.8 | 572.0 |
| 7.4 | 571.7 |
| 7.9 | 571.7 |
| 8.6 | 571.7 |
| 9.3 | 571.8 |
| 9.9 | 571.8 |
| 10.4 | 572.1 |
| 11.0 | 572.4 |
| 11.6 | 572.8 |
| 12.7 | 572.8 |
| 14.5 | 572.8 |
| 15.7 | 572.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.78 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 571.65 |
| **LTOB Elevation:** | 572.78 |
| **LTOB Max Depth:** | 1.13 |
| **LTOB Cross Sectional Area:** | 4.9 |

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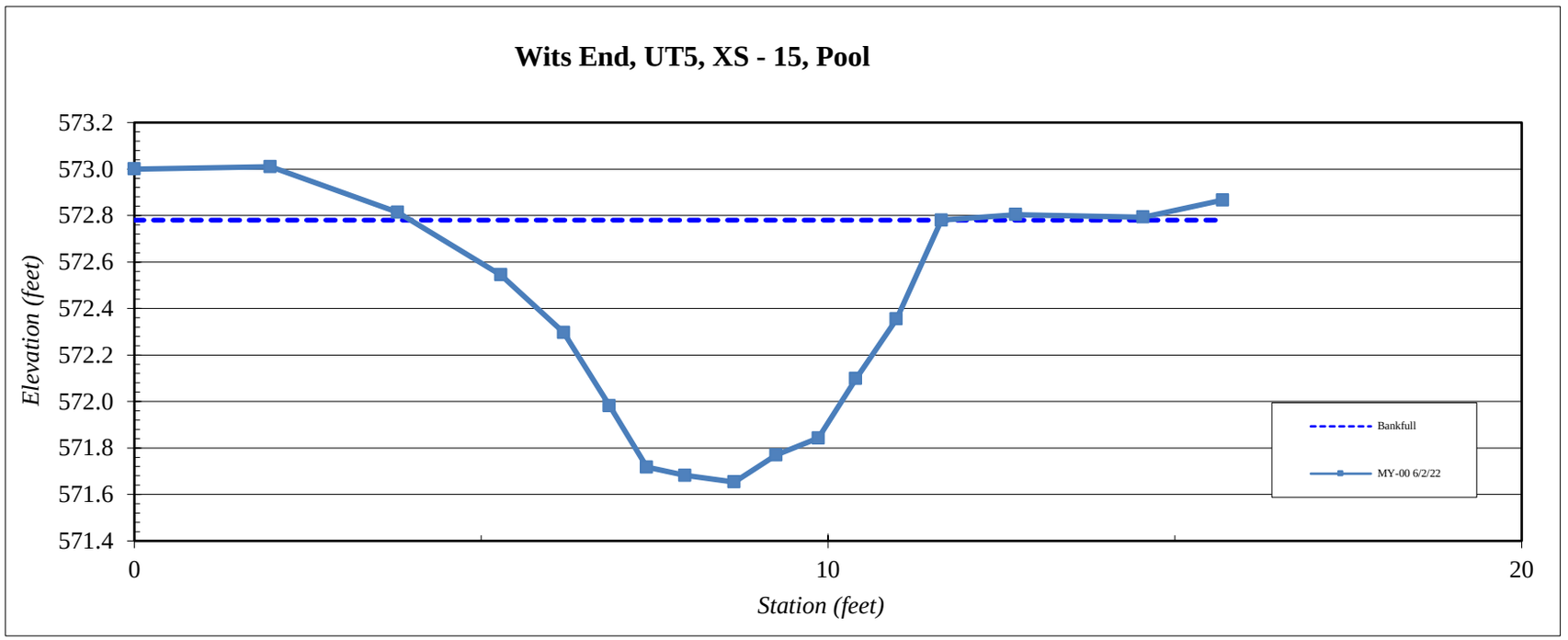
|---|---|
| **Stream Type** | E/C |



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| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT5, XS -16 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.1 |
| 2.5 | 573.1 |
| 4.0 | 572.9 |
| 4.7 | 572.7 |
| 5.5 | 572.6 |
| 6.3 | 572.4 |
| 7.4 | 572.2 |
| 8.2 | 572.2 |
| 8.7 | 572.3 |
| 10.1 | 572.3 |
| 10.8 | 572.5 |
| 11.6 | 572.8 |
| 12.6 | 572.8 |
| 14.4 | 572.8 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.84 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.21 |
| **LTOB Elevation:** | 572.84 |
| **LTOB Max Depth:** | 0.63 |
| **LTOB Cross Sectional Area:** | 3.0 |

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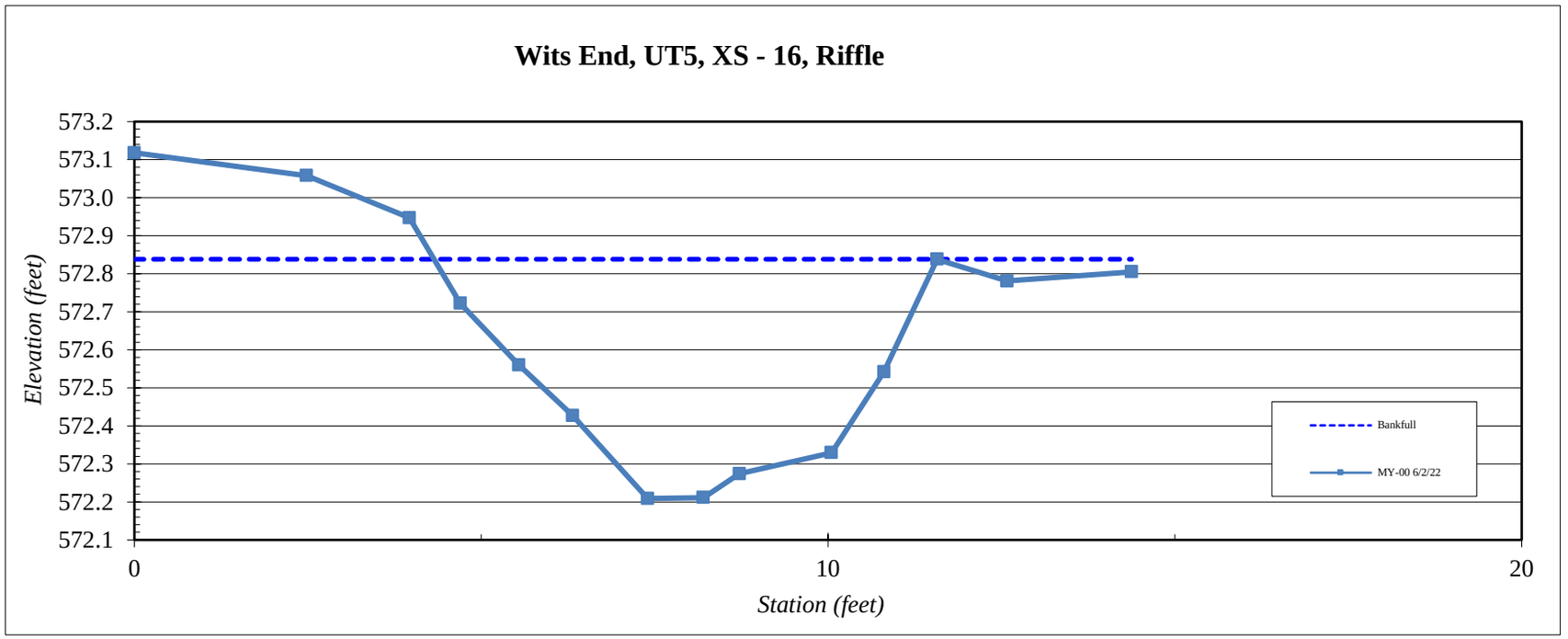
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -17 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.4 |
| 6.1 | 578.0 |
| 8.7 | 577.9 |
| 10.6 | 577.9 |
| 11.7 | 577.7 |
| 13.5 | 577.0 |
| 14.8 | 576.7 |
| 16.0 | 576.4 |
| 18.0 | 576.3 |
| 20.3 | 576.3 |
| 21.1 | 576.5 |
| 21.8 | 577.1 |
| 22.9 | 577.5 |
| 23.8 | 577.9 |
| 29.0 | 577.8 |
| 35.8 | 578.1 |
| 38.2 | 578.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 577.89 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 576.32 |
| **LTOB Elevation:** | 577.89 |
| **LTOB Max Depth:** | 1.57 |
| **LTOB Cross Sectional Area:** | 13.3 |

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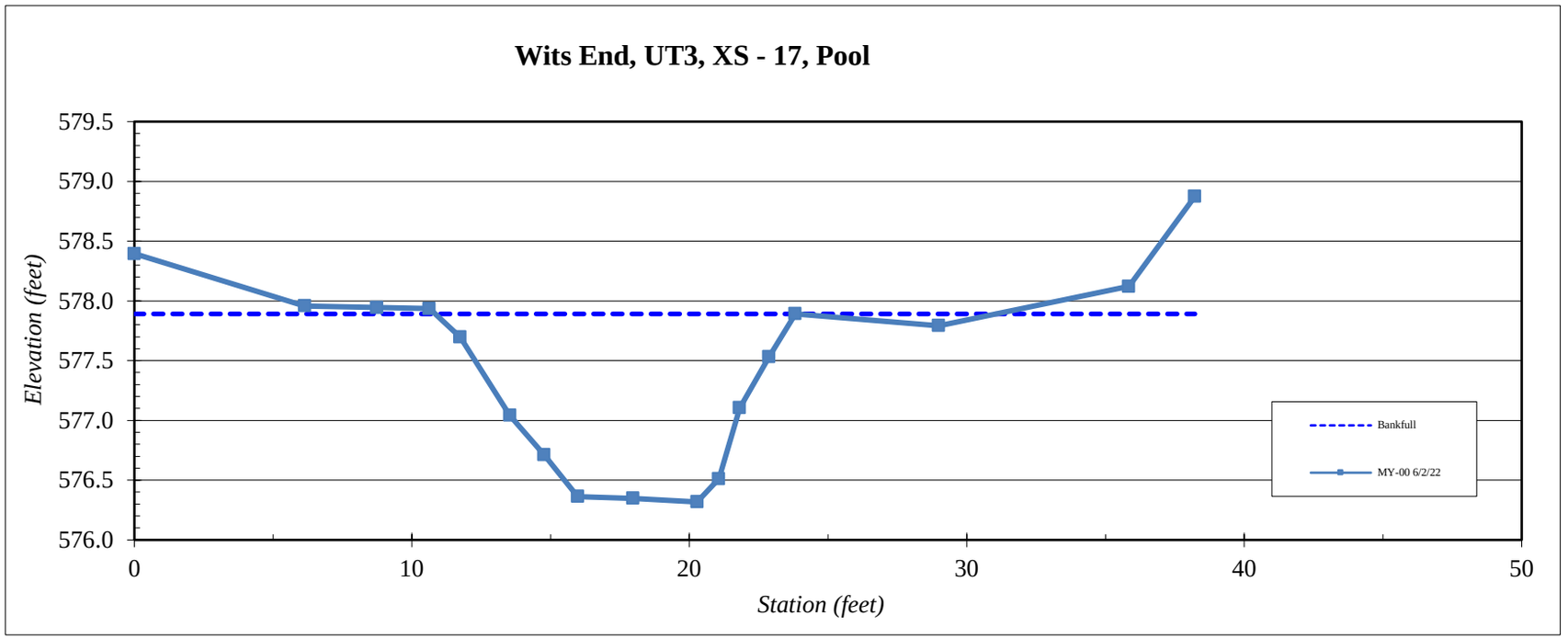
|---|---|
| **Stream Type** | C |



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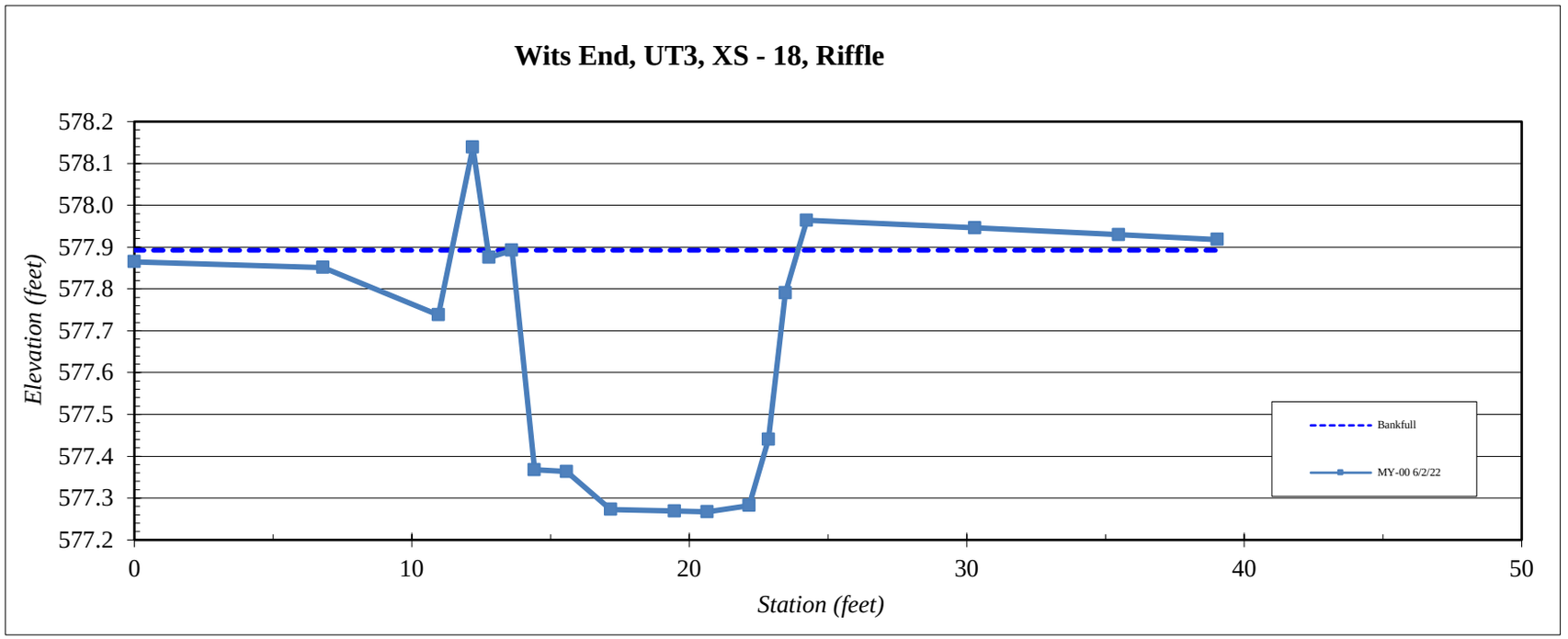
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -18 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 577.9 |
| 6.8 | 577.9 |
| 11.0 | 577.7 |
| 12.2 | 578.1 |
| 12.8 | 577.9 |
| 13.6 | 577.9 |
| 14.4 | 577.4 |
| 15.6 | 577.4 |
| 17.2 | 577.3 |
| 19.5 | 577.3 |
| 20.7 | 577.3 |
| 22.2 | 577.3 |
| 22.9 | 577.4 |
| 23.5 | 577.8 |
| 24.2 | 578.0 |
| 30.3 | 577.9 |
| 35.5 | 577.9 |
| 39.0 | 577.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 577.89 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 577.27 |
| **LTOB Elevation:** | 577.89 |
| **LTOB Max Depth:** | 0.63 |
| **LTOB Cross Sectional Area:** | 5.4 |

| | |
|---|---|
| **Stream Type** | C |

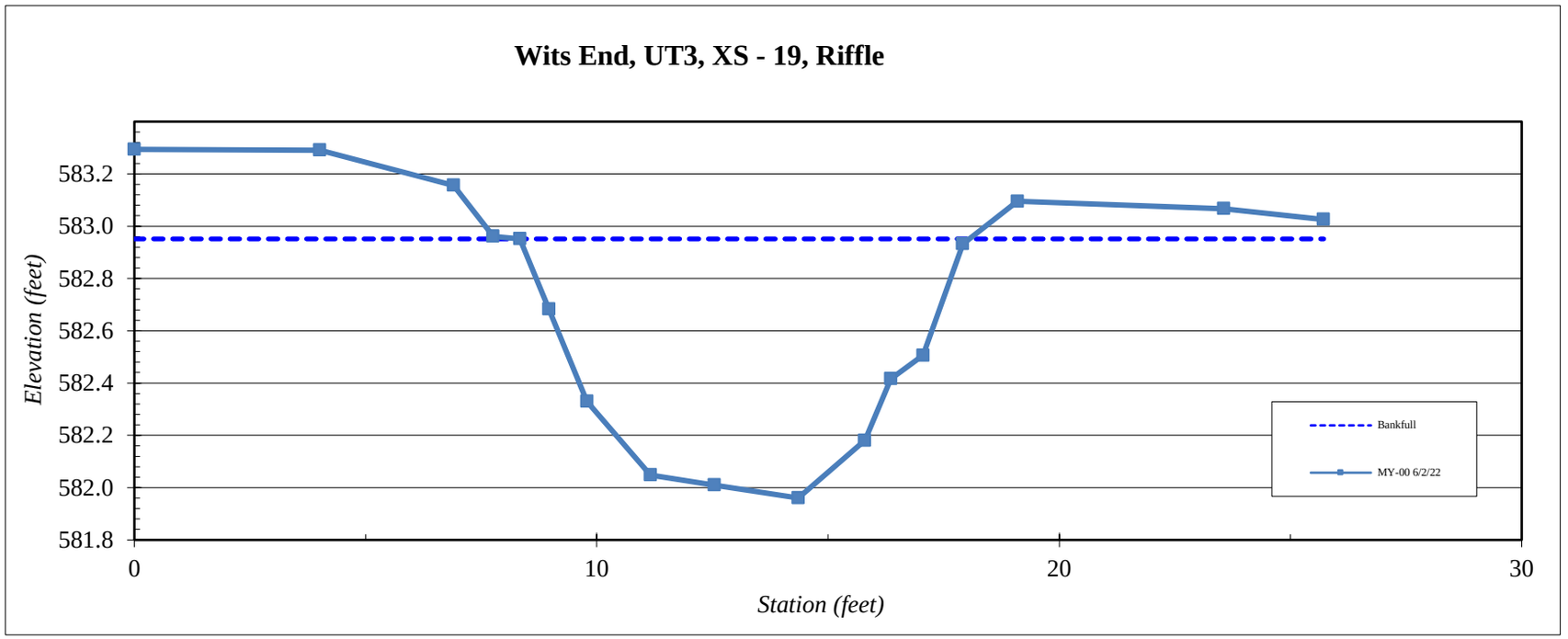


| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -19 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.3 |
| 4.0 | 583.3 |
| 6.9 | 583.2 |
| 7.8 | 583.0 |
| 8.3 | 583.0 |
| 9.0 | 582.7 |
| 9.8 | 582.3 |
| 11.2 | 582.0 |
| 12.5 | 582.0 |
| 14.4 | 582.0 |
| 15.8 | 582.2 |
| 16.4 | 582.4 |
| 17.1 | 582.5 |
| 17.9 | 582.9 |
| 19.1 | 583.1 |
| 23.6 | 583.1 |
| 25.7 | 583.0 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 582.95 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.96 |
| **LTOB Elevation:** | 582.95 |
| **LTOB Max Depth:** | 0.99 |
| **LTOB Cross Sectional Area:** | 6.7 |

| | |
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -20 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.0 |
| 2.9 | 583.1 |
| 5.1 | 582.9 |
| 6.4 | 582.6 |
| 7.4 | 582.2 |
| 8.0 | 581.8 |
| 8.9 | 581.5 |
| 10.0 | 581.4 |
| 11.5 | 581.5 |
| 12.9 | 581.6 |
| 14.0 | 581.9 |
| 15.2 | 582.4 |
| 15.9 | 582.6 |
| 17.3 | 582.8 |
| 19.7 | 582.8 |
| 22.3 | 582.8 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 582.62 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.40 |
| **LTOB Elevation:** | 582.62 |
| **LTOB Max Depth:** | 1.22 |
| **LTOB Cross Sectional Area:** | 7.7 |

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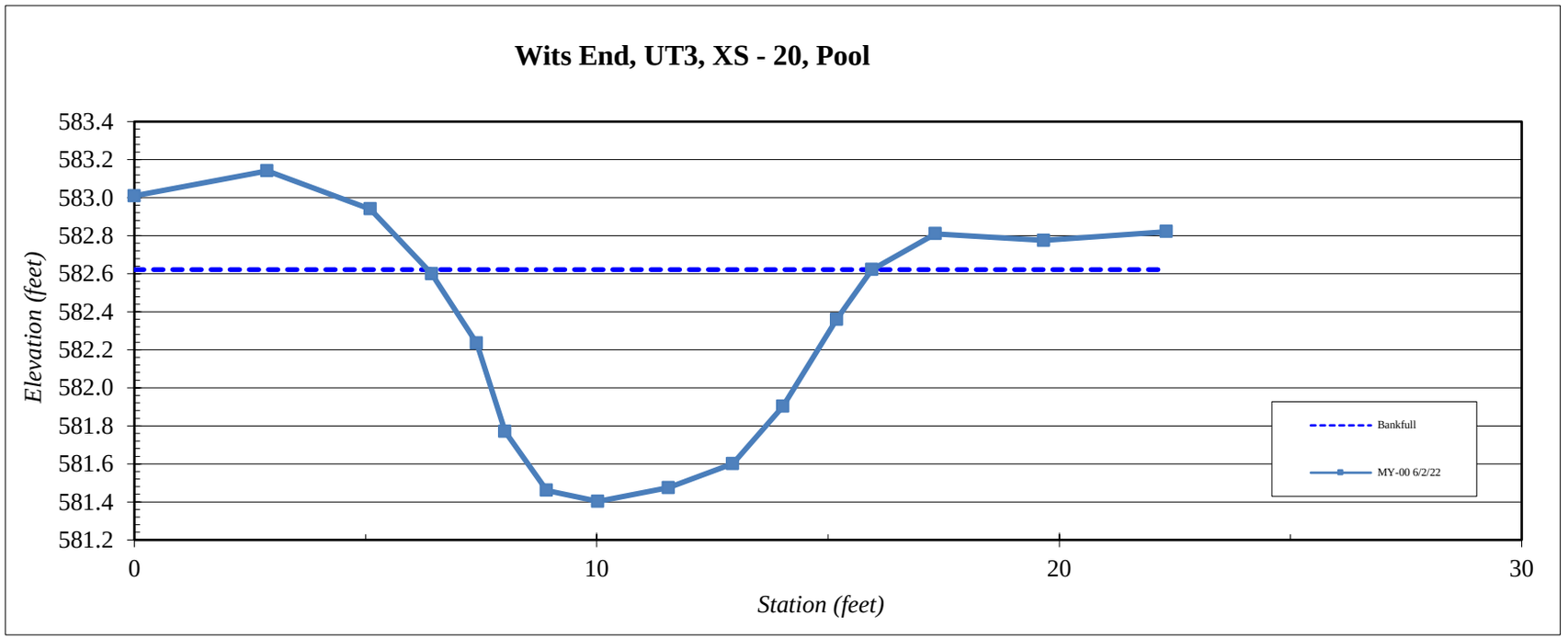
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -21 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 589.5 |
| 2.4 | 589.5 |
| 5.0 | 589.3 |
| 5.6 | 589.4 |
| 6.4 | 589.1 |
| 7.2 | 588.7 |
| 7.9 | 588.9 |
| 9.2 | 588.8 |
| 10.5 | 588.9 |
| 11.4 | 588.9 |
| 12.7 | 588.9 |
| 13.2 | 589.0 |
| 13.9 | 589.3 |
| 14.4 | 589.5 |
| 15.8 | 589.5 |
| 18.3 | 589.3 |
| 19.9 | 589.5 |
| 21.4 | 589.4 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.42 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.73 |
| **LTOB Elevation:** | 589.42 |
| **LTOB Max Depth:** | 0.69 |
| **LTOB Cross Sectional Area:** | 4.0 |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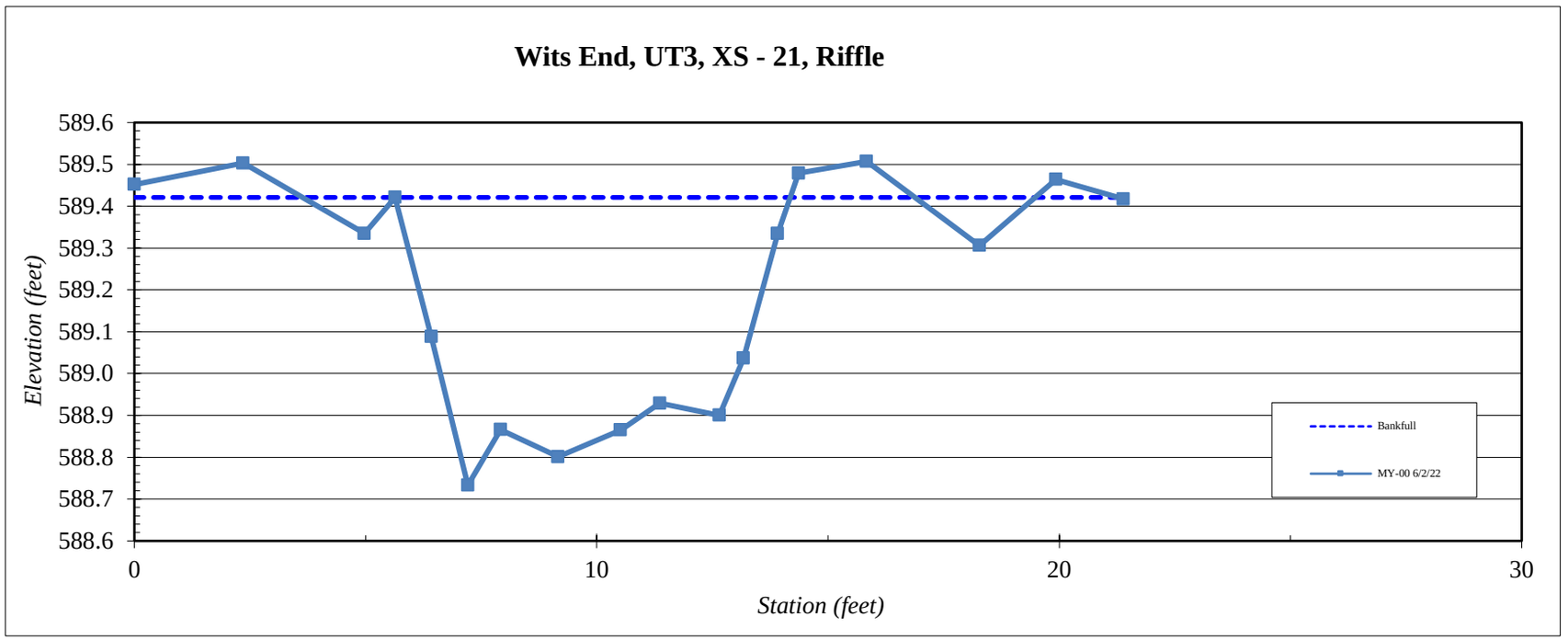
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -22 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 589.4 |
| 2.0 | 589.6 |
| 4.2 | 589.7 |
| 5.3 | 589.6 |
| 6.3 | 589.5 |
| 7.1 | 589.0 |
| 7.7 | 588.8 |
| 8.5 | 588.4 |
| 9.2 | 588.2 |
| 9.8 | 588.1 |
| 10.8 | 588.2 |
| 11.7 | 588.1 |
| 12.7 | 588.1 |
| 13.6 | 588.1 |
| 13.8 | 588.6 |
| 14.5 | 588.8 |
| 15.2 | 589.2 |
| 15.8 | 589.5 |
| 16.3 | 589.6 |
| 17.6 | 589.6 |
| 19.0 | 589.46 |
| 20.3 | 589.6 |
| 21.4 | 589.6 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.55 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.06 |
| **LTOB Elevation:** | 589.55 |
| **LTOB Max Depth:** | 1.49 |
| **LTOB Cross Sectional Area:** | 9.8 |


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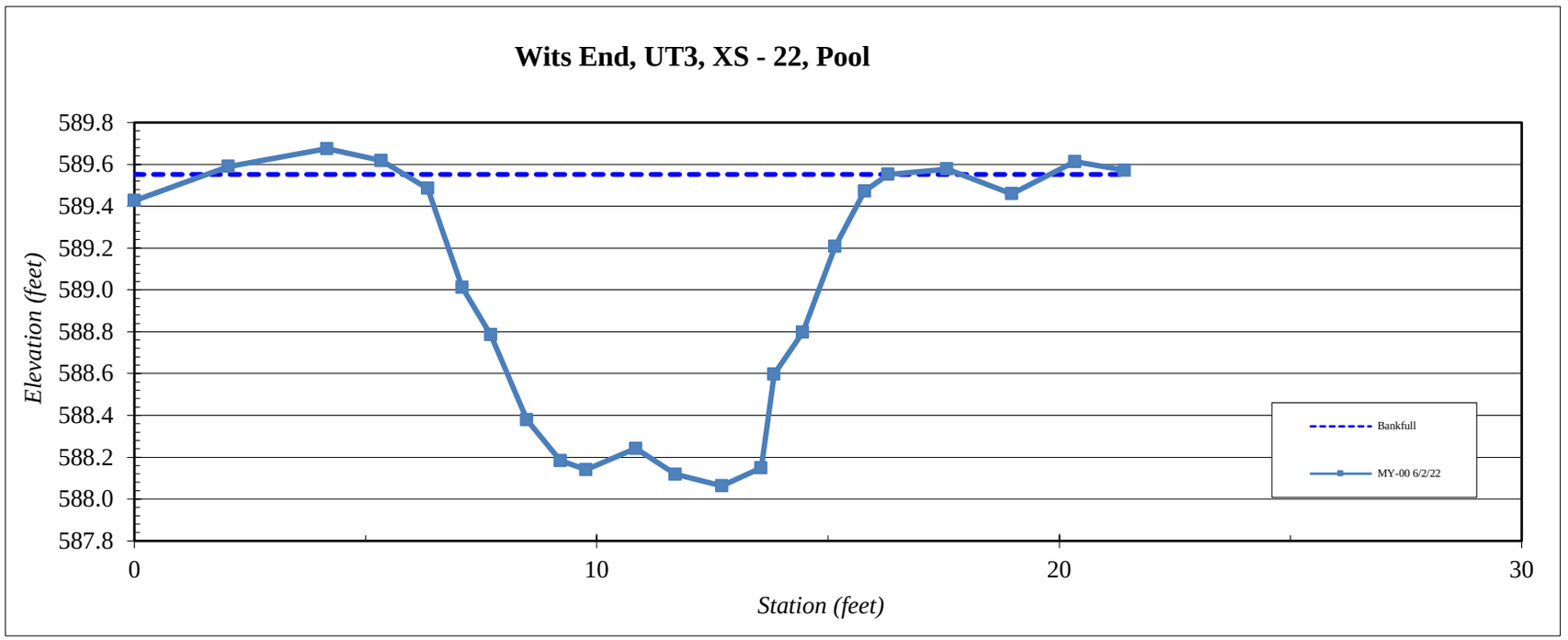
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -23 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.2 |
| 2.5 | 590.2 |
| 5.2 | 590.1 |
| 7.4 | 590.2 |
| 7.9 | 589.8 |
| 8.2 | 589.7 |
| 9.3 | 589.6 |
| 10.5 | 589.5 |
| 11.6 | 589.6 |
| 12.9 | 589.6 |
| 13.8 | 589.7 |
| 14.8 | 590.1 |
| 15.3 | 590.0 |
| 16.1 | 590.1 |
| 17.9 | 590.3 |
| 19.7 | 590.3 |
| 22.0 | 590.3 |
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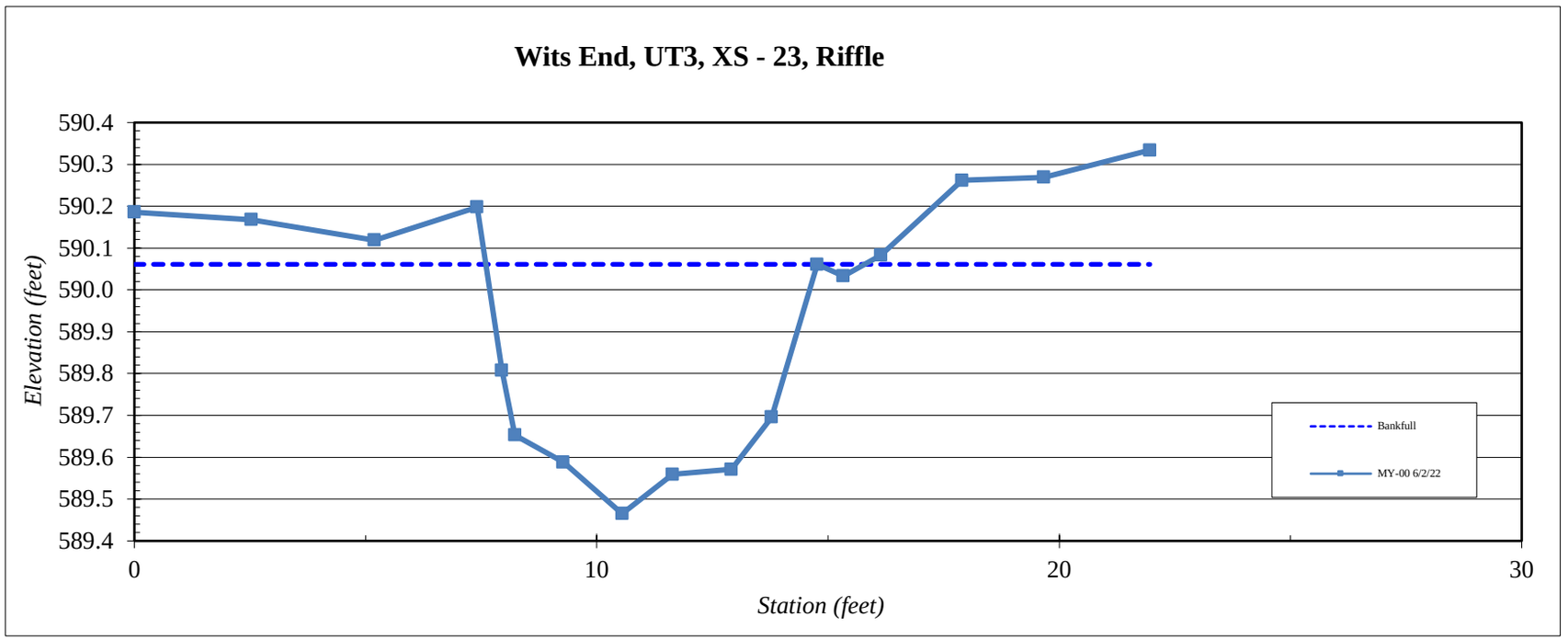
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 590.06 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 589.47 |
| **LTOB Elevation:** | 590.06 |
| **LTOB Max Depth:** | 0.60 |
| **LTOB Cross Sectional Area:** | 3.1 |

| | |
|---|---|
| **Stream Type** | E/C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -24 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.4 |
| 2.6 | 590.4 |
| 4.6 | 590.5 |
| 6.2 | 590.2 |
| 6.9 | 590.0 |
| 7.4 | 589.6 |
| 7.9 | 589.2 |
| 8.9 | 589.1 |
| 9.8 | 589.0 |
| 10.9 | 588.9 |
| 12.2 | 589.1 |
| 13.1 | 589.2 |
| 13.9 | 589.5 |
| 14.8 | 589.7 |
| 16.0 | 589.9 |
| 16.8 | 590.2 |
| 17.7 | 590.3 |
| 18.7 | 590.4 |
| 20.4 | 590.3 |
| 22.8 | 590.3 |
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| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 590.43 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.89 |
| **LTOB Elevation:** | 590.43 |
| **LTOB Max Depth:** | 1.54 |
| **LTOB Cross Sectional Area:** | 11.3 |

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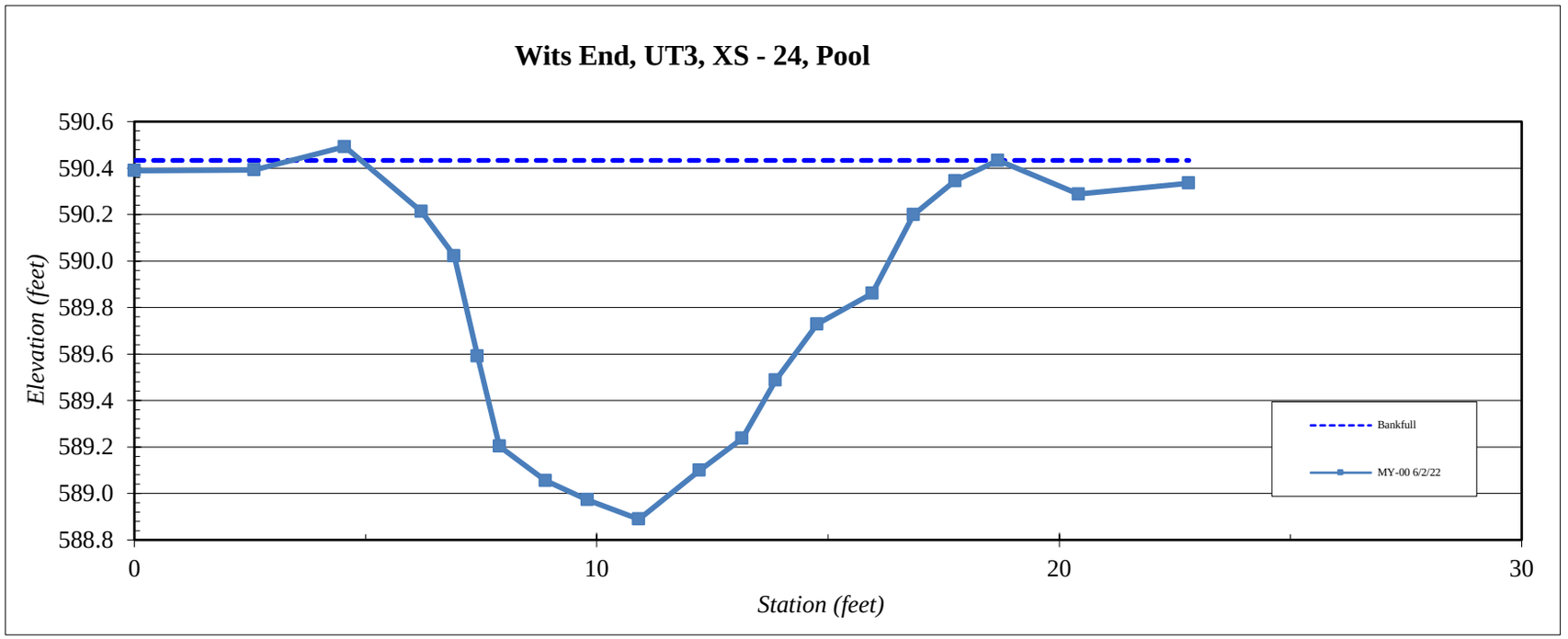
|---|---|
| **Stream Type** | E/C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -25 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.2 |
| 2.2 | 588.1 |
| 4.7 | 588.0 |
| 6.5 | 588.1 |
| 8.3 | 588.0 |
| 9.1 | 587.9 |
| 9.8 | 587.8 |
| 11.1 | 587.7 |
| 12.1 | 587.5 |
| 12.9 | 587.7 |
| 13.6 | 587.9 |
| 14.4 | 588.0 |
| 15.3 | 588.2 |
| 16.8 | 588.1 |
| 18.4 | 588.2 |
| 20.1 | 588.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 588.14 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 587.49 |
| **LTOB Elevation:** | 588.14 |
| **LTOB Max Depth:** | 0.65 |
| **LTOB Cross Sectional Area:** | 2.4 |

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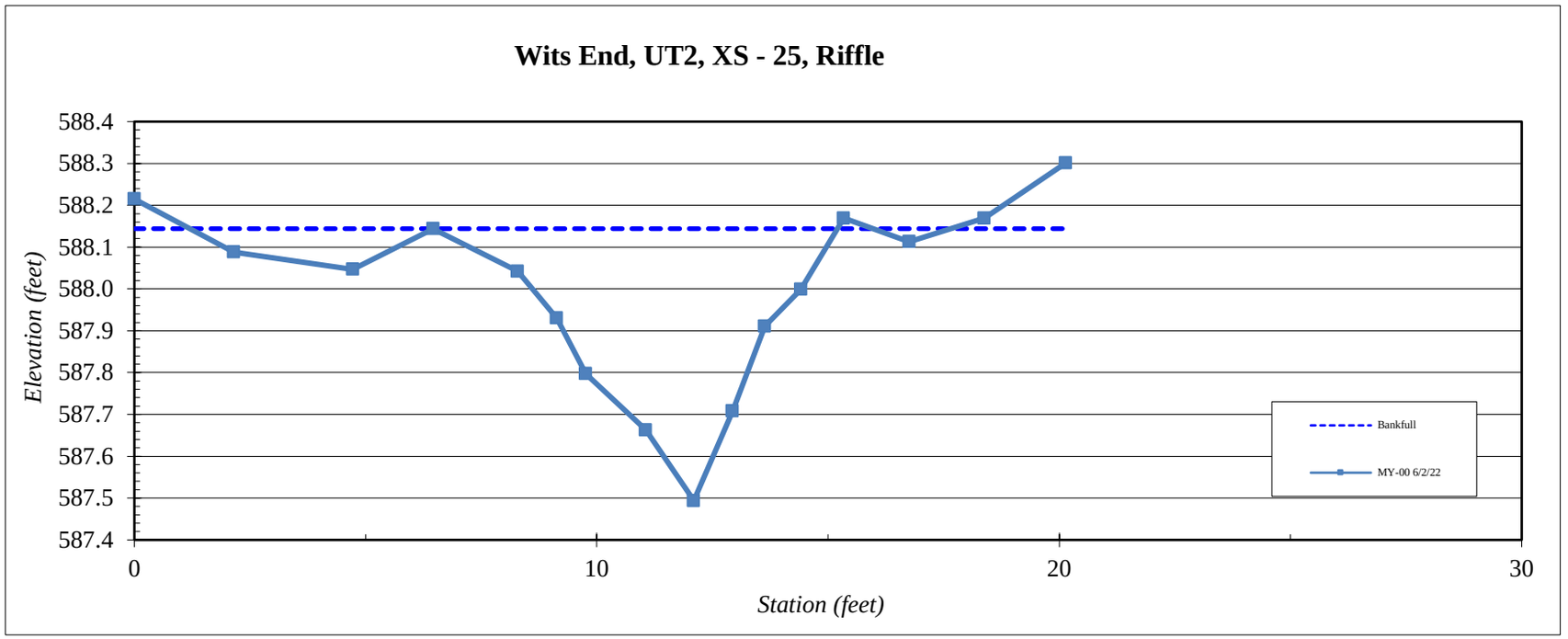
|---|---|
| **Stream Type** | C |



| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -26 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.2 |
| 2.7 | 588.3 |
| 5.3 | 588.3 |
| 7.1 | 588.2 |
| 7.5 | 587.9 |
| 8.4 | 587.4 |
| 9.2 | 586.9 |
| 9.7 | 586.6 |
| 10.4 | 586.5 |
| 11.1 | 586.6 |
| 12.0 | 586.8 |
| 13.1 | 587.0 |
| 13.6 | 587.2 |
| 14.4 | 587.3 |
| 15.0 | 587.8 |
| 16.2 | 588.0 |
| 17.4 | 588.1 |
| 18.9 | 588.3 |
| 20.5 | 588.4 |
| 21.9 | 588.3 |
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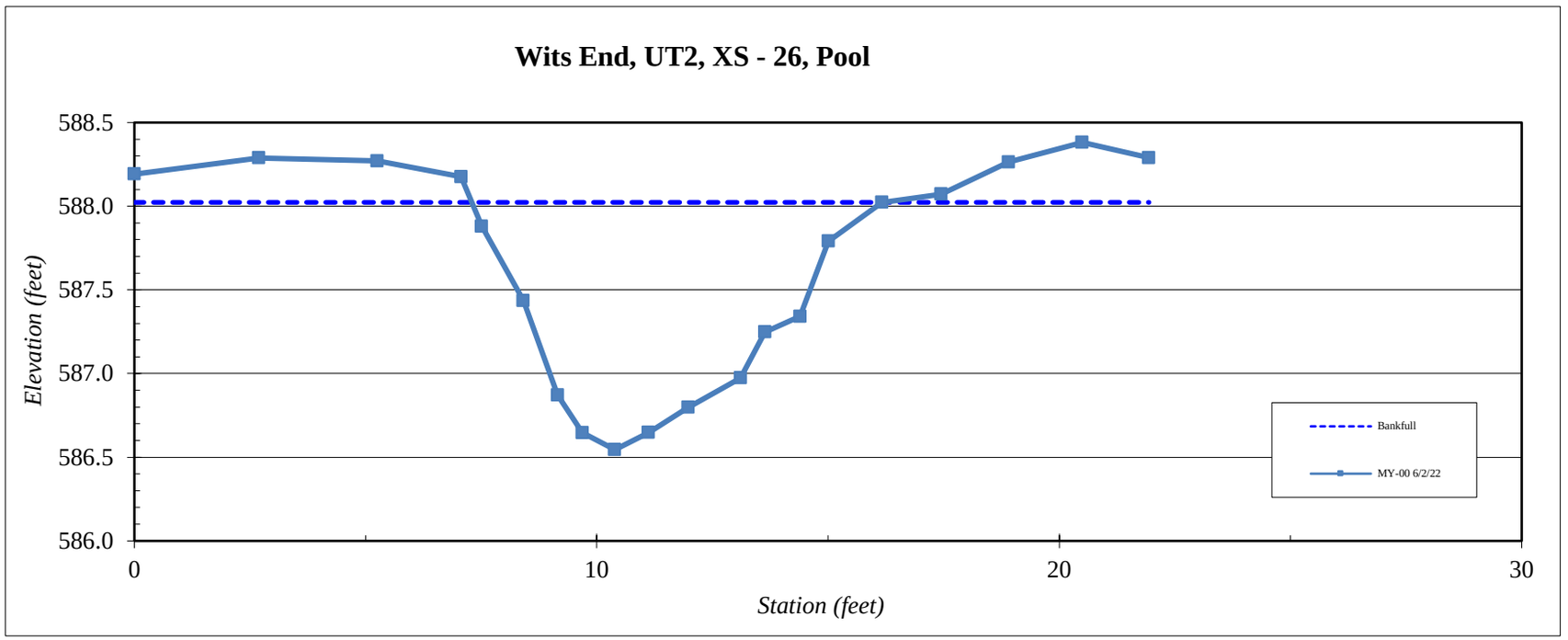
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 588.02 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.55 |
| **LTOB Elevation:** | 588.02 |
| **LTOB Max Depth:** | 1.48 |
| **LTOB Cross Sectional Area:** | 7.6 |


| | |
|---|---|
| **Stream Type** | C |



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|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -27 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 594.6 |
| 2.3 | 594.7 |
| 4.3 | 594.7 |
| 5.0 | 594.6 |
| 5.7 | 594.2 |
| 6.3 | 594.0 |
| 6.7 | 593.7 |
| 7.4 | 593.5 |
| 8.3 | 593.4 |
| 8.7 | 593.5 |
| 9.6 | 593.6 |
| 10.3 | 593.9 |
| 11.2 | 594.2 |
| 12.4 | 594.3 |
| 13.4 | 594.7 |
| 14.0 | 594.8 |
| 15.4 | 594.7 |
| 16.5 | 594.7 |
| 17.4 | 594.7 |
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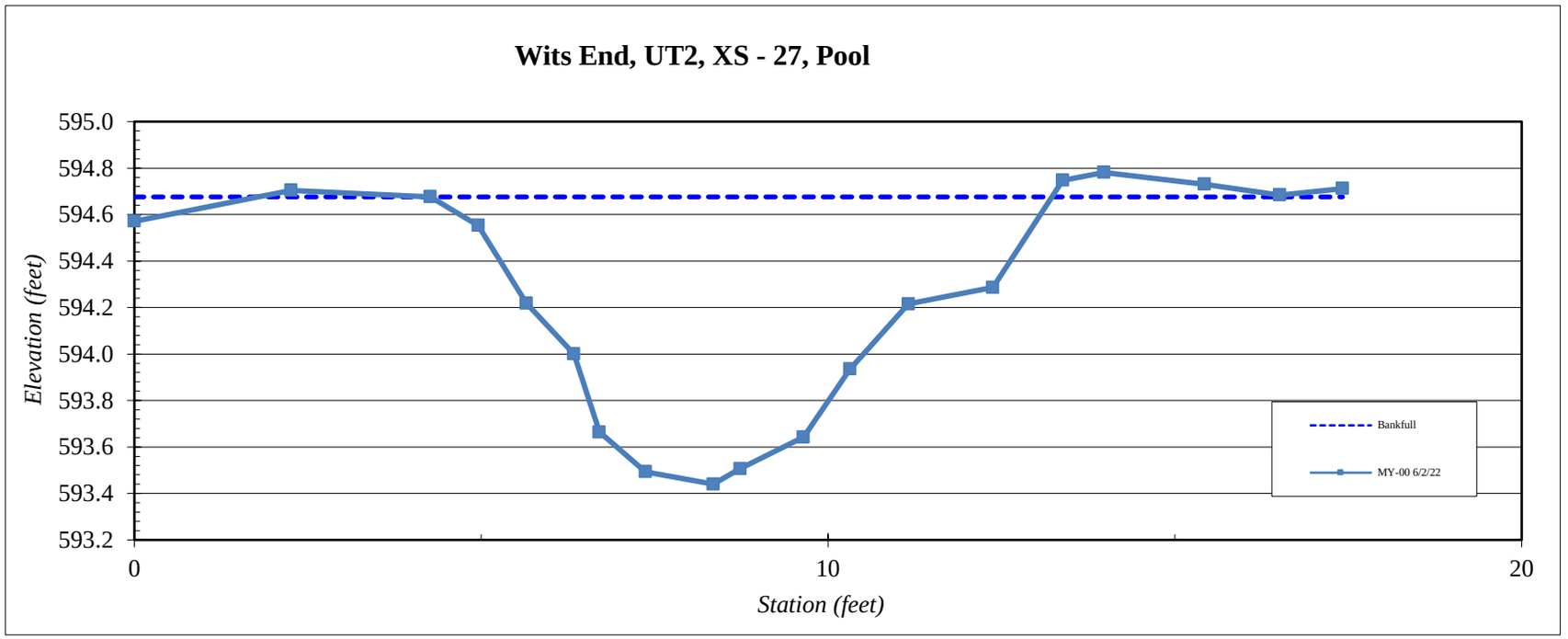
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 594.68 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 593.44 |
| **LTOB Elevation:** | 594.68 |
| **LTOB Max Depth:** | 1.24 |
| **LTOB Cross Sectional Area:** | 6.1 |

| | |
|---|---|
| **Stream Type** | C |

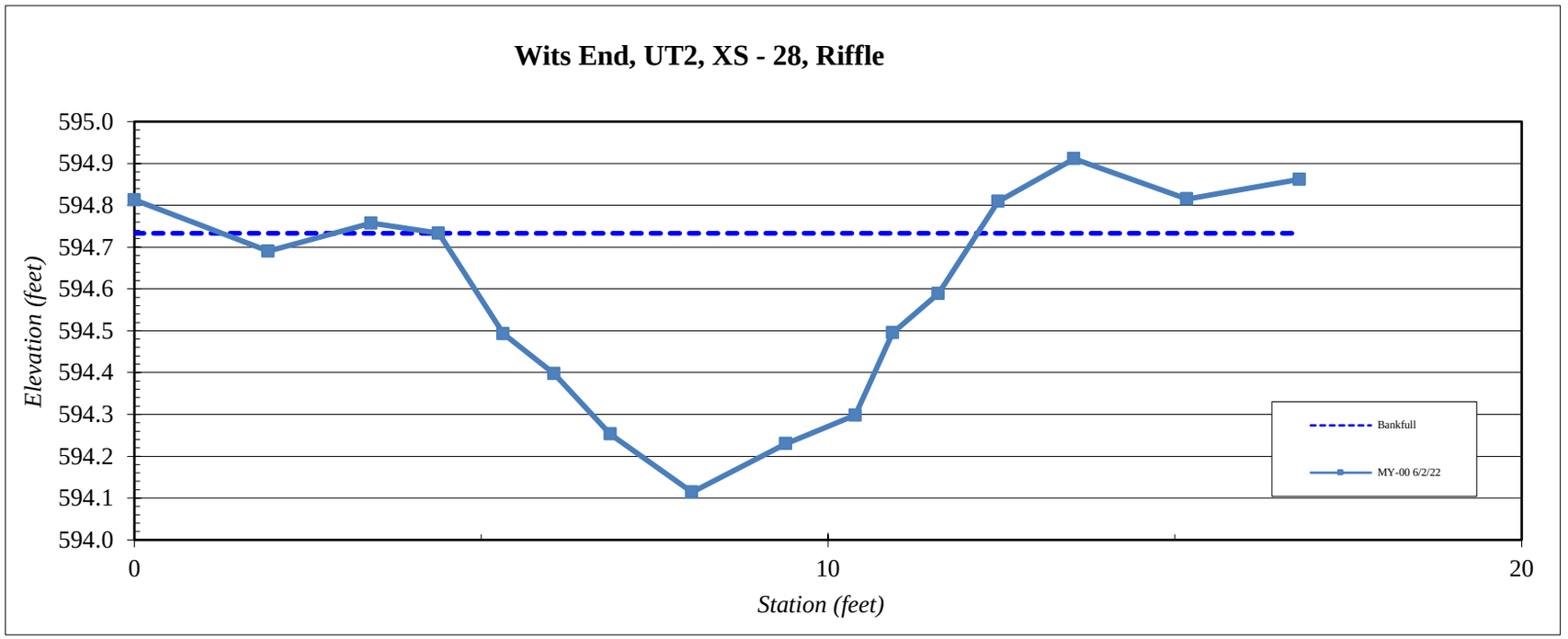


| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -28 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 594.8 |
| 1.9 | 594.7 |
| 3.4 | 594.8 |
| 4.4 | 594.7 |
| 5.3 | 594.5 |
| 6.1 | 594.4 |
| 6.9 | 594.3 |
| 8.0 | 594.1 |
| 9.4 | 594.2 |
| 10.4 | 594.3 |
| 10.9 | 594.5 |
| 11.6 | 594.6 |
| 12.5 | 594.8 |
| 13.5 | 594.9 |
| 15.2 | 594.8 |
| 16.8 | 594.9 |

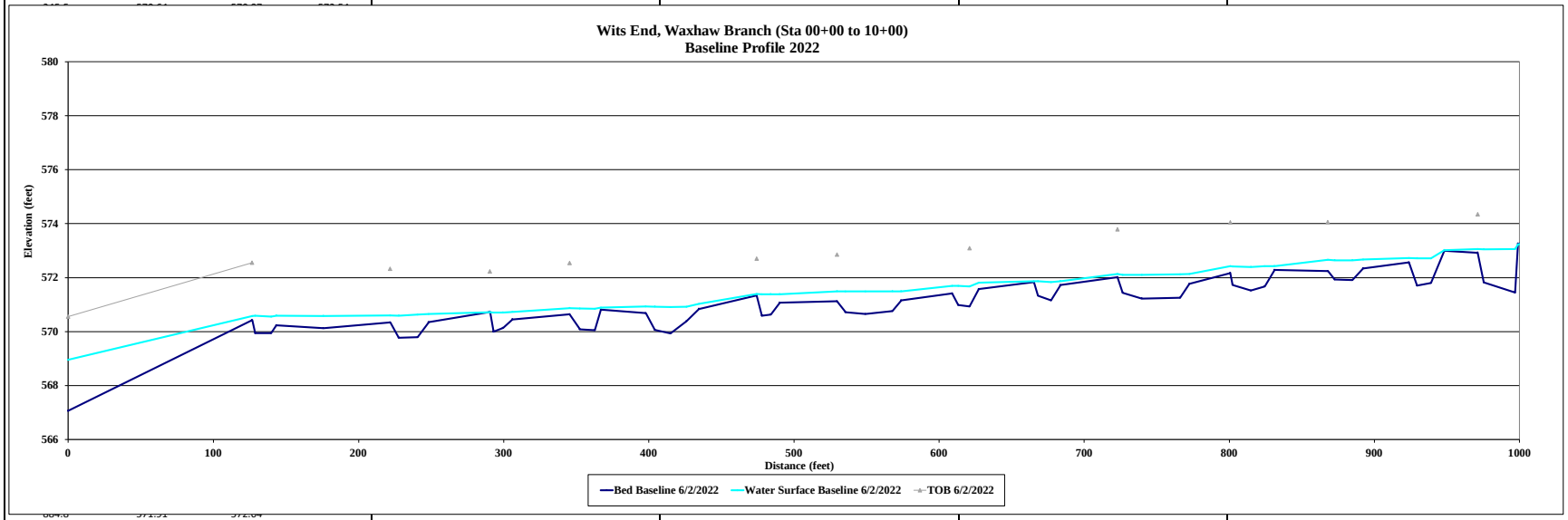
| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 594.73 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 594.11 |
| **LTOB Elevation:** | 594.73 |
| **LTOB Max Depth:** | 0.62 |
| **LTOB Cross Sectional Area:** | 2.9 |

| | |
|---|---|
| **Stream Type** | C |



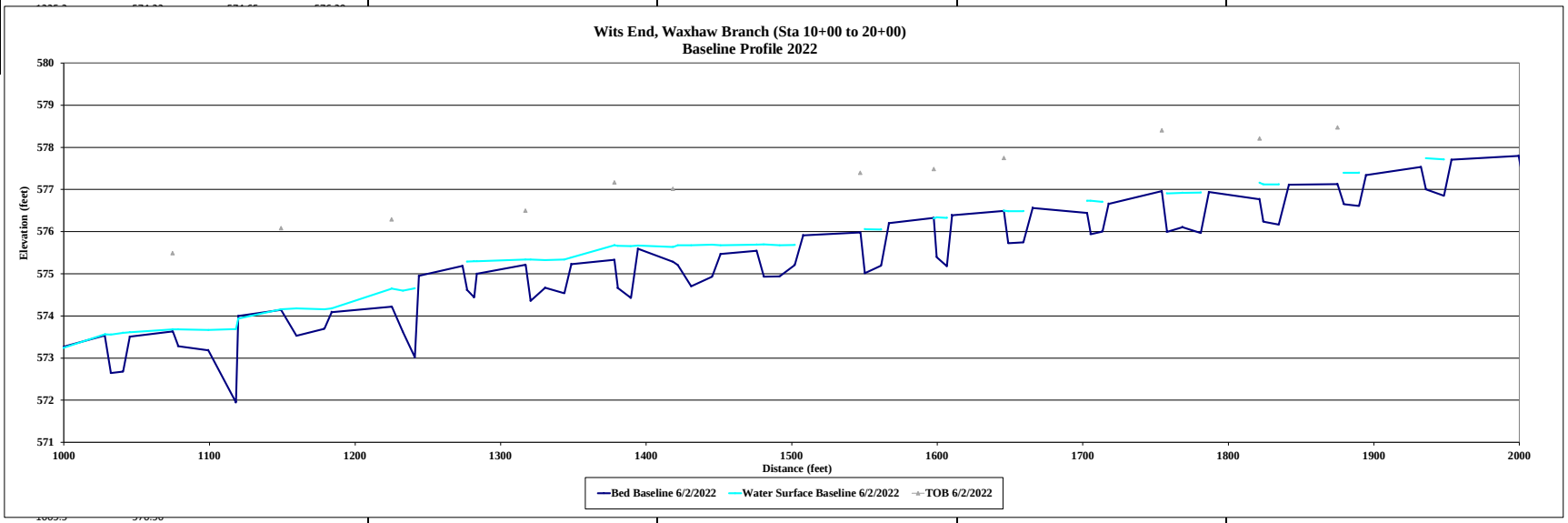
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | Waxhaw Branch (Sta 00+00 to 10+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 567.07 | 568.95 | 570.55 | | | | | | | | | | | | |
| 126.7 | 570.43 | 570.57 | 572.55 | | | | | | | | | | | | |
| 128.8 | 569.94 | 570.59 | | | | | | | | | | | | | |
| 139.7 | 569.95 | 570.55 | | | | | | | | | | | | | |
| 143.4 | 570.23 | 570.59 | | | | | | | | | | | | | |
| 175.9 | 570.13 | 570.58 | | | | | | | | | | | | | |
| 221.8 | 570.34 | 570.60 | 572.32 | | | | | | | | | | | | |
| 227.7 | 569.77 | 570.59 | | | | | | | | | | | | | |
| 240.7 | 569.79 | 570.63 | | | | | | | | | | | | | |
| 248.4 | 570.35 | 570.65 | | | | | | | | | | | | | |
| 290.5 | 570.73 | 570.72 | 572.23 | | | | | | | | | | | | |
| 293.0 | 570.00 | 570.71 | | | | | | | | | | | | | |
| 299.6 | 570.14 | 570.71 | | | | | | | | | | | | | |
| 306.0 | 570.45 | 570.73 | | | | | | | | | | | | | |
| 892.2 | 572.34 | 572.67 | | | | | | | | | | | | | |
| 923.7 | 572.56 | 572.73 | | | | | | | | | | | | | |
| 929.3 | 571.70 | 572.72 | | | | | | | | | | | | | |
| 939.0 | 571.80 | 572.72 | | | | | | | | | | | | | |
| 948.1 | 572.99 | 573.02 | | | | | | | | | | | | | |
| 971.2 | 572.92 | 573.06 | 574.35 | | | | | | | | | | | | |
| 975.3 | 571.82 | 573.05 | | | | | | | | | | | | | |
| 996.8 | 571.44 | 573.06 | | | | | | | | | | | | | |
| 998.8 | 573.26 | 573.23 | | | | | | | | | | | | | |
| 1028.3 | 573.54 | 573.57 | | | | | | | | | | | | | |
| 1032.4 | 572.65 | 573.56 | | | | | | | | | | | | | |
| 1040.5 | 572.68 | 573.60 | | | | | | | | | | | | | |
| 1045.2 | 573.51 | 573.61 | | | | | | | | | | | | | |



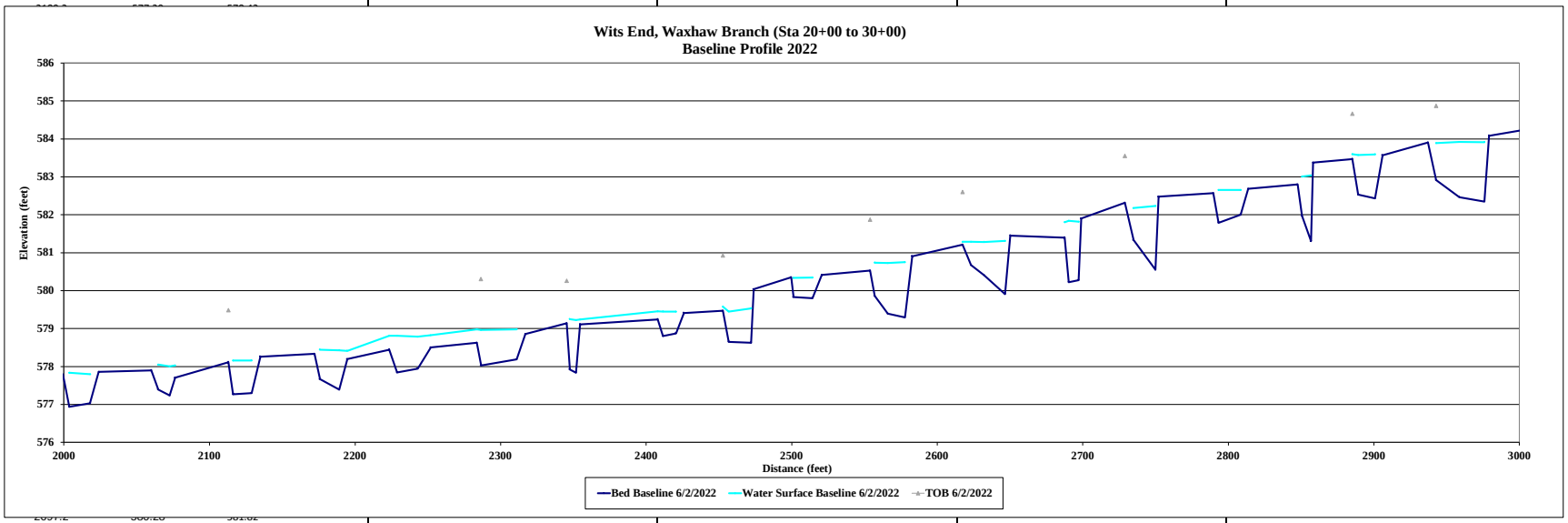
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | Waxhaw Branch (Sta 10+00 to 20+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 998.8 | 573.26 | 573.23 | | | | | | | | | | | | | |
| 1028.3 | 573.54 | 573.57 | | | | | | | | | | | | | |
| 1032.4 | 572.65 | 573.56 | | | | | | | | | | | | | |
| 1040.5 | 572.68 | 573.60 | | | | | | | | | | | | | |
| 1045.2 | 573.51 | 573.61 | | | | | | | | | | | | | |
| 1074.7 | 573.64 | 573.68 | 575.49 | | | | | | | | | | | | |
| 1078.6 | 573.28 | 573.68 | | | | | | | | | | | | | |
| 1099.2 | 573.19 | 573.67 | | | | | | | | | | | | | |
| 1118.1 | 571.95 | 573.69 | | | | | | | | | | | | | |
| 1119.8 | 574.00 | 573.94 | | | | | | | | | | | | | |
| 1149.2 | 574.14 | 574.16 | 576.08 | | | | | | | | | | | | |
| 1159.8 | 573.53 | 574.18 | | | | | | | | | | | | | |
| 1178.9 | 573.69 | 574.16 | | | | | | | | | | | | | |
| 1183.9 | 574.09 | 574.18 | | | | | | | | | | | | | |
| 1702.9 | 576.44 | 576.73 | | | | | | | | | | | | | |
| 1705.4 | 575.94 | 576.73 | | | | | | | | | | | | | |
| 1713.4 | 576.00 | 576.71 | | | | | | | | | | | | | |
| 1717.7 | 576.66 | | | | | | | | | | | | | | |
| 1754.2 | 576.96 | | 578.41 | | | | | | | | | | | | |
| 1757.8 | 575.99 | 576.91 | | | | | | | | | | | | | |
| 1768.4 | 576.11 | 576.92 | | | | | | | | | | | | | |
| 1781.0 | 575.96 | 576.93 | | | | | | | | | | | | | |
| 1786.7 | 576.94 | | | | | | | | | | | | | | |
| 1821.4 | 576.77 | 577.16 | 578.21 | | | | | | | | | | | | |
| 1824.0 | 576.24 | 577.12 | | | | | | | | | | | | | |
| 1834.6 | 576.17 | 577.12 | | | | | | | | | | | | | |
| 1841.6 | 577.11 | | | | | | | | | | | | | | |



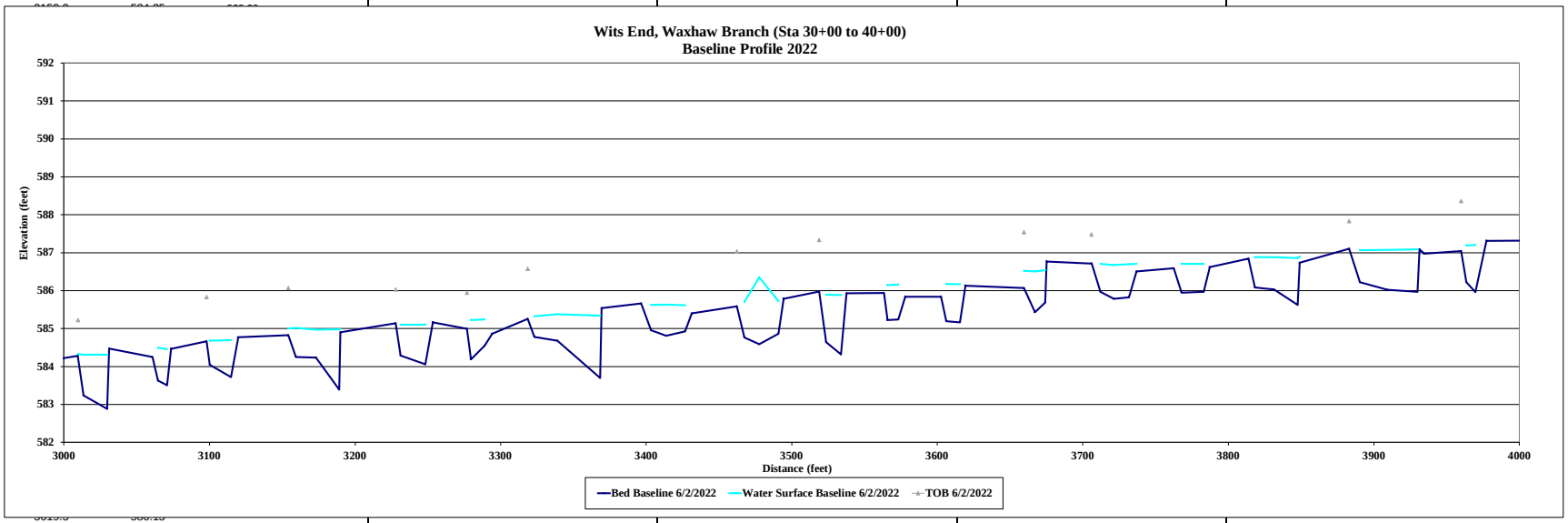
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | Waxhaw Branch (Sta 20+00 to 30+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 1999.4 | 577.80 | | | | | | | | | | | | | | |
| 2003.8 | 576.94 | 577.84 | | | | | | | | | | | | | |
| 2018.1 | 577.03 | 577.80 | | | | | | | | | | | | | |
| 2024.0 | 577.86 | | | | | | | | | | | | | | |
| 2060.1 | 577.90 | | | | | | | | | | | | | | |
| 2064.8 | 577.39 | 578.05 | | | | | | | | | | | | | |
| 2072.6 | 577.23 | 578.00 | | | | | | | | | | | | | |
| 2076.3 | 577.70 | 578.03 | | | | | | | | | | | | | |
| 2113.0 | 578.12 | | 579.49 | | | | | | | | | | | | |
| 2116.2 | 577.27 | 578.16 | | | | | | | | | | | | | |
| 2128.9 | 577.30 | 578.16 | | | | | | | | | | | | | |
| 2134.9 | 578.26 | | | | | | | | | | | | | | |
| 2172.0 | 578.33 | | | | | | | | | | | | | | |
| 2175.9 | 577.66 | 578.44 | | | | | | | | | | | | | |
| 2698.8 | 581.90 | | | | | | | | | | | | | | |
| 2728.9 | 582.31 | | 583.55 | | | | | | | | | | | | |
| 2734.8 | 581.34 | 582.18 | | | | | | | | | | | | | |
| 2749.8 | 580.55 | 582.23 | | | | | | | | | | | | | |
| 2752.0 | 582.48 | | | | | | | | | | | | | | |
| 2789.6 | 582.57 | | | | | | | | | | | | | | |
| 2793.3 | 581.79 | 582.65 | | | | | | | | | | | | | |
| 2808.4 | 582.01 | 582.65 | | | | | | | | | | | | | |
| 2813.6 | 582.68 | | | | | | | | | | | | | | |
| 2850.7 | 581.97 | 583.01 | | | | | | | | | | | | | |
| 2856.7 | 581.30 | 583.03 | | | | | | | | | | | | | |
| 2858.2 | 583.37 | | | | | | | | | | | | | | |



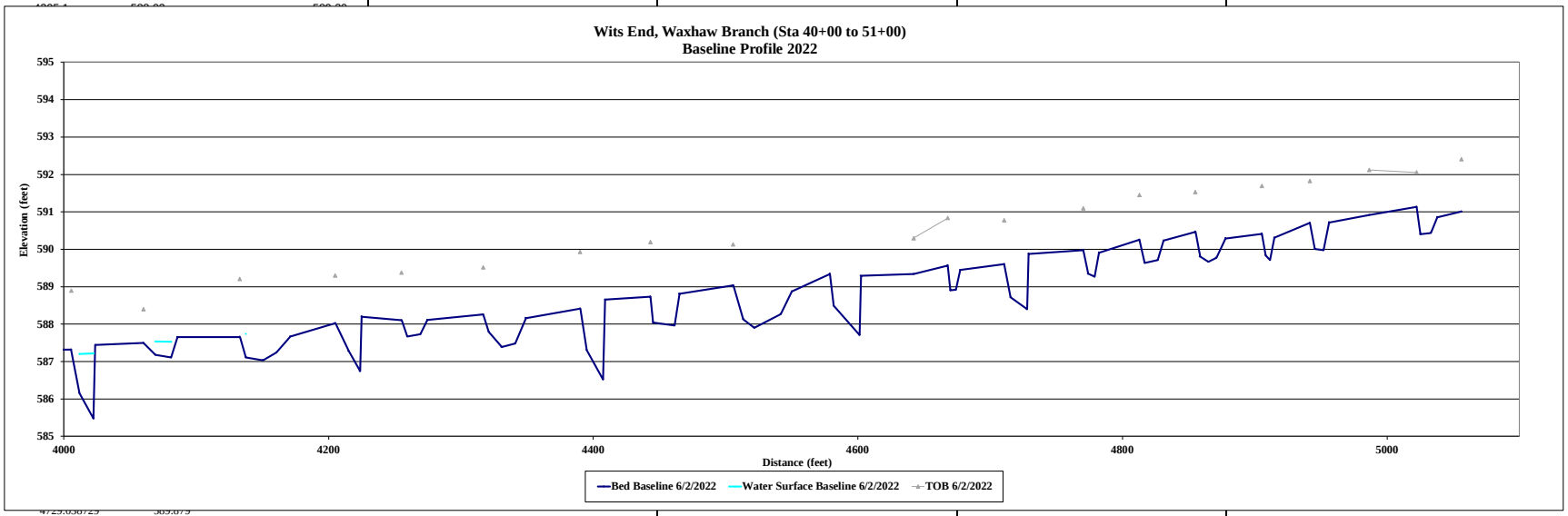
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | Waxhaw Branch (Sta 30+00 to 40+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 2979.0 | 584.09 | | | | | | | | | | | | | | |
| 3009.7 | 584.28 | 584.33 | 585.23 | | | | | | | | | | | | |
| 3013.6 | 583.24 | 584.31 | | | | | | | | | | | | | |
| 3029.8 | 582.88 | 584.31 | | | | | | | | | | | | | |
| 3031.2 | 584.47 | | | | | | | | | | | | | | |
| 3060.7 | 584.25 | | | | | | | | | | | | | | |
| 3064.6 | 583.63 | 584.49 | | | | | | | | | | | | | |
| 3070.7 | 583.50 | 584.45 | | | | | | | | | | | | | |
| 3073.7 | 584.47 | | | | | | | | | | | | | | |
| 3098.0 | 584.66 | | 585.83 | | | | | | | | | | | | |
| 3100.2 | 584.04 | 584.68 | | | | | | | | | | | | | |
| 3114.7 | 583.72 | 584.69 | | | | | | | | | | | | | |
| 3119.7 | 584.77 | | | | | | | | | | | | | | |
| 3154.2 | 584.83 | 585.01 | 586.06 | | | | | | | | | | | | |
| 3659.6 | 586.07 | 586.52 | 587.54 | | | | | | | | | | | | |
| 3667.1 | 585.43 | 586.51 | | | | | | | | | | | | | |
| 3674.2 | 585.68 | 586.54 | | | | | | | | | | | | | |
| 3675.1 | 586.77 | | | | | | | | | | | | | | |
| 3706.0 | 586.72 | | 587.48 | | | | | | | | | | | | |
| 3712.1 | 585.97 | 586.70 | | | | | | | | | | | | | |
| 3721.3 | 585.78 | 586.68 | | | | | | | | | | | | | |
| 3731.8 | 585.83 | 586.70 | | | | | | | | | | | | | |
| 3736.9 | 586.51 | 586.71 | | | | | | | | | | | | | |
| 3762.5 | 586.59 | | | | | | | | | | | | | | |
| 3767.8 | 585.95 | 586.71 | | | | | | | | | | | | | |
| 3783.0 | 585.97 | 586.70 | | | | | | | | | | | | | |
| 3787.2 | 586.62 | | | | | | | | | | | | | | |



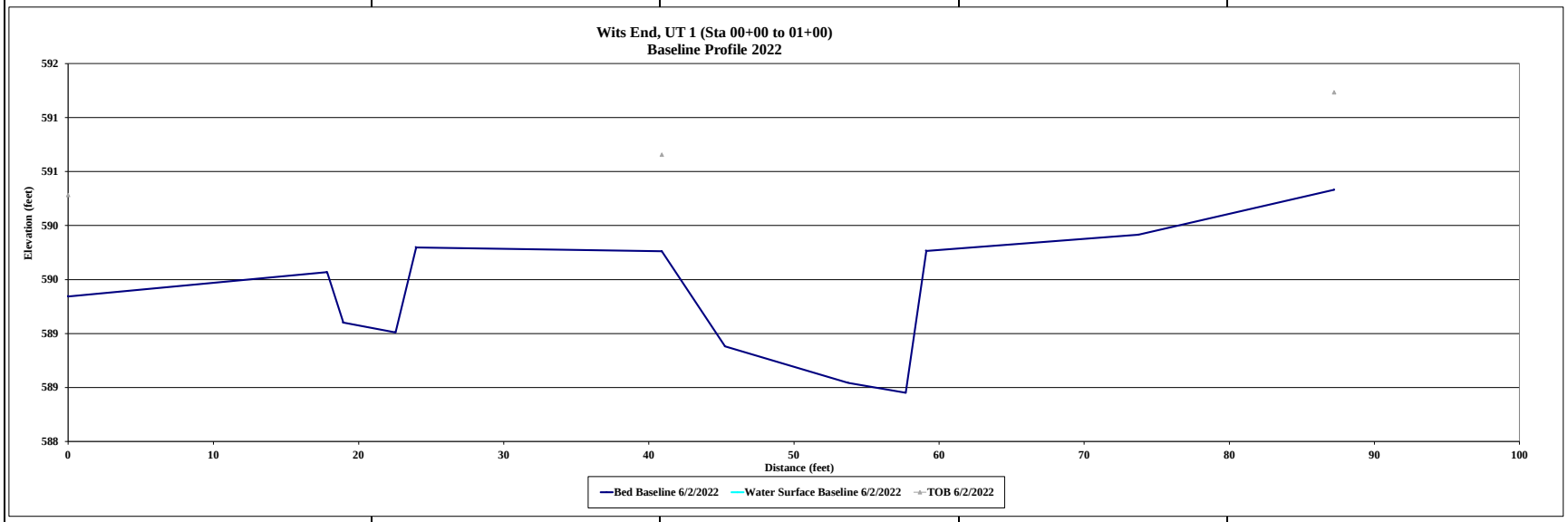
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | Waxhaw Branch (Sta 40+00 to 51+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 3977.4 | 587.31 | | | | | | | | | | | | | | |
| 4005.6 | 587.32 | | 588.89 | | | | | | | | | | | | |
| 4011.9 | 586.16 | 587.20 | | | | | | | | | | | | | |
| 4022.5 | 585.48 | 587.22 | | | | | | | | | | | | | |
| 4023.8 | 587.44 | | | | | | | | | | | | | | |
| 4060.2 | 587.50 | | 588.40 | | | | | | | | | | | | |
| 4069.2 | 587.18 | 587.53 | | | | | | | | | | | | | |
| 4081.0 | 587.11 | 587.53 | | | | | | | | | | | | | |
| 4085.8 | 587.65 | | | | | | | | | | | | | | |
| 4133.0 | 587.66 | | 589.21 | | | | | | | | | | | | |
| 4137.5 | 587.11 | 587.73 | | | | | | | | | | | | | |
| 4150.5 | 587.03 | | | | | | | | | | | | | | |
| 4160.6 | 587.24 | | | | | | | | | | | | | | |
| 4171.1 | 587.67 | | | | | | | | | | | | | | |
| 4729.038729 | 589.879 | | | | | | | | | | | | | | |
| 4770.447514 | 589.973 | | 591.092 | | | | | | | | | | | | |
| 4773.970587 | 589.347 | | | | | | | | | | | | | | |
| 4778.999094 | 589.269 | | | | | | | | | | | | | | |
| 4782.272011 | 589.91 | | | | | | | | | | | | | | |
| 4812.812082 | 590.256 | | 591.45 | | | | | | | | | | | | |
| 4816.791173 | 589.637 | | | | | | | | | | | | | | |
| 4826.552252 | 589.709 | | | | | | | | | | | | | | |
| 4830.960825 | 590.232 | | | | | | | | | | | | | | |
| 4855.119403 | 590.469 | | 591.525 | | | | | | | | | | | | |
| 4858.630208 | 589.805 | | | | | | | | | | | | | | |
| 4864.873868 | 589.662 | | | | | | | | | | | | | | |
| 4870.912105 | 589.774 | | | | | | | | | | | | | | |
| 4877.780967 | 590.29 | | | | | | | | | | | | | | |



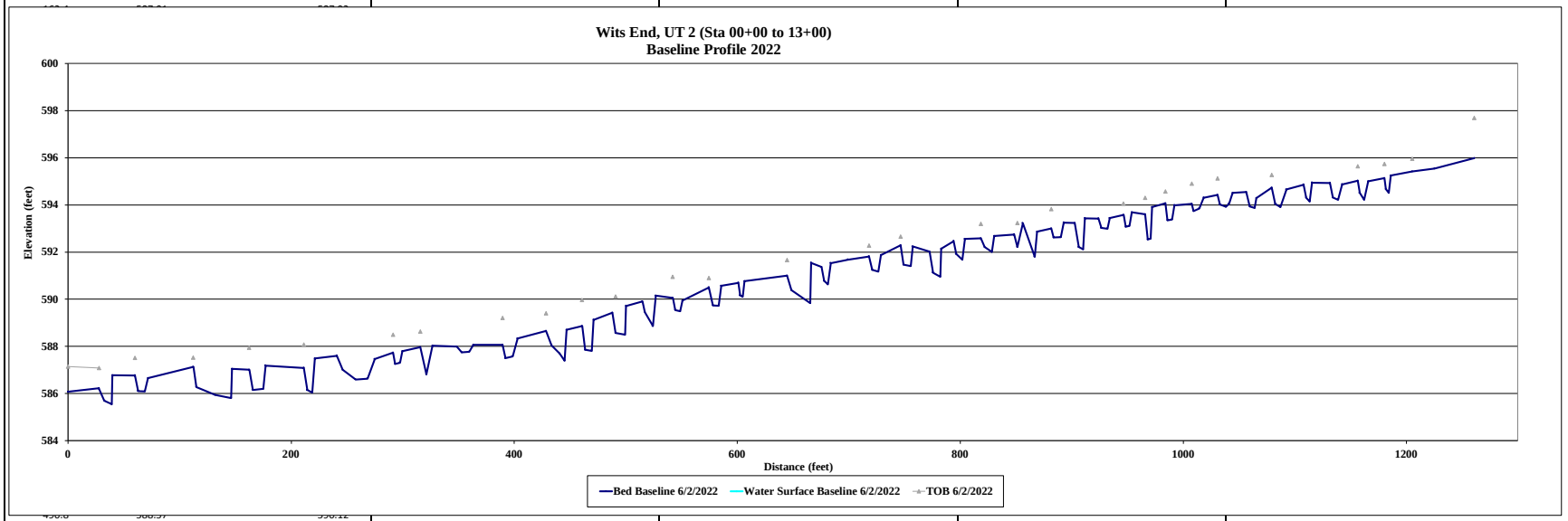
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 1 (Sta 00+00 to 01+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 589.34 | | 590.28 | | | | | | | | | | | | |
| 17.8 | 589.57 | | | | | | | | | | | | | | |
| 18.9 | 589.10 | | | | | | | | | | | | | | |
| 22.6 | 589.01 | | | | | | | | | | | | | | |
| 24.0 | 589.80 | | | | | | | | | | | | | | |
| 40.9 | 589.76 | | 590.66 | | | | | | | | | | | | |
| 45.3 | 588.88 | | | | | | | | | | | | | | |
| 53.7 | 588.54 | | | | | | | | | | | | | | |
| 57.7 | 588.45 | | | | | | | | | | | | | | |
| 59.1 | 589.77 | | | | | | | | | | | | | | |
| 73.7 | 589.91 | | | | | | | | | | | | | | |
| 87.2 | 590.33 | | 591.23 | | | | | | | | | | | | |



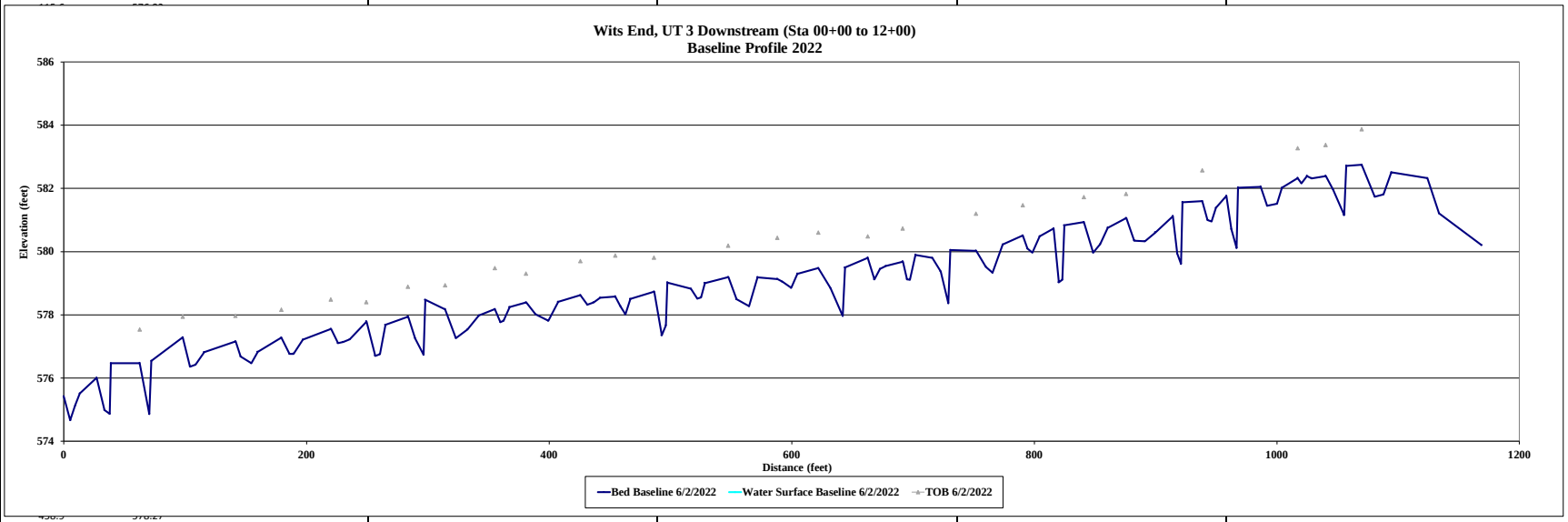
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 2 (Sta 00+00 to 13+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 586.07 | | 587.14 | | | | | | | | | | | | |
| 27.7 | 586.22 | | 587.08 | | | | | | | | | | | | |
| 32.5 | 585.69 | | | | | | | | | | | | | | |
| 39.2 | 585.54 | | | | | | | | | | | | | | |
| 39.8 | 586.77 | | | | | | | | | | | | | | |
| 59.9 | 586.77 | | 587.51 | | | | | | | | | | | | |
| 62.6 | 586.10 | | | | | | | | | | | | | | |
| 68.8 | 586.10 | | | | | | | | | | | | | | |
| 71.6 | 586.66 | | | | | | | | | | | | | | |
| 112.3 | 587.13 | | 587.52 | | | | | | | | | | | | |
| 114.9 | 586.28 | | | | | | | | | | | | | | |
| 131.8 | 585.94 | | | | | | | | | | | | | | |
| 146.2 | 585.81 | | | | | | | | | | | | | | |
| 147.0 | 587.04 | | | | | | | | | | | | | | |
| 499.3 | 588.49 | | | | | | | | | | | | | | |
| 500.3 | 589.72 | | | | | | | | | | | | | | |
| 514.9 | 589.90 | | | | | | | | | | | | | | |
| 517.1 | 589.46 | | | | | | | | | | | | | | |
| 524.3 | 588.86 | | | | | | | | | | | | | | |
| 526.8 | 590.15 | | | | | | | | | | | | | | |
| 542.2 | 590.05 | | 590.94 | | | | | | | | | | | | |
| 544.4 | 589.54 | | | | | | | | | | | | | | |
| 548.7 | 589.49 | | | | | | | | | | | | | | |
| 550.9 | 589.94 | | | | | | | | | | | | | | |
| 574.5 | 590.50 | | 590.89 | | | | | | | | | | | | |
| 578.1 | 589.74 | | | | | | | | | | | | | | |
| 583.3 | 589.72 | | | | | | | | | | | | | | |



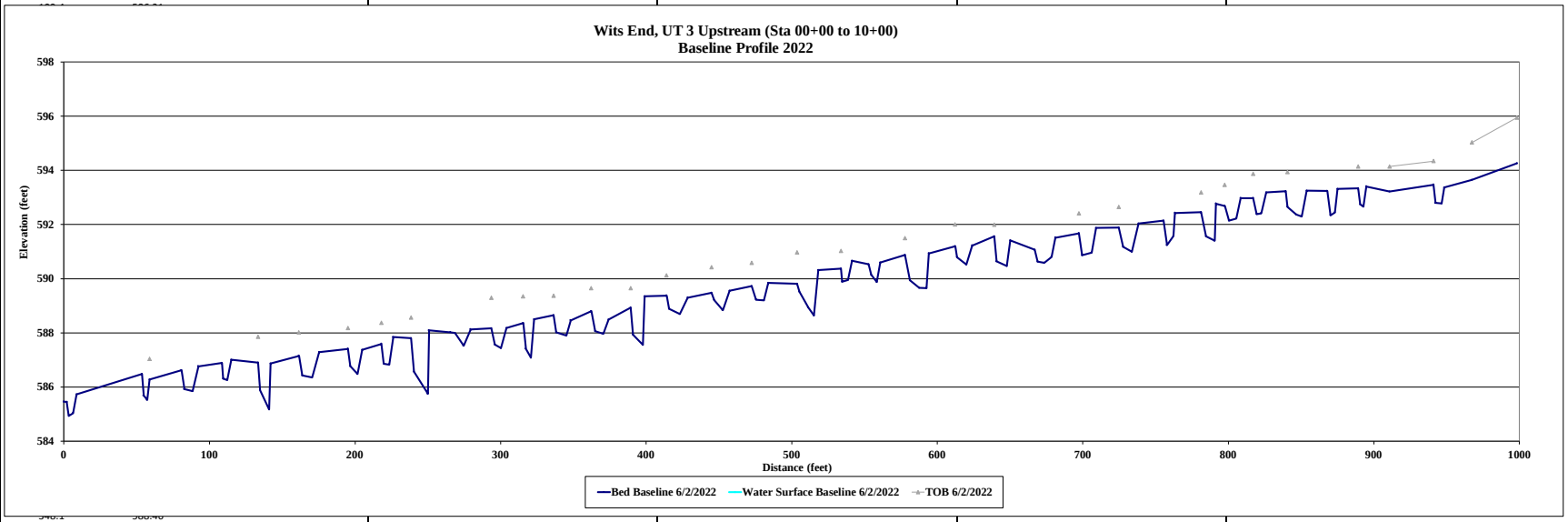
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 3 Downstream (Sta 00+00 to 12+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 575.42 | | | | | | | | | | | | | | |
| 5.4 | 574.66 | | | | | | | | | | | | | | |
| 9.4 | 575.13 | | | | | | | | | | | | | | |
| 13.1 | 575.51 | | | | | | | | | | | | | | |
| 27.1 | 576.01 | | | | | | | | | | | | | | |
| 33.5 | 574.98 | | | | | | | | | | | | | | |
| 37.9 | 574.87 | | | | | | | | | | | | | | |
| 38.8 | 576.47 | | | | | | | | | | | | | | |
| 62.4 | 576.47 | | 577.53 | | | | | | | | | | | | |
| 70.4 | 574.86 | | | | | | | | | | | | | | |
| 72.1 | 576.54 | | | | | | | | | | | | | | |
| 98.0 | 577.29 | | 577.94 | | | | | | | | | | | | |
| 104.0 | 576.36 | | | | | | | | | | | | | | |
| 108.5 | 576.42 | | | | | | | | | | | | | | |
| 466.9 | 578.50 | | | | | | | | | | | | | | |
| 486.6 | 578.73 | | 579.81 | | | | | | | | | | | | |
| 492.8 | 577.35 | | | | | | | | | | | | | | |
| 496.2 | 577.67 | | | | | | | | | | | | | | |
| 497.4 | 579.02 | | | | | | | | | | | | | | |
| 516.8 | 578.82 | | | | | | | | | | | | | | |
| 522.1 | 578.51 | | | | | | | | | | | | | | |
| 547.7 | 579.19 | | 580.18 | | | | | | | | | | | | |
| 554.5 | 578.49 | | | | | | | | | | | | | | |
| 564.9 | 578.27 | | | | | | | | | | | | | | |



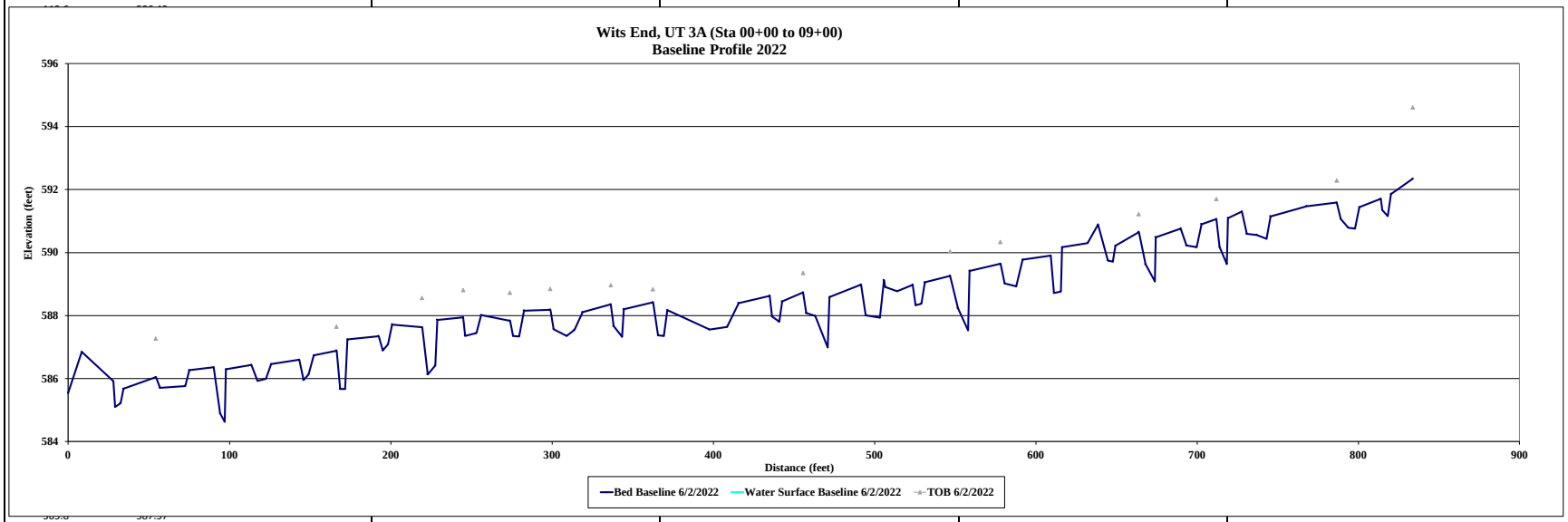
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 3 Upstream (Sta 00+00 to 10+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 585.46 | | | | | | | | | | | | | | |
| 2.1 | 585.45 | | | | | | | | | | | | | | |
| 3.5 | 584.94 | | | | | | | | | | | | | | |
| 6.4 | 585.04 | | | | | | | | | | | | | | |
| 8.8 | 585.73 | | | | | | | | | | | | | | |
| 53.7 | 586.48 | | | | | | | | | | | | | | |
| 54.8 | 585.68 | | | | | | | | | | | | | | |
| 57.1 | 585.52 | | | | | | | | | | | | | | |
| 58.8 | 586.28 | | 587.04 | | | | | | | | | | | | |
| 80.7 | 586.62 | | | | | | | | | | | | | | |
| 82.7 | 585.93 | | | | | | | | | | | | | | |
| 88.3 | 585.85 | | | | | | | | | | | | | | |
| 92.3 | 586.77 | | | | | | | | | | | | | | |
| 108.5 | 586.89 | | | | | | | | | | | | | | |
| 362.3 | 588.80 | | 589.65 | | | | | | | | | | | | |
| 364.9 | 588.06 | | | | | | | | | | | | | | |
| 370.5 | 587.97 | | | | | | | | | | | | | | |
| 374.2 | 588.49 | | | | | | | | | | | | | | |
| 389.4 | 588.93 | | 589.65 | | | | | | | | | | | | |
| 391.0 | 587.93 | | | | | | | | | | | | | | |
| 397.7 | 587.55 | | | | | | | | | | | | | | |
| 399.0 | 589.35 | | | | | | | | | | | | | | |
| 414.1 | 589.38 | | 590.12 | | | | | | | | | | | | |
| 415.8 | 588.89 | | | | | | | | | | | | | | |
| 423.1 | 588.70 | | | | | | | | | | | | | | |
| 428.5 | 589.30 | | | | | | | | | | | | | | |
| 444.9 | 589.48 | | 590.43 | | | | | | | | | | | | |



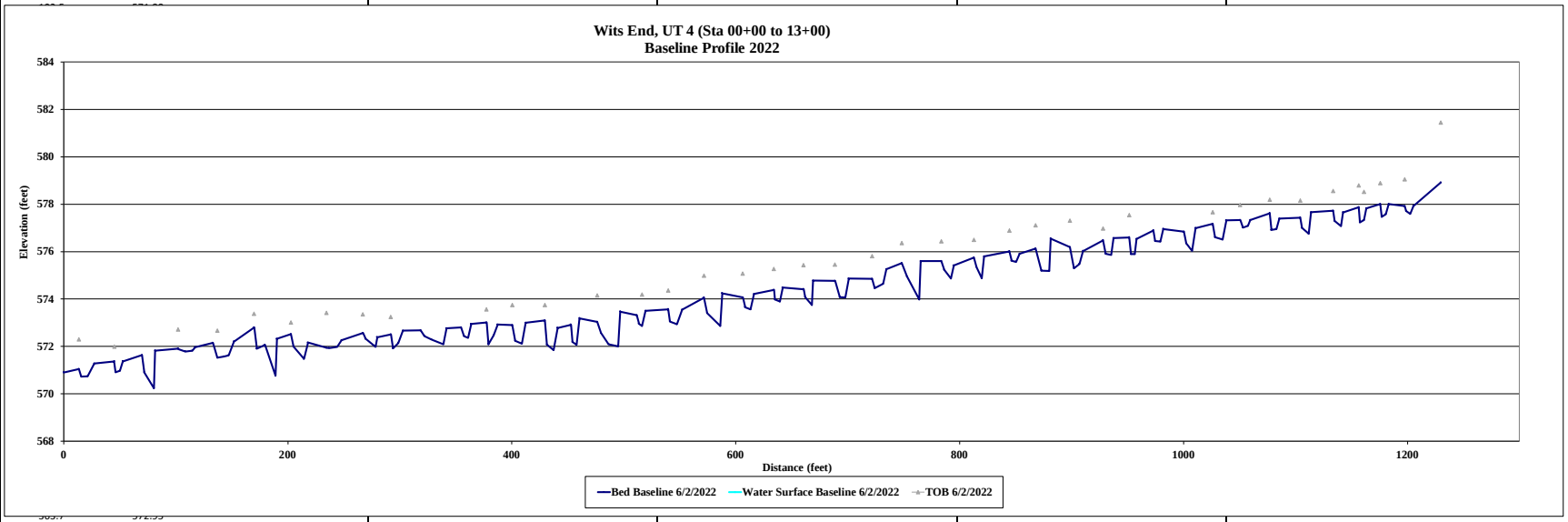
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 3A (Sta 00+00 to 09+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 585.54 | | | | | | | | | | | | | | |
| 8.4 | 586.85 | | | | | | | | | | | | | | |
| 28.0 | 585.92 | | | | | | | | | | | | | | |
| 29.1 | 585.10 | | | | | | | | | | | | | | |
| 32.4 | 585.22 | | | | | | | | | | | | | | |
| 34.2 | 585.68 | | | | | | | | | | | | | | |
| 54.3 | 586.05 | | 587.27 | | | | | | | | | | | | |
| 56.8 | 585.71 | | | | | | | | | | | | | | |
| 72.5 | 585.76 | | | | | | | | | | | | | | |
| 75.0 | 586.26 | | | | | | | | | | | | | | |
| 90.1 | 586.36 | | | | | | | | | | | | | | |
| 94.2 | 584.89 | | | | | | | | | | | | | | |
| 97.1 | 584.63 | | | | | | | | | | | | | | |
| 97.8 | 586.29 | | | | | | | | | | | | | | |
| 369.3 | 587.35 | | | | | | | | | | | | | | |
| 371.4 | 588.17 | | | | | | | | | | | | | | |
| 397.7 | 587.55 | | | | | | | | | | | | | | |
| 408.6 | 587.64 | | | | | | | | | | | | | | |
| 415.6 | 588.40 | | | | | | | | | | | | | | |
| 434.9 | 588.63 | | | | | | | | | | | | | | |
| 436.4 | 587.97 | | | | | | | | | | | | | | |
| 440.8 | 587.80 | | | | | | | | | | | | | | |
| 442.6 | 588.45 | | | | | | | | | | | | | | |
| 455.7 | 588.73 | | 589.34 | | | | | | | | | | | | |
| 457.5 | 588.08 | | | | | | | | | | | | | | |
| 463.2 | 587.99 | | | | | | | | | | | | | | |



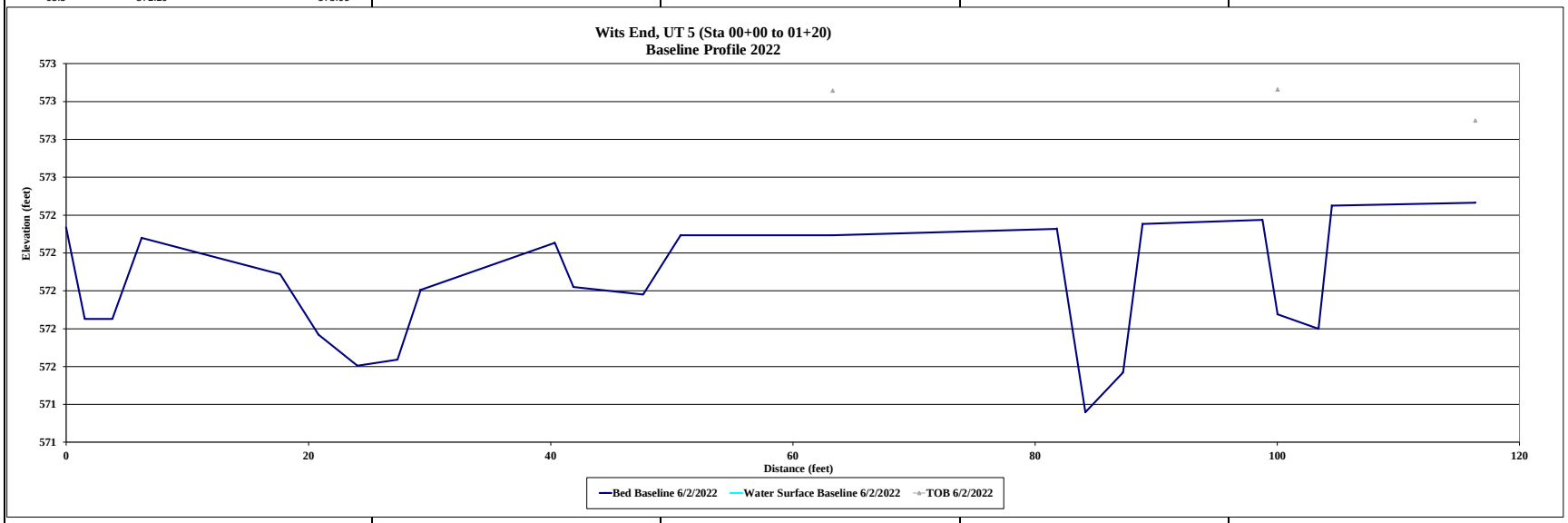
| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 4 (Sta 00+00 to 13+00) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 570.90 | | | | | | | | | | | | | | |
| 13.5 | 571.04 | | 572.30 | | | | | | | | | | | | |
| 15.8 | 570.73 | | | | | | | | | | | | | | |
| 21.3 | 570.74 | | | | | | | | | | | | | | |
| 27.2 | 571.28 | | | | | | | | | | | | | | |
| 45.1 | 571.37 | | 571.99 | | | | | | | | | | | | |
| 46.4 | 570.91 | | | | | | | | | | | | | | |
| 50.0 | 570.97 | | | | | | | | | | | | | | |
| 52.6 | 571.37 | | | | | | | | | | | | | | |
| 69.8 | 571.63 | | | | | | | | | | | | | | |
| 71.8 | 570.90 | | | | | | | | | | | | | | |
| 80.3 | 570.23 | | | | | | | | | | | | | | |
| 81.4 | 571.83 | | | | | | | | | | | | | | |
| 101.9 | 571.91 | | 572.71 | | | | | | | | | | | | |
| 377.5 | 573.01 | | 573.56 | | | | | | | | | | | | |
| 379.2 | 572.09 | | | | | | | | | | | | | | |
| 383.9 | 572.47 | | | | | | | | | | | | | | |
| 387.3 | 572.92 | | | | | | | | | | | | | | |
| 400.4 | 572.90 | | 573.75 | | | | | | | | | | | | |
| 403.0 | 572.23 | | | | | | | | | | | | | | |
| 408.9 | 572.12 | | | | | | | | | | | | | | |
| 412.5 | 573.00 | | | | | | | | | | | | | | |
| 429.5 | 573.10 | | 573.75 | | | | | | | | | | | | |
| 431.4 | 572.08 | | | | | | | | | | | | | | |
| 437.4 | 571.84 | | | | | | | | | | | | | | |
| 440.9 | 572.78 | | | | | | | | | | | | | | |
| 452.8 | 572.92 | | | | | | | | | | | | | | |



| | |
|---|---|
| **Project Name** | Wits End - Baseline (2022) Profile |
| **Reach** | UT 5 (Sta 00+00 to 01+20) |
| **Feature** | Profile |
| **Date** | 6/2/22 |
| **Crew** | Perkinson |

| 2022 Baseline Survey | | | | As needed | | | | As needed | | | | As needed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** | **Station** | **Bed Elevation** | **Water Elevation** | **TOB** |
| 0.0 | 572.33 | | | | | | | | | | | | | | |
| 1.5 | 571.85 | | | | | | | | | | | | | | |
| 3.8 | 571.85 | | | | | | | | | | | | | | |
| 6.2 | 572.28 | | | | | | | | | | | | | | |
| 17.6 | 572.09 | | | | | | | | | | | | | | |
| 20.8 | 571.77 | | | | | | | | | | | | | | |
| 24.0 | 571.60 | | | | | | | | | | | | | | |
| 27.3 | 571.64 | | | | | | | | | | | | | | |
| 29.2 | 572.01 | | | | | | | | | | | | | | |
| 40.3 | 572.25 | | | | | | | | | | | | | | |
| 41.9 | 572.02 | | | | | | | | | | | | | | |
| 47.6 | 571.98 | | | | | | | | | | | | | | |
| 50.7 | 572.29 | | | | | | | | | | | | | | |
| 63.3 | 572.29 | | 573.06 | | | | | | | | | | | | |



| Table 9A. Baseline Stream Data Summary<br>Wits End - Waxhaw Branch downstream | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 12.0 | | 13.2 | 13.4 | | 15.9 | 18.4 | 18.0 | 18.0 | 1 |
| Floodprone Width (ft) | 20 | | 32 | 150 | | 100 | 200 | 150 | 150 | 1 |
| Bankfull Mean Depth (ft) | 1.5 | | 1.6 | 1.7 | | 1.2 | 1.3 | 1.1 | 1.1 | 1 |
| Bankfull Max Depth (ft) | 2.1 | | 2.4 | 2.7 | | 1.5 | 2 | 1.5 | 1.5 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 21.2 | | 21.2 | 21.2 | | 21.2 | 21.2 | 19.2 | 19.2 | 1 |
| Width/Depth Ratio | 7.1 | | 8.3 | 8.9 | | 12 | 16 | 16.9 | 16.9 | 1 |
| Entrenchment Ratio | 1.5 | | 2.7 | 11.3 | | 6.3 | 10.9 | 8.3 | 8.3 | 1 |
| Bank Height Ratio | **1.5** | | **1.8** | **2.2** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | Eg 4/5 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 88.3 | | | | | 88.3 | | 88.3 | | |
| Sinuosity (ft) | 1.06 | | | | | 1.15 | | 1.15 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0042 | | | | | 0.0039 | | 0.004 | | |
| Other | | | | | | | | | | |

| Table 9B. Baseline Stream Data Summary<br>Wits End - Waxhaw Branch upstream | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 10.4 | | 11.6 | 13.3 | | 13.4 | 15.5 | 18.0 | 18.0 | 1 |
| Floodprone Width (ft) | 150 | | 150 | 150 | | 50 | 150 | 150 | 150 | 1 |
| Bankfull Mean Depth (ft) | 1.1 | | 1.3 | 1.4 | | 1 | 1.1 | 1.1 | 1.1 | 1 |
| Bankfull Max Depth (ft) | 2 | | 2.1 | 2.3 | | 1.2 | 1.7 | 1.5 | 1.5 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 15 | | 15 | 15 | | 15 | 15 | 19.2 | 19.2 | 1 |
| Width/Depth Ratio | 7.4 | | 8.9 | 12.2 | | 12 | 16 | 16.9 | 16.9 | 1 |
| Entrenchment Ratio | 11.2 | | 12.9 | 14.4 | | 3.7 | 9.7 | 8.3 | 8.3 | 1 |
| Bank Height Ratio | **1.3** | | **1.5** | **1.6** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | Eg 4/5 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 61.3 | | | | | 61.3 | | 61.3 | | |
| Sinuosity (ft) | 1.01 | | | | | 1.15 | | 1.15 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0052 | | | | | 0.0046 | | 0.0043 | | |
| Other | | | | | | | | | | |

| Table 9C. Baseline Stream Data Summary<br>Wits End - UT 1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 4.0 | | 4.6 | 5.1 | | 5.8 | 6.7 | 18.0 | 18.0 | 1 |
| Floodprone Width (ft) | 40 | | 45 | 50 | | 25 | 75 | 150 | 150 | 1 |
| Bankfull Mean Depth (ft) | 0.5 | | 0.6 | 0.7 | | 0.4 | 0.5 | 1.1 | 1.1 | 1 |
| Bankfull Max Depth (ft) | 0.9 | | 1 | 1 | | 0.5 | 0.7 | 1.5 | 1.5 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 2.8 | | 2.8 | 2.8 | | 2.8 | 2.8 | 19.2 | 19.2 | 1 |
| Width/Depth Ratio | 5.7 | | 8 | 10.2 | | 12 | 16 | 16.9 | 16.9 | 1 |
| Entrenchment Ratio | 7.8 | | 10.2 | 12.5 | | 4.3 | 11.2 | 8.3 | 8.3 | 1 |
| Bank Height Ratio | **1.1** | | **1.3** | **1.5** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | Eg 4/5 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 61.3 | | | | | 61.3 | | 61.3 | | |
| Sinuosity (ft) | 1.06 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0262 | | | | | 0.0253 | | 0.0071 | | |
| Other | | | | | | | | | | |

| Table 9D. Baseline Stream Data Summary<br>Wits End - UT 2 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 4.1 | | 4.8 | 7 | | 6.9 | 8 | 7.7 | 8.7 | 1 |
| Floodprone Width (ft) | 22 | | 33 | 40 | | 25 | 75 | 50 | 50 | 1 |
| Bankfull Mean Depth (ft) | 0.6 | | 0.8 | 1 | | 0.5 | 0.6 | 0.3 | 0.4 | 1 |
| Bankfull Max Depth (ft) | 1.2 | | 1.4 | 1.4 | | 0.6 | 0.9 | 0.6 | 0.6 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 4 | | 4 | 4 | | 4 | 4 | 2.4 | 2.8 | 1 |
| Width/Depth Ratio | 2 | | 4.1 | 6 | | 12 | 16 | 21.2 | 31.4 | 1 |
| Entrenchment Ratio | 4.7 | | 5.4 | 8.3 | | 3.1 | 9.6 | 5.8 | 6.5 | 1 |
| Bank Height Ratio | **1** | | **1.1** | **1.5** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | E 6 | | | | | Ce 3/4 | | Ce 4 | | |
| Bankfull Discharge (cfs) | 14.8 | | | | | 14.8 | | 14.8 | | |
| Sinuosity (ft) | 1 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0089 | | | | | 0.0076 | | 0.0077 | | |
| Other | | | | | | | | | | |

| Table 9E. Baseline Stream Data Summary<br>Wits End - UT 3 Lower | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 7.1 | | 8 | 10.3 | | 9.7 | 11.2 | 9.7 | 10.3 | 1 |
| Floodprone Width (ft) | 8 | | 10 | 23 | | 50 | 100 | 75 | 75 | 1 |
| Bankfull Mean Depth (ft) | 0.8 | | 1 | 1.1 | | 0.7 | 0.8 | 0.5 | 0.7 | 1 |
| Bankfull Max Depth (ft) | 1.1 | | 1.3 | 1.5 | | 0.9 | 1.2 | 0.6 | 1.0 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 7.8 | | 7.8 | 7.8 | | 7.8 | 7.8 | 5.4 | 6.7 | 1 |
| Width/Depth Ratio | 6.5 | | 8 | 19.8 | | 12 | 16 | 14.1 | 19.7 | 1 |
| Entrenchment Ratio | 1.1 | | 1.3 | 2.2 | | 5.2 | 9 | 7.3 | 7.7 | 1 |
| Bank Height Ratio | **1.7** | | **2.3** | **3** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | G 4/5 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 30.6 | | | | | 30.6 | | 30.6 | | |
| Sinuosity (ft) | 1.03 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0071 | | | | | 0.0066 | | 0.0065 | | |
| Other | | | | | | | | | | |

| Table 9F. Baseline Stream Data Summary<br>Wits End - UT 3A | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 5.8 | | 5.8 | 5.8 | | 7 | 8.1 | 8.5 | 8.5 | 1 |
| Floodprone Width (ft) | 8 | | 9 | 8 | | 25 | 75 | 75 | 50 | 1 |
| Bankfull Mean Depth (ft) | 0.7 | | 0.7 | 0.7 | | 0.5 | 0.6 | 0.5 | 0.5 | 1 |
| Bankfull Max Depth (ft) | 0.9 | | 1 | 1 | | 0.6 | 0.9 | 0.7 | 0.7 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 4.1 | | 4.1 | 4.1 | | 4.1 | 4.1 | 4.0 | 4.0 | 1 |
| Width/Depth Ratio | 8.3 | | 8.3 | 8.3 | | 12 | 16 | 18.2 | 18.2 | 1 |
| Entrenchment Ratio | 1.4 | | 1.6 | 1.8 | | 1 | 1.3 | 5.9 | 5.9 | 1 |
| Bank Height Ratio | **1.4** | | **1.8** | **1.8** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | G 4 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 15.2 | | | | | 15.2 | | 15.2 | | |
| Sinuosity (ft) | 1.02 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.009 | | | | | 0.0084 | | 0.008 | | |
| Other | | | | | | | | | | |

| Table 9G. Baseline Stream Data Summary<br>Wits End - UT 3 Upstream | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 5.3 | | 5.7 | 6.1 | | 7 | 8.1 | 7.2 | 7.2 | 1 |
| Floodprone Width (ft) | 7 | | 8 | 8 | | 25 | 75 | 50 | 50 | 1 |
| Bankfull Mean Depth (ft) | 0.8 | | 0.9 | 0.9 | | 0.5 | 0.6 | 0.4 | 0.4 | 1 |
| Bankfull Max Depth (ft) | 0.9 | | 1 | 1.1 | | 0.6 | 0.9 | 0.6 | 0.6 | 1 |
| 4.7 | 15 | | 4.7 | 4.7 | | 4.1 | 4.1 | 3.1 | 3.1 | 1 |
| Width/Depth Ratio | 5.9 | | 6.8 | 7.6 | | 12 | 16 | 16.8 | 16.8 | 1 |
| Entrenchment Ratio | 1.1 | | 1.3 | 1.5 | | 1 | 1.3 | 7.0 | 7.0 | 1 |
| Bank Height Ratio | **2.3** | | **2.9** | **3.4** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | G 4/5 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 17.6 | | | | | 15.2 | | 15.2 | | |
| Sinuosity (ft) | 1.03 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0089 | | | | | 0.0084 | | 0.0083 | | |
| Other | | | | | | | | | | |

| Table 9H. Baseline Stream Data Summary<br>Wits End - UT 4 Upstream | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 4.4 | | 10.6 | 17.9 | | 6.9 | 8 | 18.0 | 18.0 | 1 |
| Floodprone Width (ft) | 30 | | 50 | 60 | | 25 | 75 | 150 | 150 | 1 |
| Bankfull Mean Depth (ft) | 0.2 | | 0.6 | 1 | | 0.5 | 0.6 | 1.1 | 1.1 | 1 |
| Bankfull Max Depth (ft) | 0.4 | | 0.9 | 1.4 | | 0.6 | 0.9 | 1.5 | 1.5 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 4.3 | | 4.3 | 4.3 | | 4 | 4 | 19.2 | 19.2 | 1 |
| Width/Depth Ratio | 4.4 | | 29.8 | 89.5 | | 12 | 16 | 16.9 | 16.9 | 1 |
| Entrenchment Ratio | 3.1 | | 5.1 | 9.6 | | 3.1 | 9.6 | 8.3 | 8.3 | 1 |
| Bank Height Ratio | **1** | | **1.4** | **1.8** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | Cg D 4/5 | | | | | Ce 3/4 | | Ce 4 | | |
| Bankfull Discharge (cfs) | 16 | | | | | 14.8 | | 14.8 | | |
| Sinuosity (ft) | 1.02 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0076 | | | | | 0.0076 | | 0.0058 | | |
| Other | | | | | | | | | | |

| Table 9I. Baseline Stream Data Summary<br>Wits End - UT 5 Upstream | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Pre-Existing Condition (applicaple)** | | | | | **Design** | | **Monitoring Baseline (MY0)** | | |
| **Riffle Only** | Min | Mean | Med | Max | n | Min | Max | Min | Max | n |
| Bankfull Width (ft) | 3.1 | | 3.4 | 3.7 | | 5.4 | 6.2 | 7.3 | 7.3 | 1 |
| Floodprone Width (ft) | 10 | | 13 | 15 | | 15 | 50 | 30 | 30 | 1 |
| Bankfull Mean Depth (ft) | 0.7 | | 0.8 | 0.8 | | 0.4 | 0.4 | 0.4 | 0.4 | 1 |
| Bankfull Max Depth (ft) | 1 | | 1.3 | 1.6 | | 0.5 | 0.7 | 0.6 | 0.6 | 1 |
| Bankfull Cross Sectional Area ($ft^2$) | 2.4 | | 2.4 | 2.4 | | 2.4 | 2.4 | 3.0 | 3.0 | 1 |
| Width/Depth Ratio | 3.9 | | 4.6 | 5.3 | | 12 | 16 | 17.7 | 17.7 | 1 |
| Entrenchment Ratio | 3.2 | | 3.6 | 4.1 | | 2.8 | 8.1 | 4.1 | 4.1 | 1 |
| Bank Height Ratio | **1** | | **1.3** | **1.6** | | **1** | **1.3** | **1** | **1** | 1 |
| Max part size (mm) mobilized at bankfull | | | | | | | | | | |
| Rosgen Classification | Eg 4 | | | | | Ce 3/4 | | Ce 3/4 | | |
| Bankfull Discharge (cfs) | 8 | | | | | 8 | | 8 | | |
| Sinuosity (ft) | 1.04 | | | | | 1.1 | | 1.1 | | |
| Water Surface Slope (Channel) (ft/ft) | 0.0113 | | | | | 0.0107 | | 0.0011 | | |
| Other | | | | | | | | | | |

## Table 10A. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) Waxhaw Branch

| | Waxhaw Br - Cross Section 1 (Riffle) | | | | | | | Waxhaw Br - Cross Section 2 (Pool) | | | | | | | Waxhaw Br - Cross Section 3 (Riffle) | | | | | | | Waxhaw Br - Cross Section 4 (Pool) | | | | | | | Waxhaw Br - Cross Section 5 (Riffle) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 572.78 | | | | | | | 572.99 | | | | | | | 578.32 | | | | | | | 578.36 | | | | | | | 583.96 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 571.33 | | | | | | | 570.29 | | | | | | | 577.06 | | | | | | | 576.45 | | | | | | | 582.57 | | | | | | |
| LTOB[2] Elevation | 572.78 | | | | | | | 572.99 | | | | | | | 578.32 | | | | | | | 578.36 | | | | | | | 583.96 | | | | | | |
| LTOB[2] Max Depth (ft) | 1.45 | | | | | | | 2.70 | | | | | | | 1.27 | | | | | | | 1.92 | | | | | | | 1.39 | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | 19.0 | | | | | | | 32.2 | | | | | | | 11.5 | | | | | | | 18.6 | | | | | | | 16.3 | | | | | | |

| | Waxhaw Br - Cross Section 6 (Pool) | | | | | | | Waxhaw Br - Cross Section 7 (Pool) | | | | | | | Waxhaw Br - Cross Section 8 (Riffle) | | | | | | | Waxhaw Br - Cross Section 9 (Riffle) | | | | | | | Waxhaw Br - Cross Section 10 (Pool) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 583.94 | | | | | | | 587.97 | | | | | | | 587.88 | | | | | | | 589.98 | | | | | | | 589.92 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 581.80 | | | | | | | 586.03 | | | | | | | 586.78 | | | | | | | 588.56 | | | | | | | 587.92 | | | | | | |
| LTOB[2] Elevation | 583.94 | | | | | | | 587.97 | | | | | | | 587.88 | | | | | | | 589.98 | | | | | | | 589.92 | | | | | | |
| LTOB[2] Max Depth (ft) | 2.14 | | | | | | | 1.93 | | | | | | | 1.11 | | | | | | | 1.42 | | | | | | | 2.00 | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | 23.5 | | | | | | | 18.2 | | | | | | | 10.0 | | | | | | | 13.9 | | | | | | | 16.3 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | |
| Thalweg Elevation | | | | | | | |
| LTOB[2] Elevation | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Table 10B. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) UT 2

| | UT 2 - Cross Section 25 (Riffle) | | | | | | | UT 2 - Cross Section 26 (Pool) | | | | | | | UT 2 - Cross Section 27 (Pool) | | | | | | | UT 3 - Cross Section 28 (Riffle) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 588.14 | | | | | | | 588.02 | | | | | | | 594.68 | | | | | | | 594.73 | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | | | | | | | |
| Thalweg Elevation | 587.49 | | | | | | | 586.55 | | | | | | | 593.44 | | | | | | | 594.11 | | | | | | | | | | | | | |
| LTOB[2] Elevation | 588.14 | | | | | | | 588.02 | | | | | | | 594.68 | | | | | | | 594.73 | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | 0.65 | | | | | | | 1.48 | | | | | | | 1.24 | | | | | | | 0.62 | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | 2.4 | | | | | | | 7.6 | | | | | | | 6.1 | | | | | | | 2.88 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Table 10C. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) UT 3

| | UT 3 - Cross Section 17 (Pool) | | | | | | | UT 2 - Cross Section 18 (Riffle) | | | | | | | UT 3 - Cross Section 19 (Riffle) | | | | | | | UT 3 - Cross Section 20 (Pool) | | | | | | | UT 3 - Cross Section 23 (Riffle) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 577.89 | | | | | | | 577.89 | | | | | | | 582.95 | | | | | | | 582.62 | | | | | | | 590.06 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 576.32 | | | | | | | 577.27 | | | | | | | 581.96 | | | | | | | 581.40 | | | | | | | 589.47 | | | | | | |
| LTOB[2] Elevation | 577.89 | | | | | | | 577.89 | | | | ` | | | 582.95 | | | | | | | 582.62 | | | | ` | | | 590.06 | | | | ` | | |
| LTOB[2] Max Depth (ft) | 1.57 | | | | | | | 0.63 | | | | | | | 0.99 | | | | | | | 1.22 | | | | | | | 0.60 | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | 13.3 | | | | | | | 5.4 | | | | | | | 6.7 | | | | | | | 7.7 | | | | | | | 3.1 | | | | | | |

| | UT 3 - Cross Section 24 (Pool) | | | | | | |
|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 590.43 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | |
| Thalweg Elevation | 588.89 | | | | | | |
| LTOB[2] Elevation | 590.43 | | | | ` | | |
| LTOB[2] Max Depth (ft) | 1.54 | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | 11.3 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | |
| Thalweg Elevation | | | | | | | |
| LTOB[2] Elevation | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 **- Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Table 10D. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) UT 3A

| | UT 3A - Cross Section 21 (Riffle) | | | | | | | UT 3A - Cross Section 22 (Pool) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 589.42 | | | | | | | 589.55 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 588.73 | | | | | | | 588.06 | | | | | | |
| LTOB[2] Elevation | 589.42 | | | | | | | 589.55 | | | | | | |
| LTOB[2] Max Depth (ft) | 0.69 | | | | | | | 1.49 | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | 4.0 | | | | | | | 9.8 | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

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2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Table 10E. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) UT 4

| | UT 4 - Cross Section 11 (Pool) | | | | | | | UT 4 - Cross Section 12 (Riffle) | | | | | | | UT 4 - Cross Section 13 (Pool) | | | | | | | UT 4 - Cross Section 14 (Riffle) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 573.37 | | | | | | | 573.37 | | | | | | | 576.28 | | | | | | | 576.50 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 572.21 | | | | | | | 572.72 | | | | | | | 574.88 | | | | | | | 575.81 | | | | | | |
| LTOB[2] Elevation | 573.37 | | | | | | | 573.37 | | | | ` | | | 576.28 | | | | ` | | | 576.50 | | | | ` | | |
| LTOB[2] Max Depth (ft) | 1.16 | | | | | | | 0.65 | | | | | | | 1.39 | | | | | | | 0.69 | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | 6.7 | | | | | | | 4.0 | | | | | | | 6.4 | | | | | | | 3.2 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | |
| Thalweg Elevation | | | | | | | |
| LTOB[2] Elevation | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | |
| Thalweg Elevation | | | | | | | |
| LTOB[2] Elevation | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | |
| LTOB[2] Cross Sectional Area (ft[2]) | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Table 10F. Monitoring Data - Cross Section Morphology Monitoring Summary

## (Wits End/ DMS:100164) UT 5

| | UT 5 - Cross Section 15 (Pool) | | | | | | | UT 5 - Cross Section 16 (Riffle) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ | MY0 | MY1 | MY2 | MY3 | MY5 | MY7 | MY+ |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | 572.78 | | | | | | | 572.84 | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | 1.00 | | | | | | | 1.00 | | | | | | |
| Thalweg Elevation | 571.65 | | | | | | | 572.21 | | | | | | |
| LTOB[2] Elevation | 572.78 | | | | | | | 572.84 | | | | ` | | |
| LTOB[2] Max Depth (ft) | 1.13 | | | | | | | 0.63 | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | 4.9 | | | | | | | 3.0 | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area | | | | | | | | | | | | | | |
| Bank Height Ratio_Based on AB Bankfull[1] Area | | | | | | | | | | | | | | |
| Thalweg Elevation | | | | | | | | | | | | | | |
| LTOB[2] Elevation | | | | | | | | | | | | | | |
| LTOB[2] Max Depth (ft) | | | | | | | | | | | | | | |
| LTOB[2] Cross Sectional Area ($ft^2$) | | | | | | | | | | | | | | |

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth** - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

## Appendix D: Hydrologic Data

Groundwater Gauge Soil Profiles
Pre-Construction Groundwater Gauge Data (2020 & 2021)
Figure 2. Pre-Construction Groundwater Gauge Locations
Stream Gauge Graphs

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

# SOIL BORING LOG

Axiom Environmental, Inc.

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 1 (34.908395, -80.441709)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-2 | 2.5 Y 4/2 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 2-12 | 2.5 Y 6/4 | 90 | 2.5 Y 6/3 | 5 | D | M | Silty Loam |
| | | | 2.5 Y 5/8 | 5 | C | PL | |
| | | | | | | | |
| 12+ | 2.5 Y 6/3 | 97 | 2.5 Y 6/3 | 3 | C | M | Clay Loam |
| | | | | | | | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 2 (35.831389, -79.887733)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-2 | 2.5 Y 5/2 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 2-9 | 2.5 Y 6/3 | 75 | 2.5 Y 6/2 | 20 | D | M | Silty Loam |
| | | | 2.5 Y 5/6 | 5 | C | M | |
| | | | | | | | |
| 9-18 | 2.5 Y 7/2 | 80 | 2.5 Y 6/2 | 20 | D | M | Silty Loam |
| | | | | | | | |
| 18+ | 2.5 Y 6/4 | 85 | 2.5 Y 6/6 | 10 | C | M | Silty Clay Loam |
| | | | 2.5 Y 7/2 | 5 | D | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 3 (34.908623, -80.443312)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-6 | 2.5 Y 5/3 | 98 | 2.5 Y 5/6 | 2 | C | PL | Silty Clay Loam |
| | | | | | | | |
| 6-15 | 2.5 Y 6/3 | 95 | 2.5 Y 6/6 | 2 | | | Silty Loam |
| | | | 2.5 Y 4/4 | 3 | | | |
| | | | | | | | |
| 15+ | 2.5 Y 6/6 | 80 | 2.5 Y 6/3 | 10 | D | M | Sandy Clay Loam |
| | | | 2.5 Y 6/8 | 10 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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Raleigh, North Carolina 27603
919-215-1693

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 4 (34.909572, -80.442676)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 2.5 Y 4/3 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 4-12 | 2.5 Y 6/6 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 12-20 | 2.5 Y 6/3 | 95 | 2.5 Y 6/6 | 3 | C | M | Silty Loam |
| | | | 2.5 Y 4/4 | 2 | C | M | |
| | | | | | | | |
| 20+ | 2.5 Y 6/3 | 95 | 2.5 Y 6/6 | 3 | C | M | Silty Clay Loam |
| | | | 2.5 Y 4/4 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 5 (34.909931, -80.442588)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 2.5 Y 6/4 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 4-17 | 2.5 Y 6/4 | 98 | 2.5 Y 5/6 | 2 | C | M | Silty Loam |
| | | | | | | | |
| 17+ | 2.5 Y 6/8 | 100 | | | | | Silty Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 6 (34.910248, -80.44328)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 2.5 Y 5/3 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 4-13 | 2.5 Y 6/4 | 100 | | | | | Silty Loam |
| | | | | | | | |
| 13-20+ | 2.5 Y 6/4 | 96 | 2.5 Y 6/8 | 2 | C | M | Fine Sandy Loam |
| | | | 2.5 Y 4/4 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 7 (34.910815, -80.442702)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 2.5 Y 5/2 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 3-12 | 2.5 Y 6/4 | 70 | 2.5 Y 6/6 | 30 | C | M | Gravel Silt Loam |
| | | | | | | | |
| 12-21+ | 2.5 Y 6/6 | 95 | 2.5 Y 6/4 | 3 | D | M | Clay Loam |
| | | | 2.5 Y 6/8 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 8 (34.910834, -80.443475)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-1 | 10 YR 5/3 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 1-9 | 2.5 Y 4/2 | 100 | | | | | Fine Sandy Loam |
| | | | | | | | |
| 9-18 | 2.5 Y 6/4 | 100 | | | | | Fine Sandy Loam |
| | | | | | | | |
| 18+ | 2.5 Y 6/3 | 80 | 2.5 Y 6/6 | 10 | | | Gravel Loam |
| | | | 2.5 Y 4/3 | 10 | | | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 9 (34.911343, -80.444421)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-2 | 2.5 Y 5/3 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 2-9 | 2.5 Y 5/4 | 97 | 2.5 Y 6/8 | 3 | C | PL | Silt Loam |
| | | | | | | | |
| 9-18 | 2.5 Y 6/4 | 95 | 2.5 Y 6/3 | 3 | D | M | Loam |
| | | | 2.5 Y 6/8 | 2 | C | PL | |
| | | | | | | | |
| 18+ | 2.5 Y 6/4 | 95 | 2.5 Y 6/3 | 3 | D | M | Clay |
| | | | 2.5 Y 6/8 | 2 | C | PL | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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Raleigh, North Carolina 27603
919-215-1693

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 11 (34.912335, -80.447071)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-11 | 2.5 Y 6/4 | 100 | | | | | Sandy Clay Loam |
| | | | | | | | |
| 11-16 | 2.5 Y 4/2 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 16+ | 2.5 Y 6/4 | 95 | 2.5 Y 6/2 | 3 | D | M | Loamy Clay |
| | | | 2.5 Y 5/6 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 12 (34.912704, -80.447368)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 2.5 Y 6/4 | 70 | 2.5 Y 5/2 | 28 | C | M | Silt Loam |
| | | | 2.5 Y 5/6 | 2 | C | M | |
| | | | | | | | |
| 3-17 | 2.5 Y 6/4 | 98 | 2.5 Y 6/8 | 2 | C | M | Silt Loam |
| | | | | | | | |
| 17+ | 2.5 Y 6/6 | 85 | 2.5 Y 6/4 | 12 | D | M | Loamy Clay |
| | | | 2.5 Y 6/8 | 3 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 13 (34.912023, -80.447574)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 2.5 Y 3/3 | 100 | | | | | Loam |
| | | | | | | | |
| 3-9 | 2.5 Y 6/4 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 9-19 | 2.5 Y 5/3 | 97 | 2.5 Y 5/6 | 3 | C | M | Fine Sandy Loam |
| | | | | | | | |
| 19+ | 2.5 Y 6/6 | 100 | | | | | Loam |
| | | | | | | | |
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| | | | | | | | |

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 14 (34.911495, -80.448929)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-5 | 2.5 Y 4/4 | 100 | | | | | Loam |
| | | | | | | | |
| 5-18 | 2.5 Y 6/4 | 97 | 2.5 Y 6/8 | 3 | C | M | Fine Sandy Loam |
| | | | | | | | |
| 18+ | 2.5 Y 6/4 | 80 | 2.5 Y 6/8 | 15 | C | M | Sandy Clay Loam |
| | | | 2.5 Y 6/3 | 5 | D | M | |
| | | | | | | | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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Raleigh, North Carolina 27603
919-215-1693

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 15 (34.911912, -80.443331)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 2.5 Y 5/3 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 3-10 | 2.5 Y 6/4 | 97 | 2.5 Y 6/8 | 3 | C | M | Fine Sandy Loam |
| | | | | | | | |
| 10+ | 2.5 Y 6/6 | 100 | | | | | Sandy Clay Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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Raleigh, North Carolina 27603
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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 16 (34.912721, -80.443728)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-5 | 10 YR 5/3 | 97 | 10 YR 3/4 | 3 | C | M | Silt |
| | | | | | | | |
| 5-11 | 2.5 Y 6/4 | 80 | 2.5 Y 6/2 | 5 | D | M | Sandy Clay Loam |
| | | | 2.5 Y 3/2 | 10 | C | M | |
| | | | 2.5 Y 5/6 | 5 | P | L | |
| | | | | | | | |
| 11+ | 2.5 Y 6/6 | 97 | 10 YR 5/6 | 3 | C | M | Sandy Clay Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 17 (34.913352, -80.443761)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 2.5 Y 6/4 | 97 | 10 YR 5/6 | 3 | C | M | Silt |
| | | | | | | | |
| 3-10 | 2.5 Y 6/3 | 60 | 2.5 Y 5/1 | 35 | D | M | Clay Loam (Pond Sediment) |
| | | | 2.5 Y 4/3 | 3 | C | M | |
| | | | 2.5 Y 6/8 | 2 | C | M | |
| | | | | | | | |
| 10-15+ | 2.5 Y 5/2 | 95 | 2.5 Y 4/4 | 5 | C | M | Silt (Pond Sediment) |
| | | | | | | | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 18 (34.914105, -80.443531)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0+ | 2.5 Y 5/2 | 60 | 2.5 Y 2/1 | 40 | C | M | Silt (Pond Sediment) |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 19 (34.914131, -80.444315)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 10 YR 5/3 | 90 | 10 YR 5/1 | 5 | D | M | Loam |
| | | | 10 YR 5/6 | 5 | C | M | |
| | | | | | | | |
| 4-8 | 2.5 Y 6/2 | 90 | 10 YR 5/1 | 5 | D | M | Sandy Loam |
| | | | 10 YR 5/6 | 5 | C | M | |
| | | | | | | | |
| 8-18+ | 2.5 Y 6/2 | 100 | | | | | Loamy Sand |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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919-215-1693

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 20 (35.831389, -79.887733)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 2.5 Y 6/4 | 95 | 10 YR 5/6 | 3 | C | M | Silt |
| | | | | | | | |
| 4+ | 10 YR 5/1 | 70 | 10 YR 6/3 | 28 | C | M | Silt |
| | | | 10 YR 5/6 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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919-215-1693

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 21 (34.915517, -80.444192)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 10 YR 6/3 | 98 | 10 YR 6/2 | 2 | D | M | Silt Loam |
| | | | | | | | |
| 3-12 | 10 YR 6/3 | 65 | 10 YR 7/1 | 30 | D | M | Clay Loam |
| | | | 10 YR 6/6 | 5 | C | M | |
| | | | | | | | |
| 12-21 | 10 YR 4/1 | 70 | 10 YR 3/1 | 20 | C | M | Silt |
| | | | 10 YR 4/4 | 10 | C | M | |
| | | | | | | | |
| 21+ | 2.5 Y 6/3 | 98 | 2.5 Y 6/6 | 2 | C | M | Gravel Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 22 (34.915434, -80.444929)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-6 | 10 YR 5/2 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 6-15 | 10 YR 6/3 | 50 | 10 YR 3/1 | 45 | C | M | Sandy Clay Loam |
| | | | 10 YR 4/6 | 5 | C | M | |
| | | | | | | | |
| 15-18 | 10 YR 6/2 | 100 | | | | | Gravel Loam |
| | | | | | | | |
| 18+ | 2.58 Y 6/3 | 100 | | | | | Clay Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 23 (34.915962, -80.444648)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 10 YR 6/2 | 98 | 10 YR 6/6 | 2 | C | PL | Silt Loam |
| | | | | | | | |
| 3-8 | 10 YR 6/2 | 75 | 2.5 Y 7/4 | 24 | C | M | Sandy Clay Loam |
| | | | 10 YR 6/6 | 1 | C | M | |
| | | | | | | | |
| | | | | | | | |
| 8-18 | 2.5 Y 5/6 | 80 | 2.5 Y 6/6 | 20 | C | M | Loamy Clay |
| | | | | | | | |
| 18-24 | 2.5 Y 5/6 | 100 | | | | | Clay |
| | | | | | | | |
| 24+ | 2.5 Y 6/6 | 75 | 2.5 Y 6/3 | 23 | D | M | Clay |
| | | | 2.5 Y 5/4 | 2 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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919-215-1693

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 24 (34.916465, -80.445179)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-11 | 10 YR 6/2 | 90 | 10 YR 6/1 | 6 | D | M | Silt Loam |
| | | | 10 YR 5/6 | 4 | C | M | |
| | | | | | | | |
| 11-18 | 10 YR 5/1 | 97 | 10 YR 5/3 | 3 | C | PL | Clay |
| | | | | | | | |
| 18+ | 10 YR 6/1 | 90 | 10 YR 7/2 | 10 | C | M | Fine Sandy Loam |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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919-215-1693

Axiom Environmental, Inc.

# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 25 (34.917795, -80.446322)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-3 | 10 YR 5/2 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 3-15 | 10 YR 7/4 | 70 | 10 YR 6/2 | 25 | D | M | Silt Loam |
| | | | 10 YR 6/8 | 5 | C | M | |
| | | | | | | | |
| 15+ | 10 YR 7/3 | 80 | 10 YR 4/6 | 20 | C | M | Fine Sand |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 26 (34.916283, -80.444017)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam*

Notes: Location is shown on Figure 1 CCPV. *Gauge located in drained pond, most appropiate soil series based on landscape position.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-6 | 10 YR 6/3 | 97 | 10 YR 5/4 | 3 | C | PL | Silt Loam |
| | | | | | | | |
| 6-15 | 10 YR 6/2 | 95 | 10 YR 4/6 | 5 | C | PL | Fine Sandy Loam |
| | | | | | | | |
| 15-20 | 10 YR 6/4 | 95 | 10 YR 5/2 | 5 | D | M | Gravel Loam |
| | | | | | | | |
| 20+ | 2.5 Y 7/4 | 98 | 2.5 Y 6/3 | 1 | C | M | Clay |
| | | | 10 YR 5/6 | 1 | C | M | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 27 (34.917262, -80.442973)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 10 YR 6/4 | 98 | 10 YR 5/6 | 2 | C | PL | Silt Loam |
| | | | | | | | |
| 4-9 | 10 YR 7/6 | 78 | 10 YR 7/4 | 20 | D | M | Fine Sandy Loam |
| | | | 10 YR 6/8 | 2 | C | M | |
| | | | | | | | |
| 9-21 | 10 YR 7/8 | 99 | 10 YR 6/8 | 1 | C | M | Clay Loam |
| | | | | | | | |
| 21+ | 10 YR 6/8 | 70 | 10 YR 7/4 | 25 | D | M | Sandy Clay Loam |
| | | | 10 YR 5/8 | 5 | | | |
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis

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# SOIL BORING LOG

Date: 6/1/2022

Project/Site: Wits End

County, State: Union County, NC

Sampling Point/
Coordinates: **Soil Profile GW 28 (34.917856, -80.442393)**

Investigator: W. Grant Lewis

Soil Series: CmB - Cid channery silt loam

Notes: Location is shown on Figure 1 CCPV.

| Depth (inches) | Matrix | | Mottling | | | | Texture |
|---|---|---|---|---|---|---|---|
| | Color | % | Color | % | Type | Location | |
| 0-4 | 10 YR 6/2 | 100 | | | | | Silt Loam |
| | | | | | | | |
| 4-9 | 10 YR 6/4 | 95 | 10 YR 6/8 | 5 | C | M | Gravel Loam |
| | | | | | | | |
| 9+ | 10 YR 6/6 | 60 | 10 YR 6/2 | 35 | D | M | Sandy Clay Loam |
| | | | 10 YR 5/8 | 5 | C | M | |
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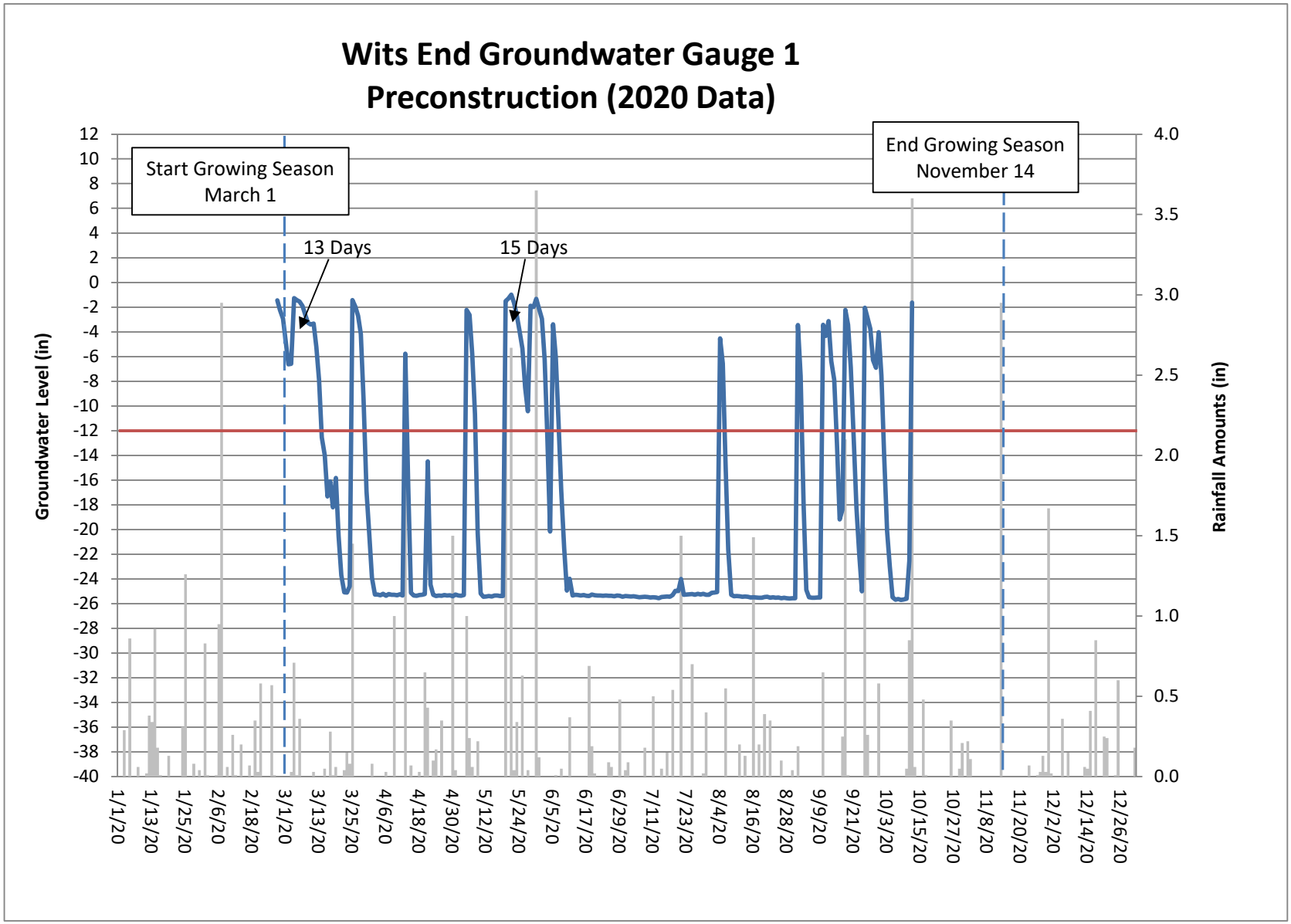
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Locaction: PL=Pore Lining, M=Matrix.

North Carolina Licensed Soil Scientist

Number: 1233

Signature: W Grant Lewis

Name/Print: W. Grant Lewis


Wits End Groundwater Gauge 1
Preconstruction (2020 Data)
Start Growing Season
March 1
End Growing Season
November 14
13 Days
15 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
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-10
-12
-14
-16
-18
-20
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4.0
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8/16/20
8/28/20
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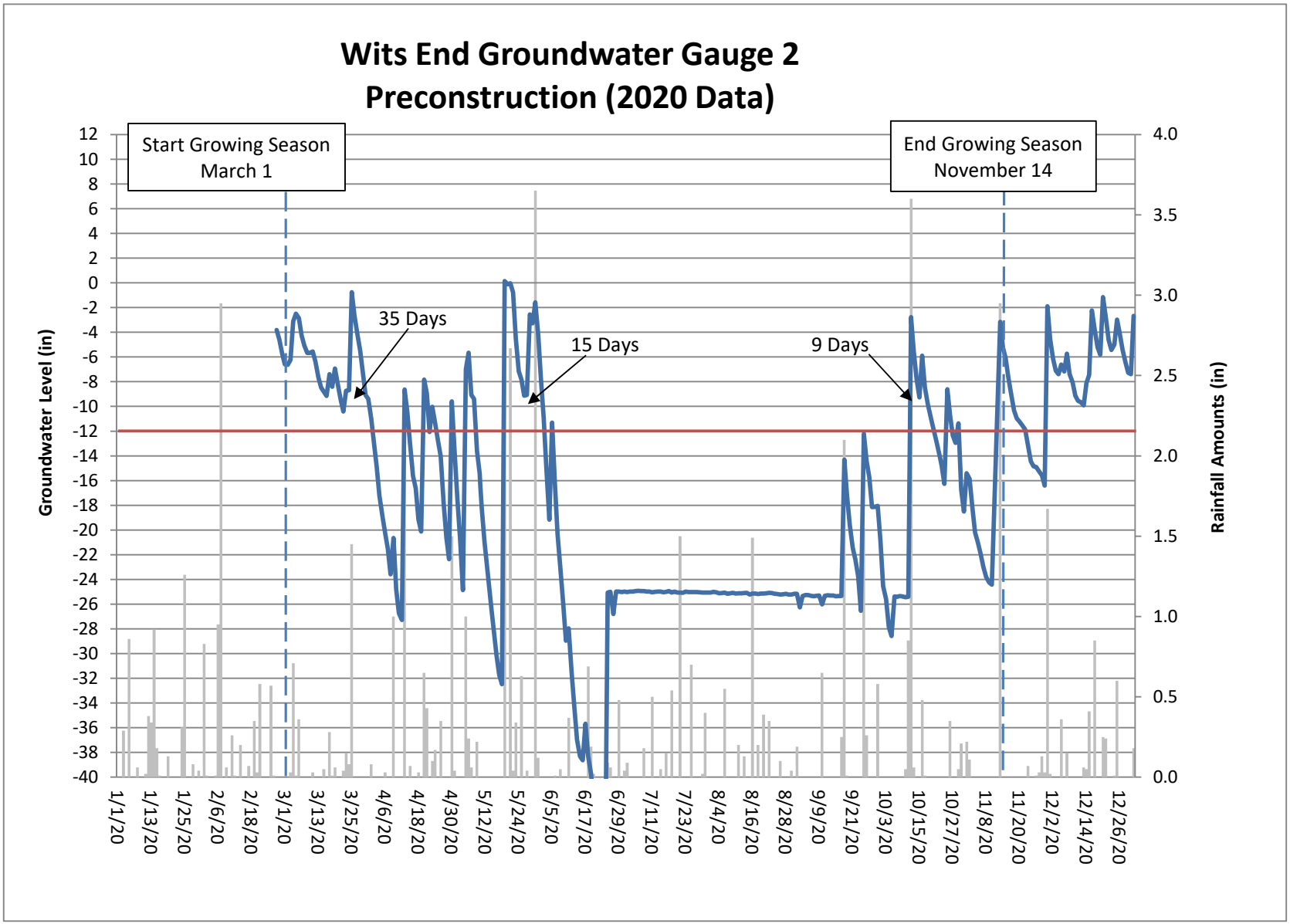
Wits End Groundwater Gauge 2
Preconstruction (2020 Data)
Start Growing Season
March 1
End Growing Season
November 14
35 Days
15 Days
9 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/20
1/13/20
1/25/20
2/6/20
2/18/20
3/1/20
3/13/20
3/25/20
4/6/20
4/18/20
4/30/20
5/12/20
5/24/20
6/5/20
6/17/20
6/29/20
7/11/20
7/23/20
8/4/20
8/16/20
8/28/20
9/9/20
9/21/20
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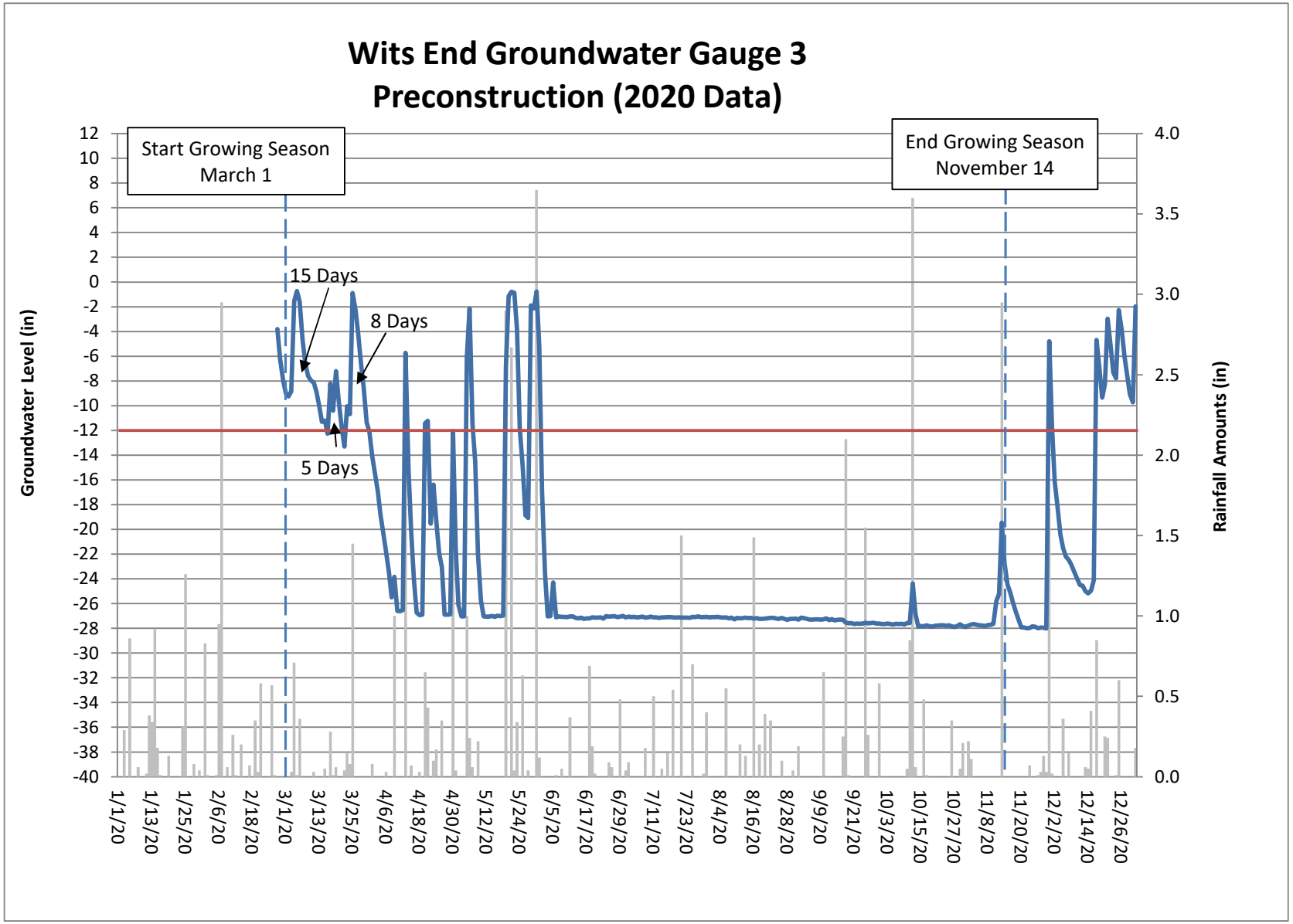
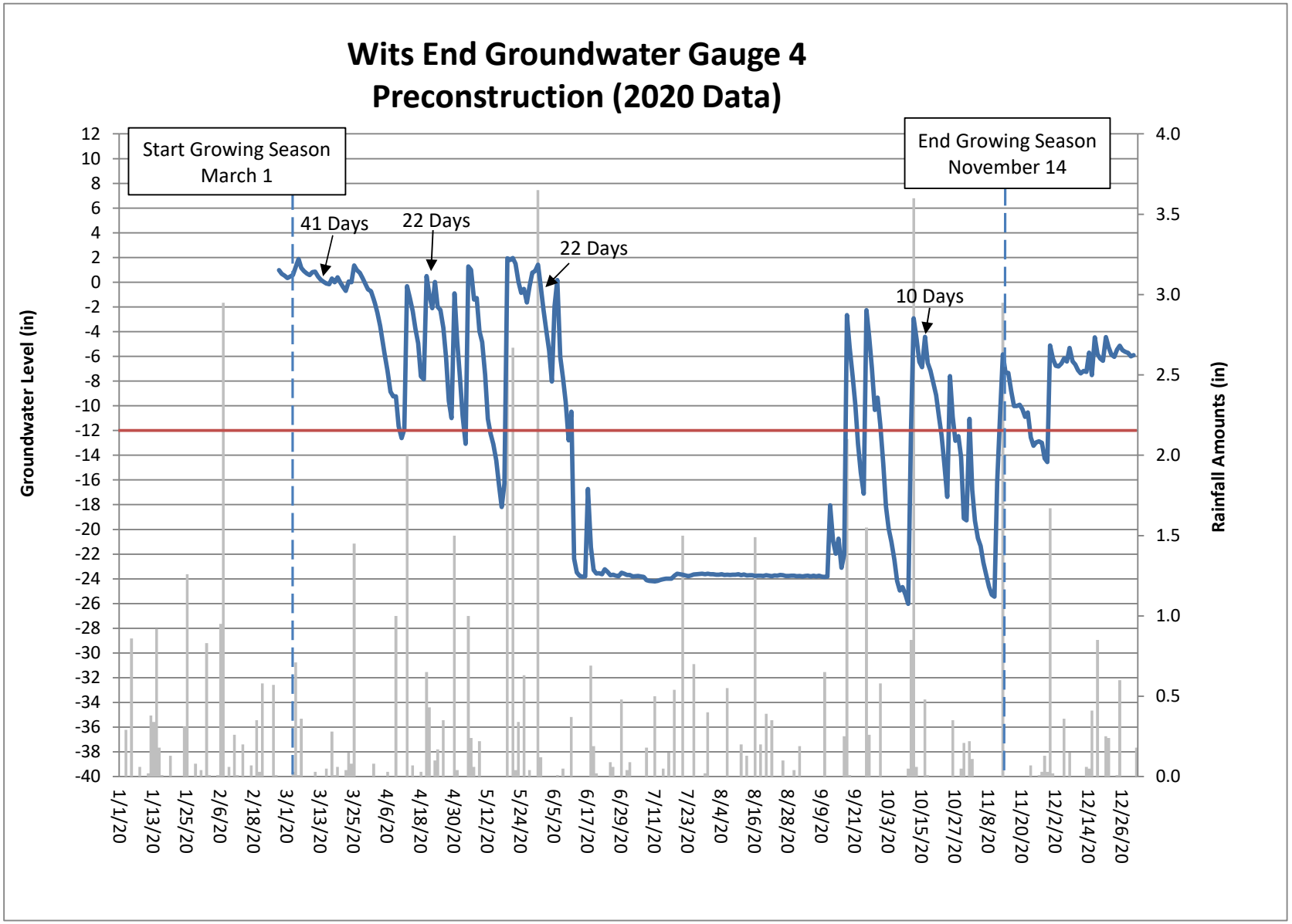
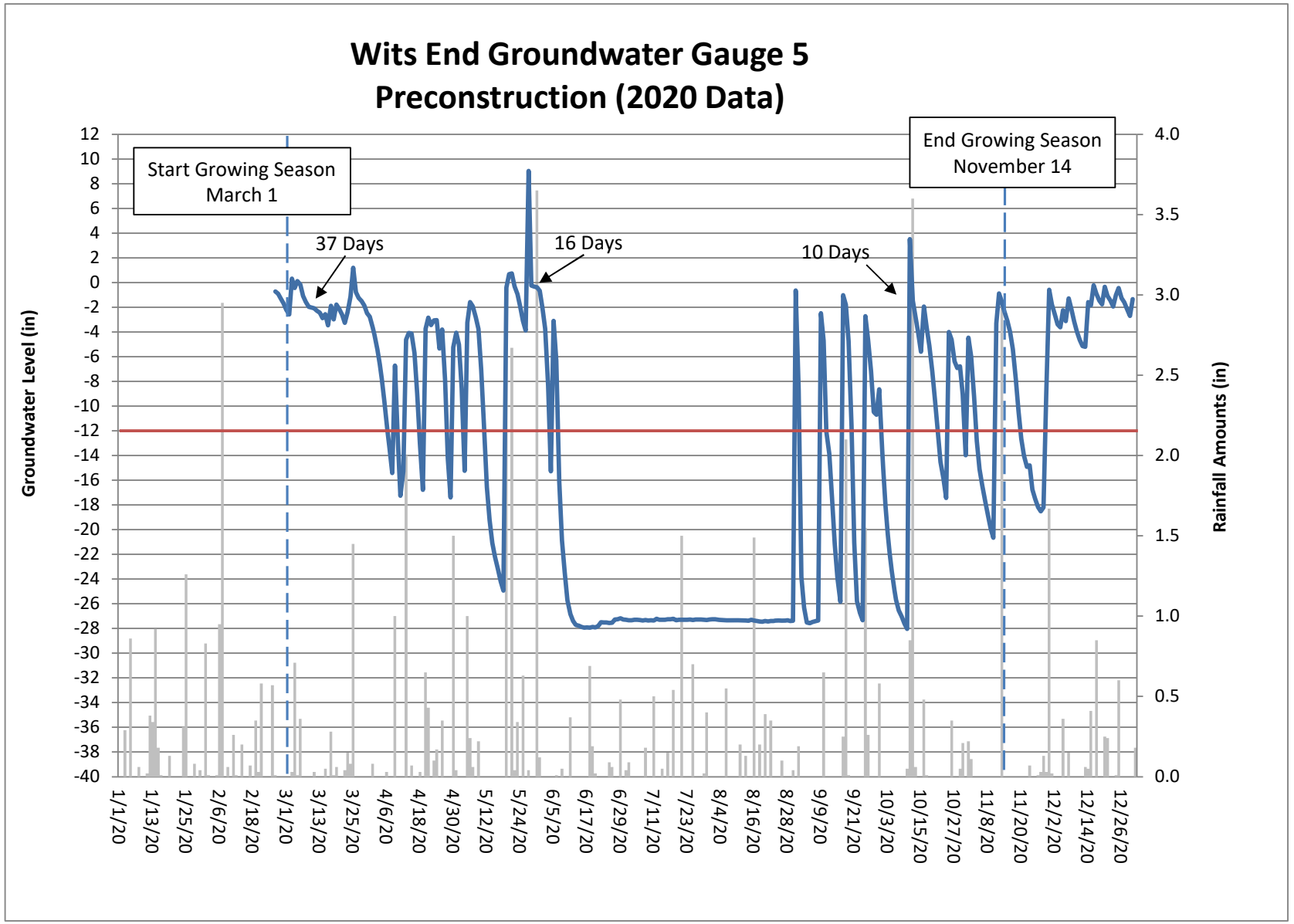
12/2/20
12/14/20
12/26/20


Wits End Groundwater Gauge 3
Preconstruction (2020 Data)
Start Growing Season
March 1
End Growing Season
November 14
15 Days
8 Days
5 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/20
1/13/20
1/25/20
2/6/20
2/18/20
3/1/20
3/13/20
3/25/20
4/6/20
4/18/20
4/30/20
5/12/20
5/24/20
6/5/20
6/17/20
6/29/20
7/11/20
7/23/20
8/4/20
8/16/20
8/28/20
9/9/20
9/21/20
10/3/20
10/15/20
10/27/20
11/8/20
11/20/20
12/2/20
12/14/20
12/26/20


Wits End Groundwater Gauge 4
Preconstruction (2020 Data)
Start Growing Season
March 1
End Growing Season
November 14
41 Days
22 Days
22 Days
10 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/20
1/13/20
1/25/20
2/6/20
2/18/20
3/1/20
3/13/20
3/25/20
4/6/20
4/18/20
4/30/20
5/12/20
5/24/20
6/5/20
6/17/20
6/29/20
7/11/20
7/23/20
8/4/20
8/16/20
8/28/20
9/9/20
9/21/20
10/3/20
10/15/20
10/27/20
11/8/20
11/20/20
12/2/20
12/14/20
12/26/20


Wits End Groundwater Gauge 5
Preconstruction (2020 Data)
Start Growing Season
March 1
End Growing Season
November 14
37 Days
16 Days
10 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/20
1/13/20
1/25/20
2/6/20
2/18/20
3/1/20
3/13/20
3/25/20
4/6/20
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4/30/20
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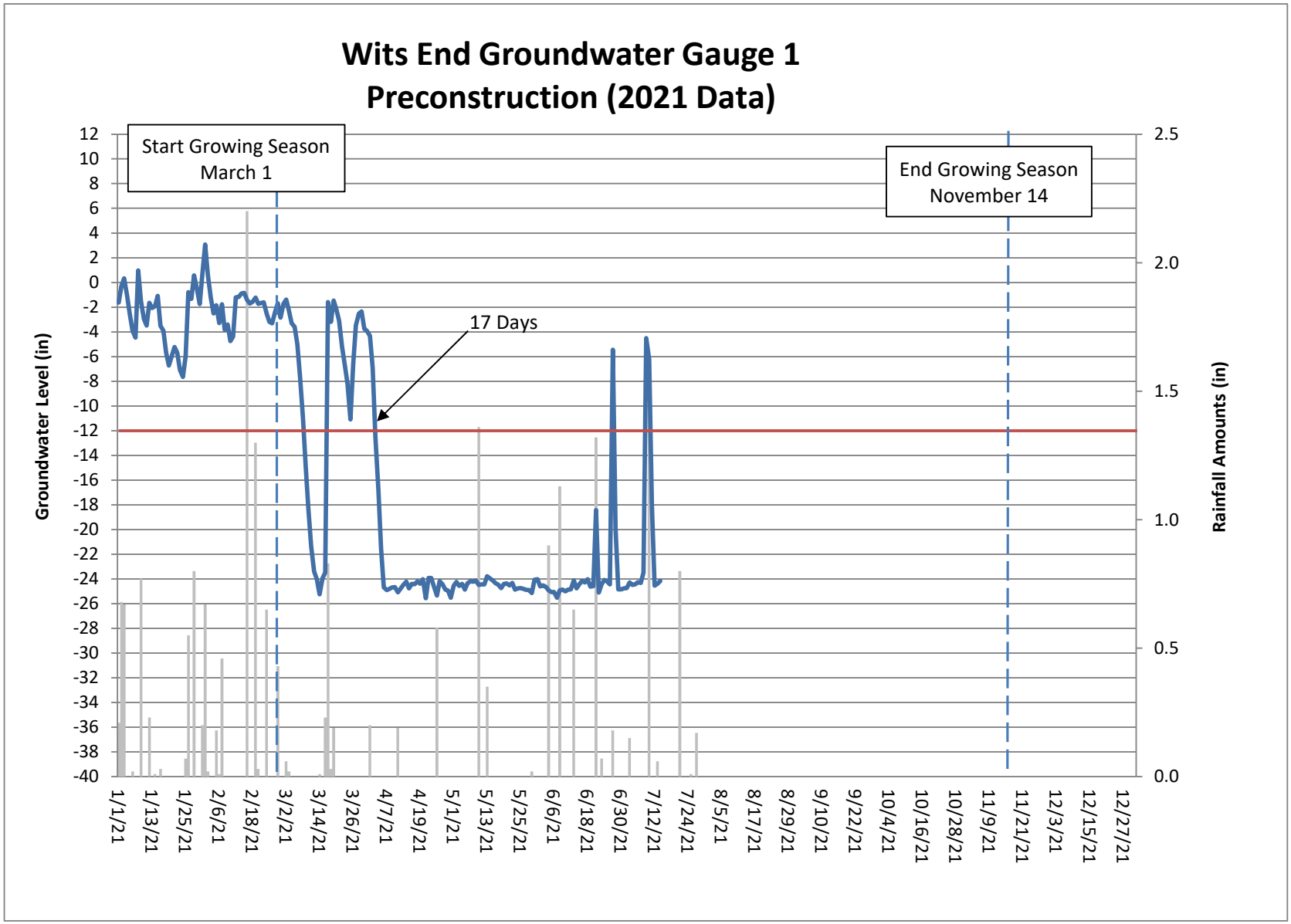
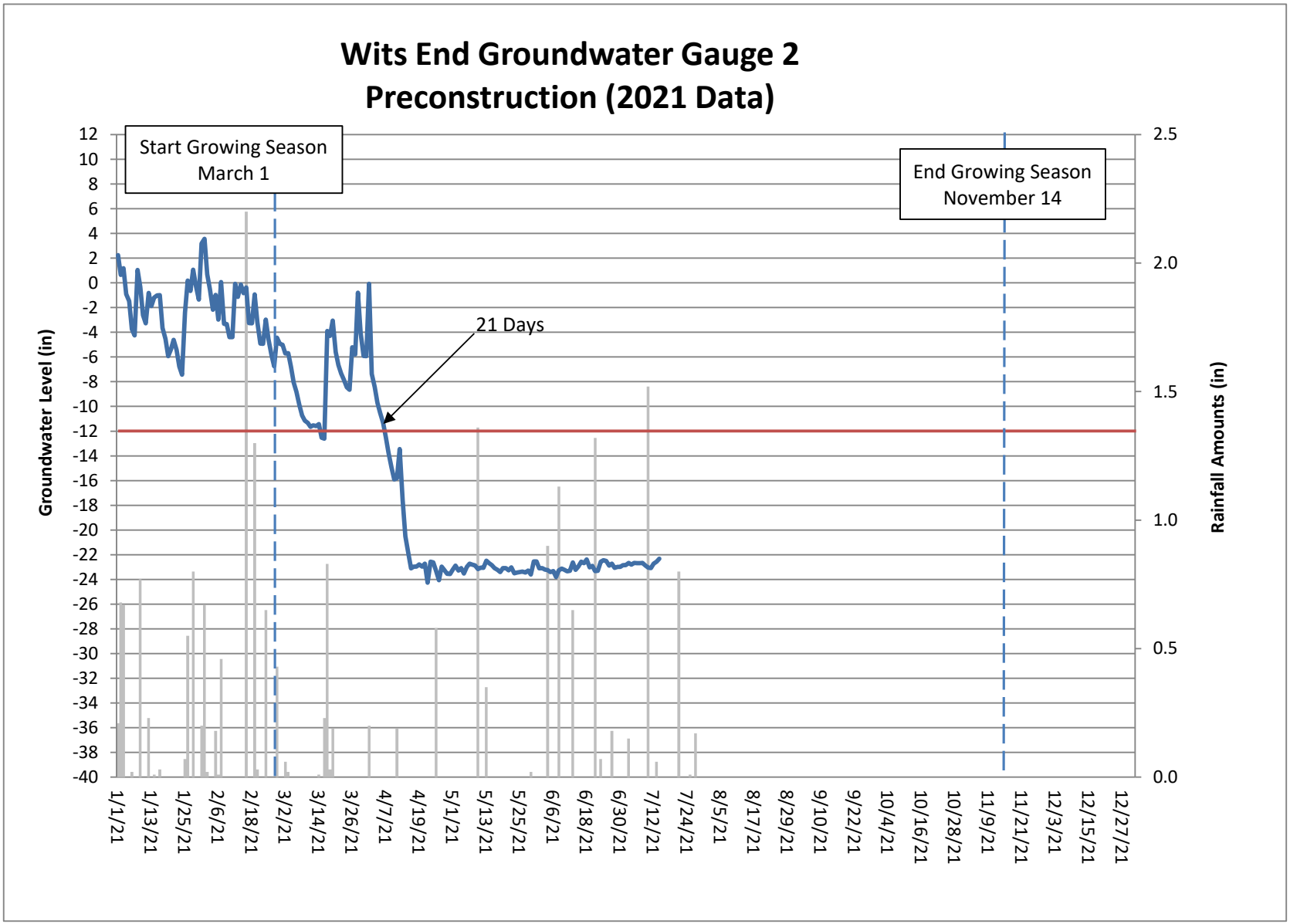
5/24/20
6/5/20
6/17/20
6/29/20
7/11/20
7/23/20
8/4/20
8/16/20
8/28/20
9/9/20
9/21/20
10/3/20
10/15/20
10/27/20
11/8/20
11/20/20
12/2/20
12/14/20
12/26/20


Wits End Groundwater Gauge 1
Preconstruction (2021 Data)
Start Growing Season
March 1
End Growing Season
November 14
17 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
2.5
2.0
1.5
1.0
0.5
0.0
1/1/21
1/13/21
1/25/21
2/6/21
2/18/21
3/2/21
3/14/21
3/26/21
4/7/21
4/19/21
5/1/21
5/13/21
5/25/21
6/6/21
6/18/21
6/30/21
7/12/21
7/24/21
8/5/21
8/17/21
8/29/21
9/10/21
9/22/21
10/4/21
10/16/21
10/28/21
11/9/21
11/21/21
12/3/21
12/15/21
12/27/21


Wits End Groundwater Gauge 2
Preconstruction (2021 Data)
Start Growing Season
March 1
End Growing Season
November 14
21 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
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2.0
1.5
1.0
0.5
0.0
1/1/21
1/13/21
1/25/21
2/6/21
2/18/21
3/2/21
3/14/21
3/26/21
4/7/21
4/19/21
5/1/21
5/13/21
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6/18/21
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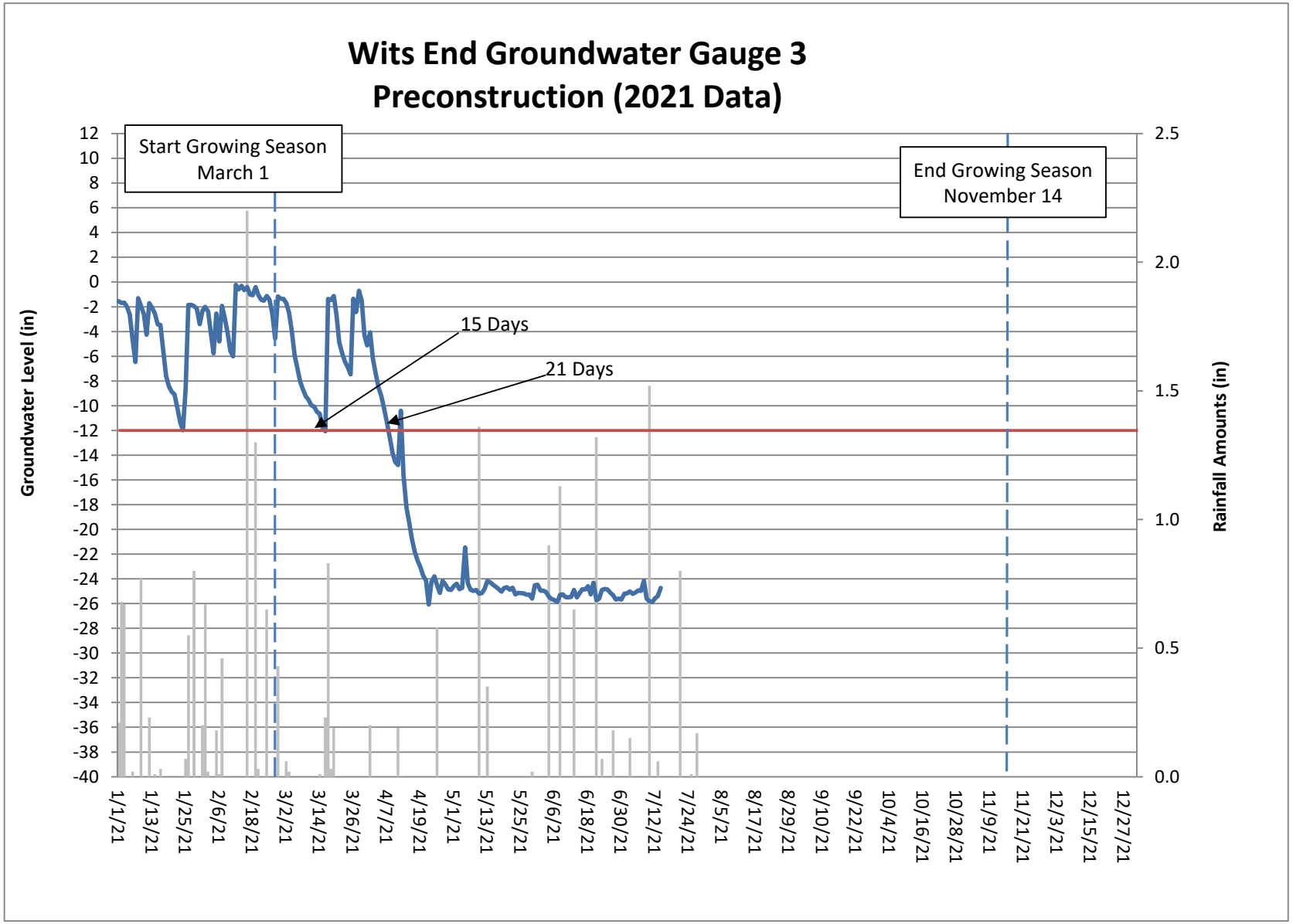
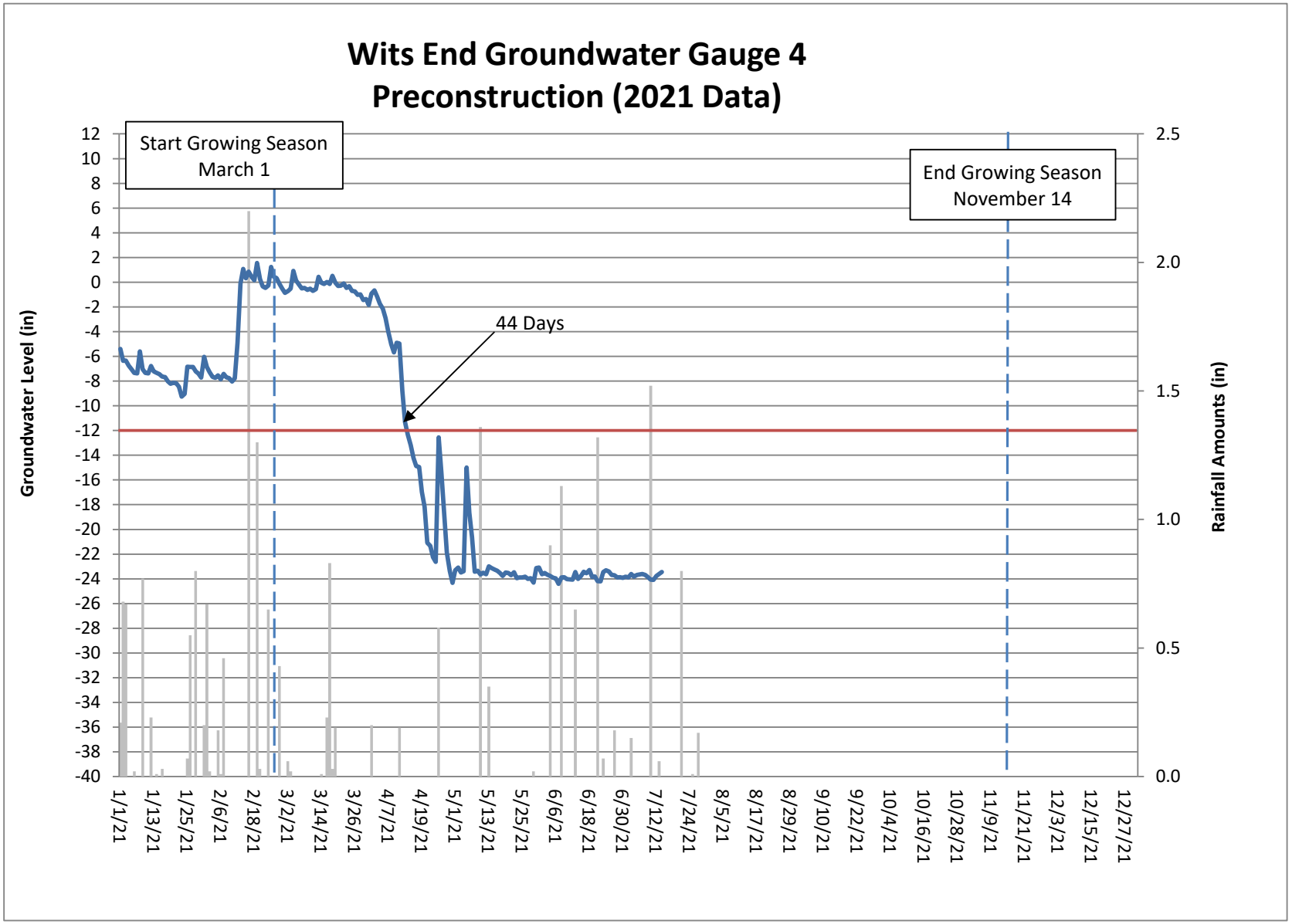
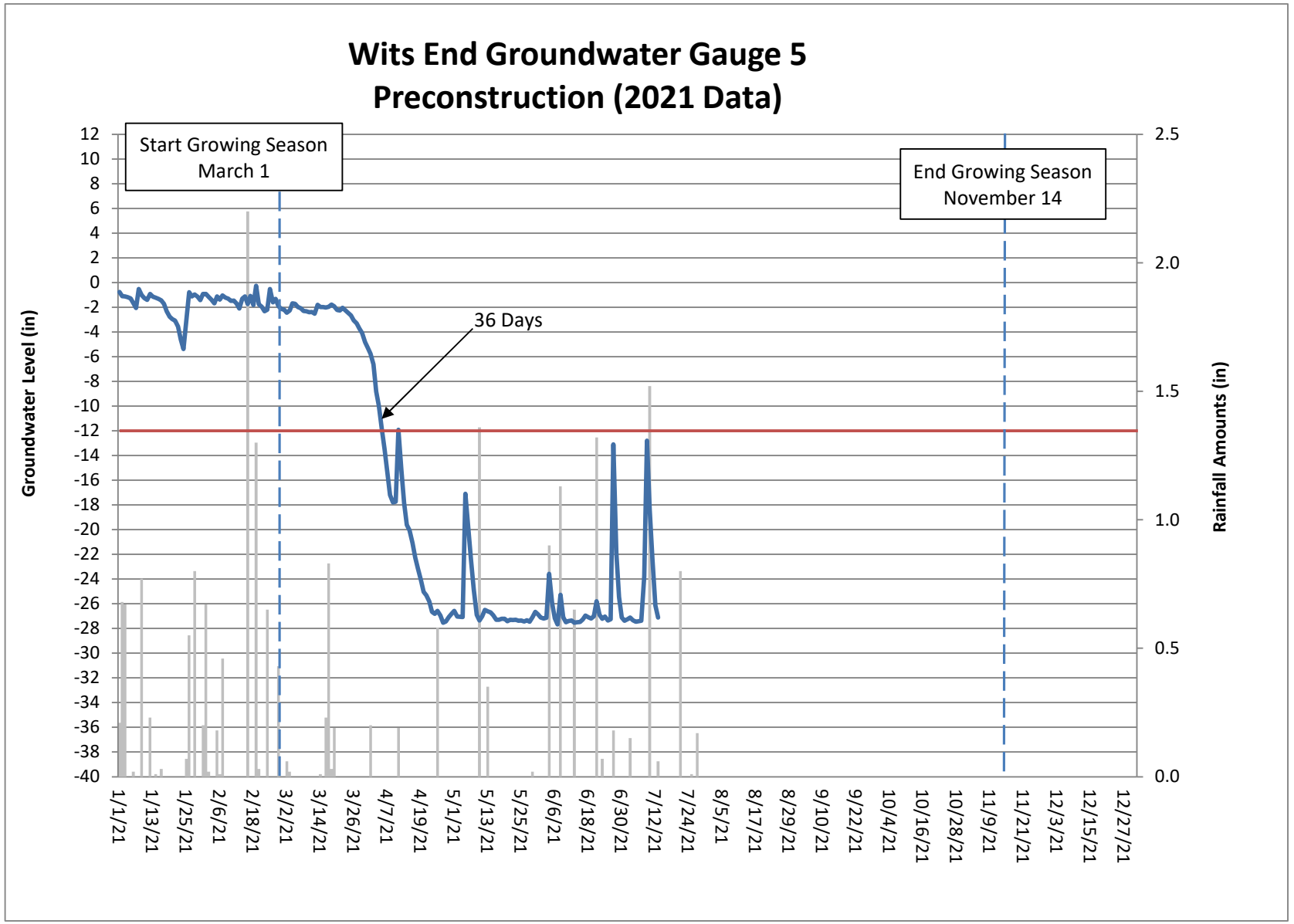
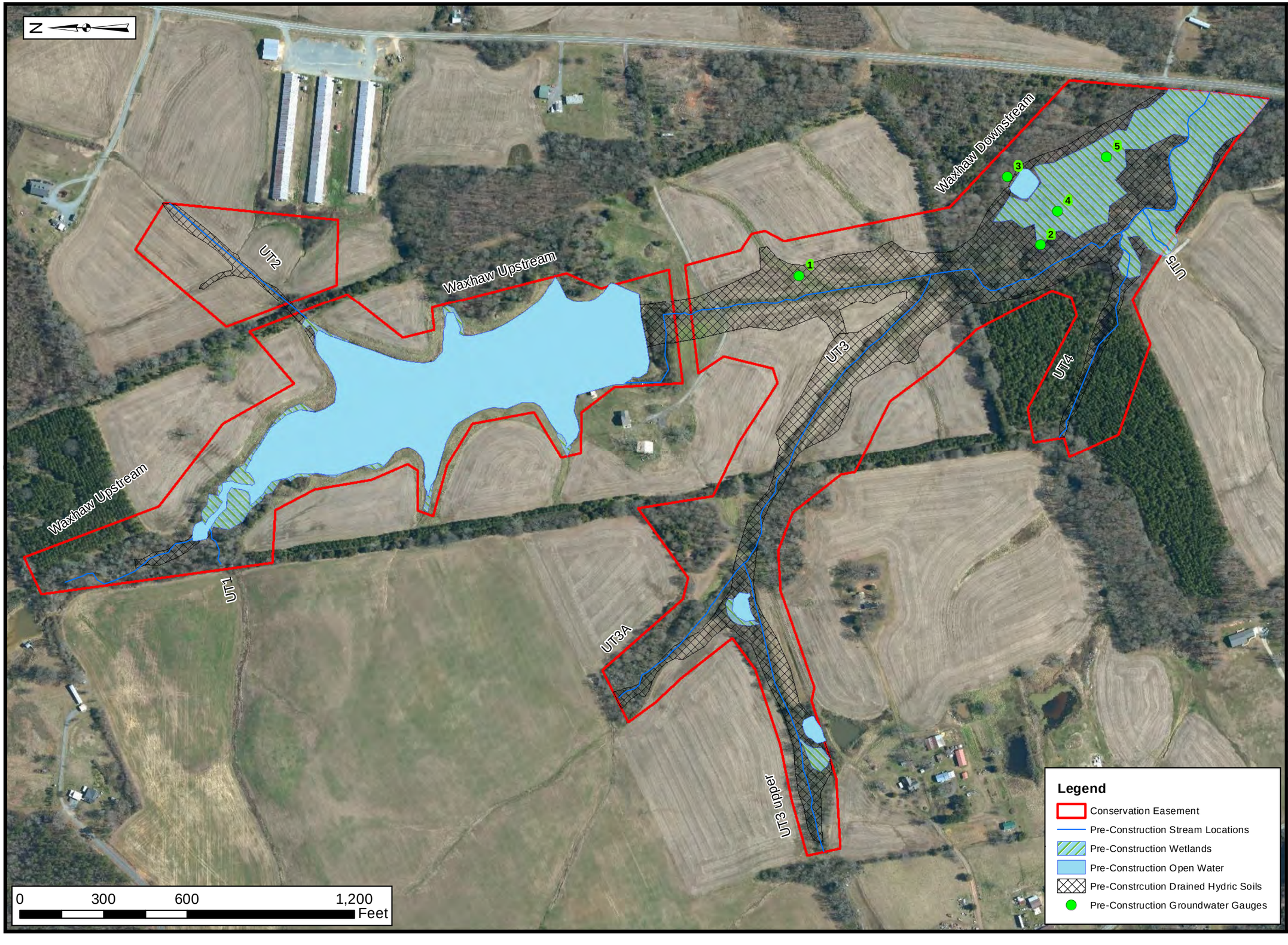
9/10/21
9/22/21
10/4/21
10/16/21
10/28/21
11/9/21
11/21/21
12/3/21
12/15/21
12/27/21


Wits End Groundwater Gauge 3
Preconstruction (2021 Data)
Start Growing Season
March 1
End Growing Season
November 14
15 Days
21 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
2.5
2.0
1.5
1.0
0.5
0.0
1/1/21
1/13/21
1/25/21
2/6/21
2/18/21
3/2/21
3/14/21
3/26/21
4/7/21
4/19/21
5/1/21
5/13/21
5/25/21
6/6/21
6/18/21
6/30/21
7/12/21
7/24/21
8/5/21
8/17/21
8/29/21
9/10/21
9/22/21
10/4/21
10/16/21
10/28/21
11/9/21
11/21/21
12/3/21
12/15/21
12/27/21


Wits End Groundwater Gauge 4
Preconstruction (2021 Data)
Start Growing Season
March 1
End Growing Season
November 14
44 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
2.5
2.0
1.5
1.0
0.5
0.0
1/1/21
1/13/21
1/25/21
2/6/21
2/18/21
3/2/21
3/14/21
3/26/21
4/7/21
4/19/21
5/1/21
5/13/21
5/25/21
6/6/21
6/18/21
6/30/21
7/12/21
7/24/21
8/5/21
8/17/21
8/29/21
9/10/21
9/22/21
10/4/21
10/16/21
10/28/21
11/9/21
11/21/21
12/3/21
12/15/21
12/27/21


Wits End Groundwater Gauge 5
Preconstruction (2021 Data)
Start Growing Season
March 1
End Growing Season
November 14
36 Days
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
2.5
2.0
1.5
1.0
0.5
0.0
1/1/21
1/13/21
1/25/21
2/6/21
2/18/21
3/2/21
3/14/21
3/26/21
4/7/21
4/19/21
5/1/21
5/13/21
5/25/21
6/6/21
6/18/21
6/30/21
7/12/21
7/24/21
8/5/21
8/17/21
8/29/21
9/10/21
9/22/21
10/4/21
10/16/21
10/28/21
11/9/21
11/21/21
12/3/21
12/15/21
12/27/21




Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

**WITS END**

Union County, NC

Title:

**PRE-CONSTRUCTION GROUNDWATER GAUGE LOCATIONS**

Drawn by: KRJ

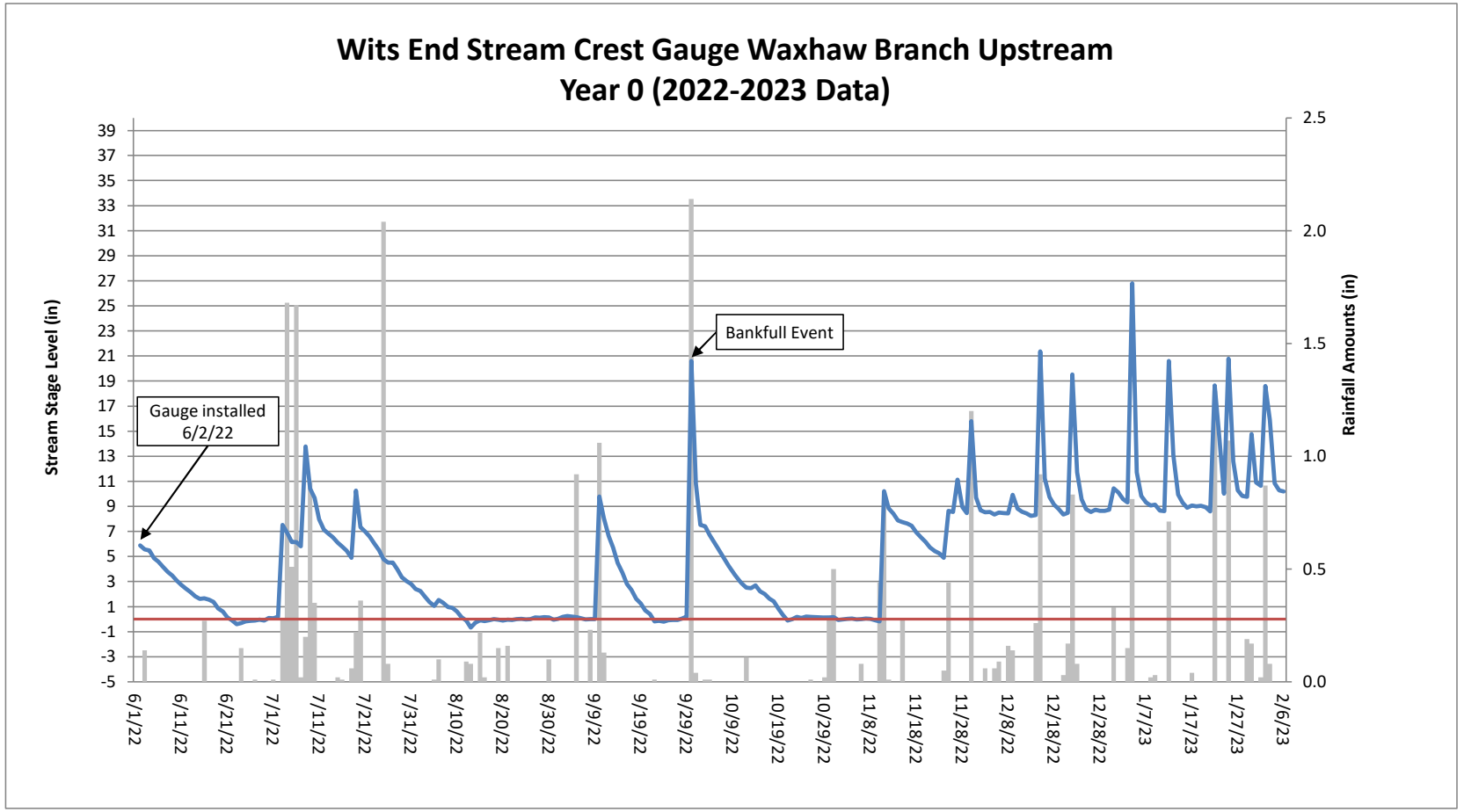
Date: July 2022

Scale: 1:3900

Project No.: 20-011

FIGURE

**2**


Wits End Stream Crest Gauge Waxhaw Branch Upstream
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
Bankfull Event
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
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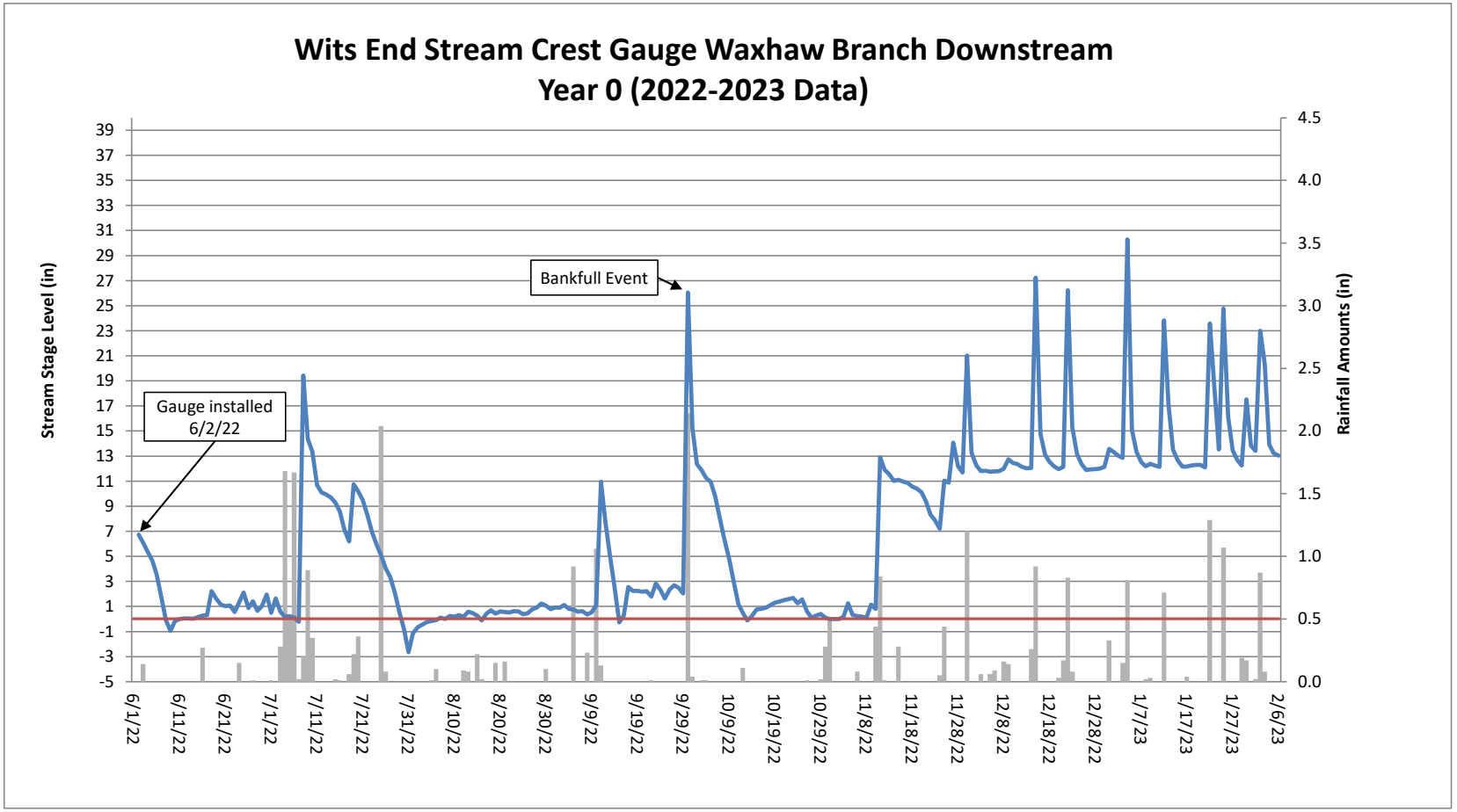
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Crest Gauge Waxhaw Branch Downstream
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Bankfull Event
Gauge installed
6/2/22
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
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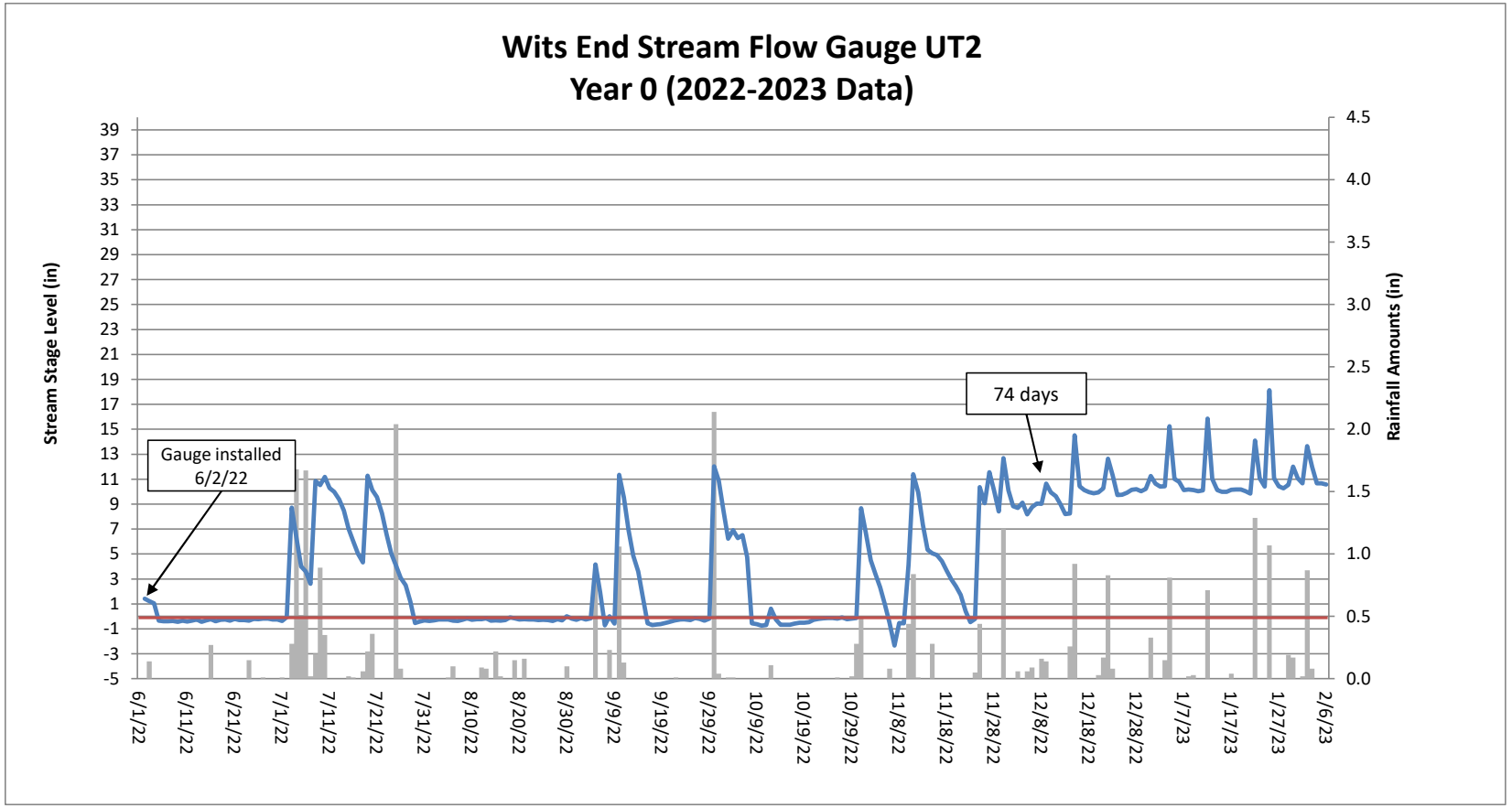
1/17/23
1/27/23
2/6/23


Wits End Stream Flow Gauge UT2
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
74 days
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
11/28/22
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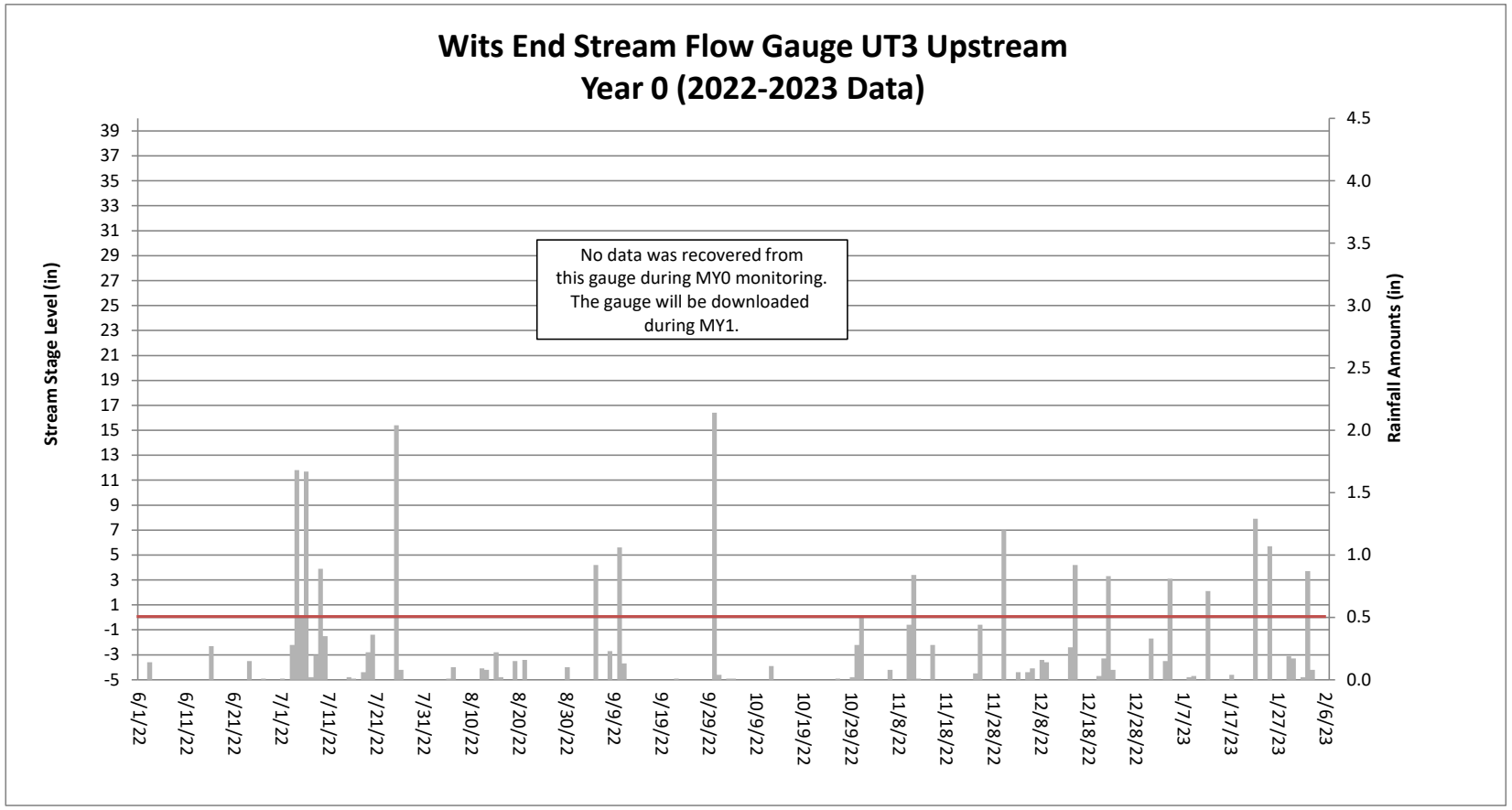
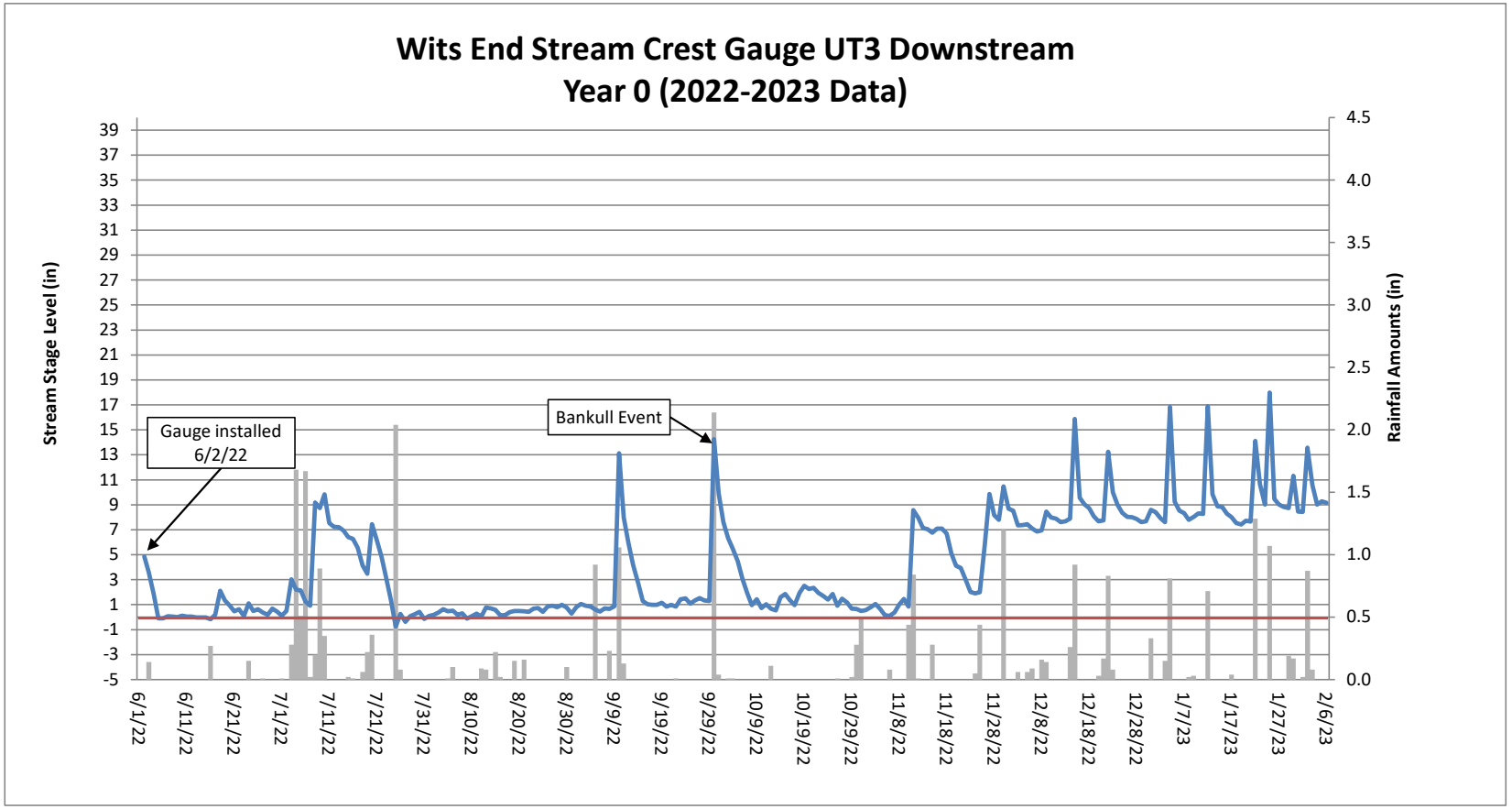
12/18/22
12/28/22
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Flow Gauge UT3 Upstream
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
No data was recovered from this gauge during MY0 monitoring. The gauge will be downloaded during MY1.
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
11/28/22
12/8/22
12/18/22
12/28/22
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Crest Gauge UT3 Downstream
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
Bankull Event
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
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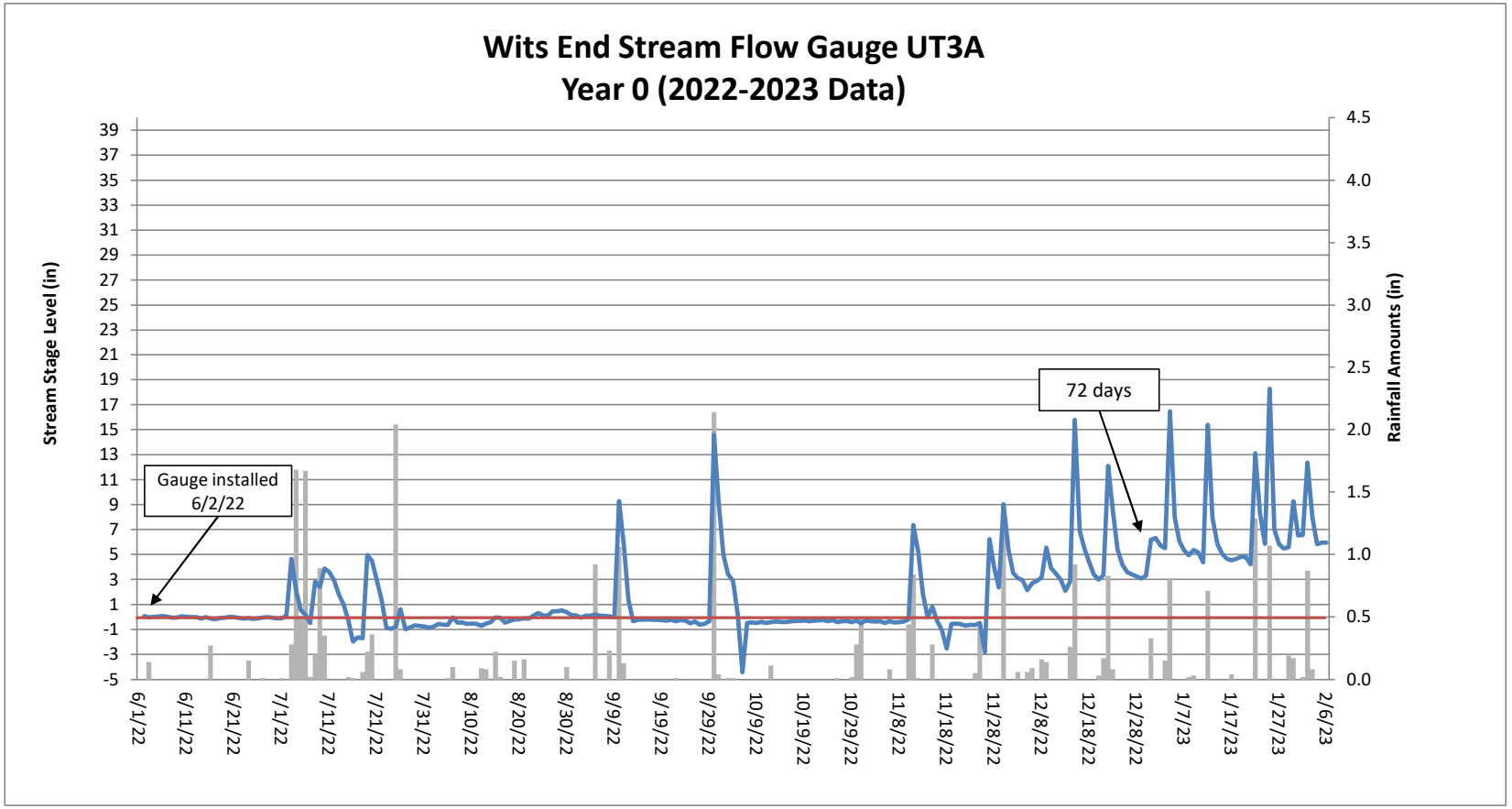
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Flow Gauge UT3A
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
72 days
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
10/9/22
10/19/22
10/29/22
11/8/22
11/18/22
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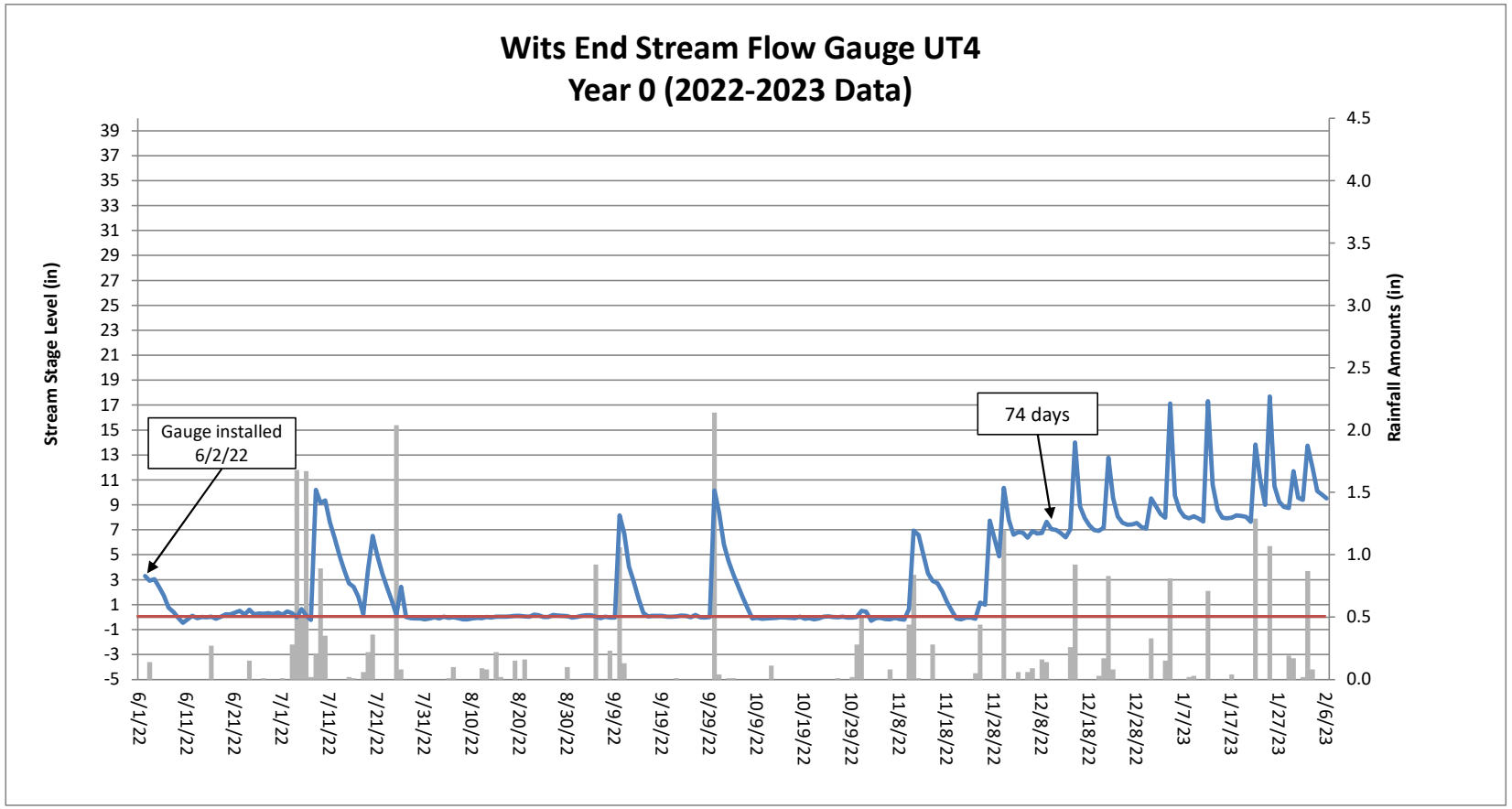
12/18/22
12/28/22
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Flow Gauge UT4
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
74 days
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/1/22
6/11/22
6/21/22
7/1/22
7/11/22
7/21/22
7/31/22
8/10/22
8/20/22
8/30/22
9/9/22
9/19/22
9/29/22
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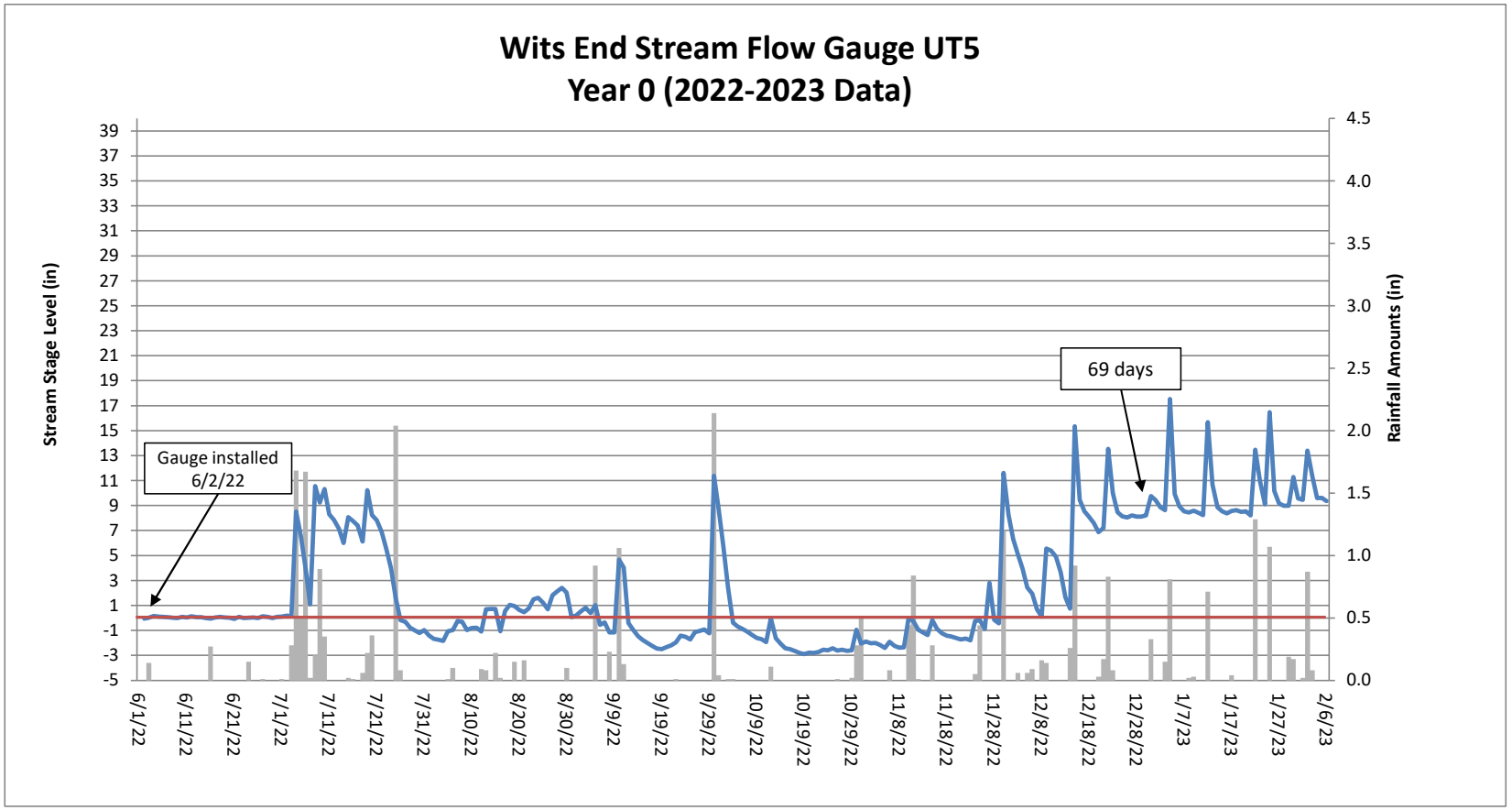
11/28/22
12/8/22
12/18/22
12/28/22
1/7/23
1/17/23
1/27/23
2/6/23


Wits End Stream Flow Gauge UT5
Year 0 (2022-2023 Data)
Stream Stage Level (in)
Rainfall Amounts (in)
Gauge installed 6/2/22
69 days
39
37
35
33
31
29
27
25
23
21
19
17
15
13
11
9
7
5
3
1
-1
-3
-5
4.5
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6/1/22
6/11/22
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8/20/22
8/30/22
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11/28/22
12/8/22
12/18/22
12/28/22
1/7/23
1/17/23
1/27/23
2/6/23

## Appendix E: Project Timeline and Contact Info

Table 11. Project Timeline
Table 12. Project Contacts

**Table 11. Project Timeline**

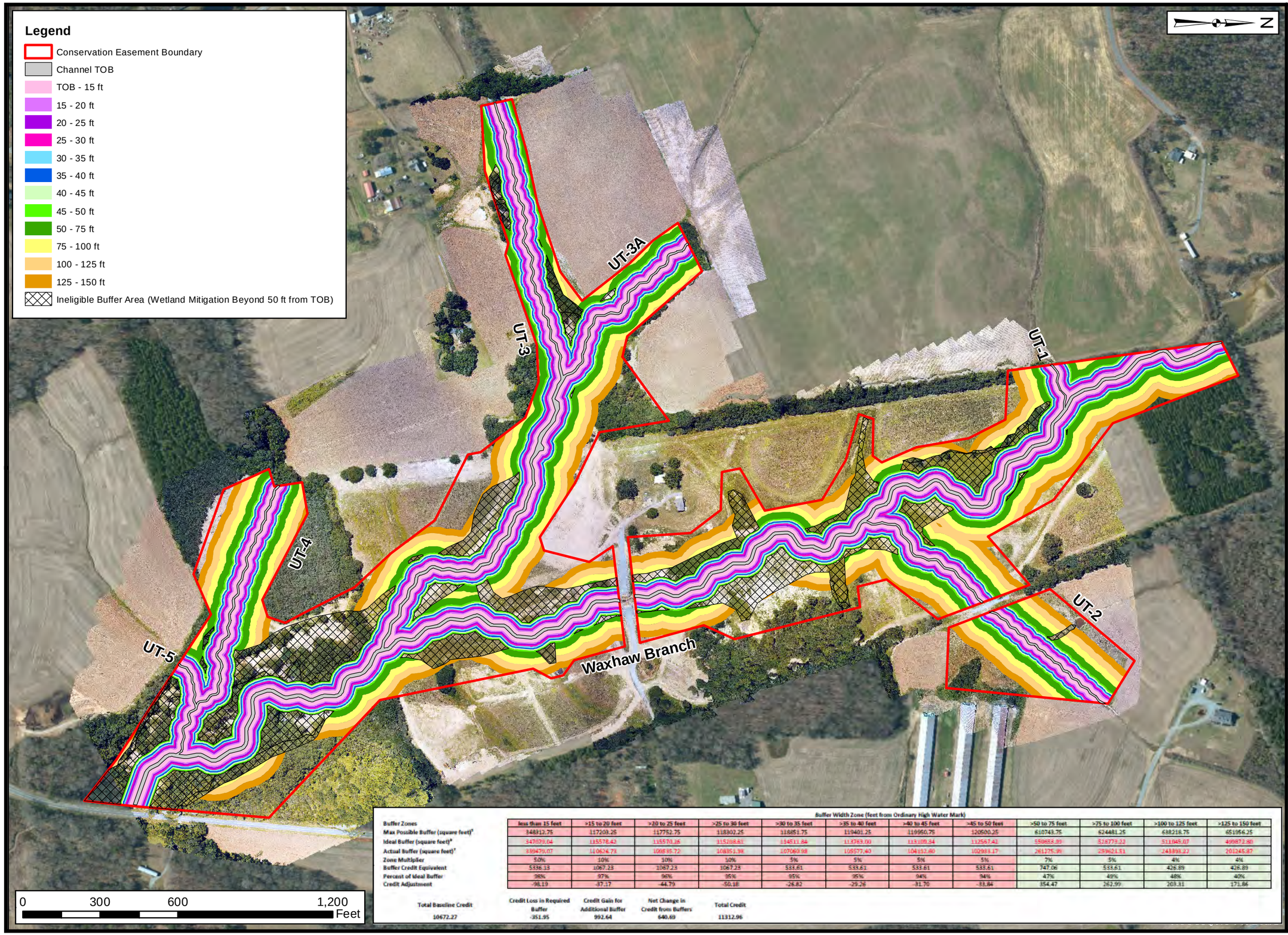
| Activity or Deliverable | Data Collection Complete | Task Completion or Deliverable Submission |
|---|---|---|
| Project Instituted | NA | Aug-20 |
| Mitigation Plan Approved | NA | 28-Jul-21 |
| Construction (Grading) Completed | NA | 22-Jul-22 |
| Planting Completed | NA | 28-Jul-22 |
| As-built Survey Completed | Jul-22 | Jul-22 |
| MY-0 Baseline Report | Jun-22 | Mar-23 |
| Stream Survey | 1-Jun-22 | NA |
| Vegetation Survey | 10-Feb-23 | NA |
| MY1+ Monitoring Reports | | |
| Remediation Items (e.g. beaver removal, supplements, repairs etc.) | | |
| Encroachment | | |
| | | |

**Table 12. Project Contacts**

| Project Name/Number | |
|---|---|
| **Provider** | Restoration Systems, LLC<br>1101 Haynes Street, Suite 211<br>Raleigh, NC 27604 |
| Mitigation Provider POC | Ray Holz<br>919-755-9490 |
| **Designer** | Axiom Environmental, Inc.<br>218 Snow Ave<br>Raleigh, NC 27603 |
| Primary project design POC | Grant Lewis<br>919-215-1693 |
| **Construction Contractor** | Land Mechanics Designs, Inc.<br>126 Circle G Lane<br>Willow Spring, NC 27592<br>Charles Hill<br>919-639-6132 |

## Appendix F: Other Data

Figures 3A-B. Stream Buffer Credit Adjustment Output
Wilmington District Stream Buffer Credit Calculator
UT 3 Redesign Summary Sheet
Recorded Release and Removal of Trails from Conservation Easement




Buffer Width Zone (feet from Ordinary High Water Mark)

| Buffer Zones | less than 15 feet | >15 to 20 feet | >20 to 25 feet | >25 to 30 feet | >30 to 35 feet | >35 to 40 feet | >40 to 45 feet | >45 to 50 feet | >50 to 75 feet | >75 to 100 feet | >100 to 125 feet | >125 to 150 feet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max Possible Buffer (square feet)* | 348812.75 | 117203.25 | 117752.75 | 118302.25 | 118851.75 | 119401.25 | 119950.75 | 120500.25 | 610743.75 | 624481.25 | 638218.75 | 651956.25 |
| Ideal Buffer (square feet)* | 347079.04 | 115578.42 | 115570.26 | 115708.61 | 114511.84 | 113763.00 | 113109.34 | 112567.41 | 550858.39 | 518779.22 | 511045.07 | 499872.80 |
| Actual Buffer (square feet)† | 339479.07 | 110674.73 | 108835.72 | 108351.39 | 107060.98 | 106577.40 | 104152.80 | 102983.17 | 261275.99 | 239621.51 | 243899.22 | 201245.87 |
| Zone Multiplier | 50% | 10% | 10% | 10% | 5% | 5% | 5% | 5% | 7% | 5% | 4% | 4% |
| Buffer Credit Equivalent | 5336.13 | 1067.23 | 1067.23 | 1067.23 | 533.61 | 533.61 | 533.61 | 533.61 | 747.06 | 533.61 | 426.89 | 426.89 |
| Percent of Ideal Buffer | 98% | 97% | 96% | 95% | 95% | 95% | 94% | 94% | 47% | 48% | 48% | 40% |
| Credit Adjustment | -98.19 | -37.17 | -44.79 | -50.18 | -26.82 | -29.26 | -31.70 | -33.84 | 354.47 | 262.99 | 203.31 | 171.86 |

| Total Baseline Credit | Credit Loss in Required Buffer | Credit Gain for Additional Buffer | Net Change in Credit from Buffers | Total Credit |
|---|---|---|---|---|
| 10672.27 | -351.95 | 992.64 | 640.69 | 11312.96 |

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

**WITS END SITE**

Union County, NC

Title:

**STREAM BUFFER CREDIT ADJUSTMENT OUTPUT (ACTUAL BUFFER)**

Drawn by: KRJ

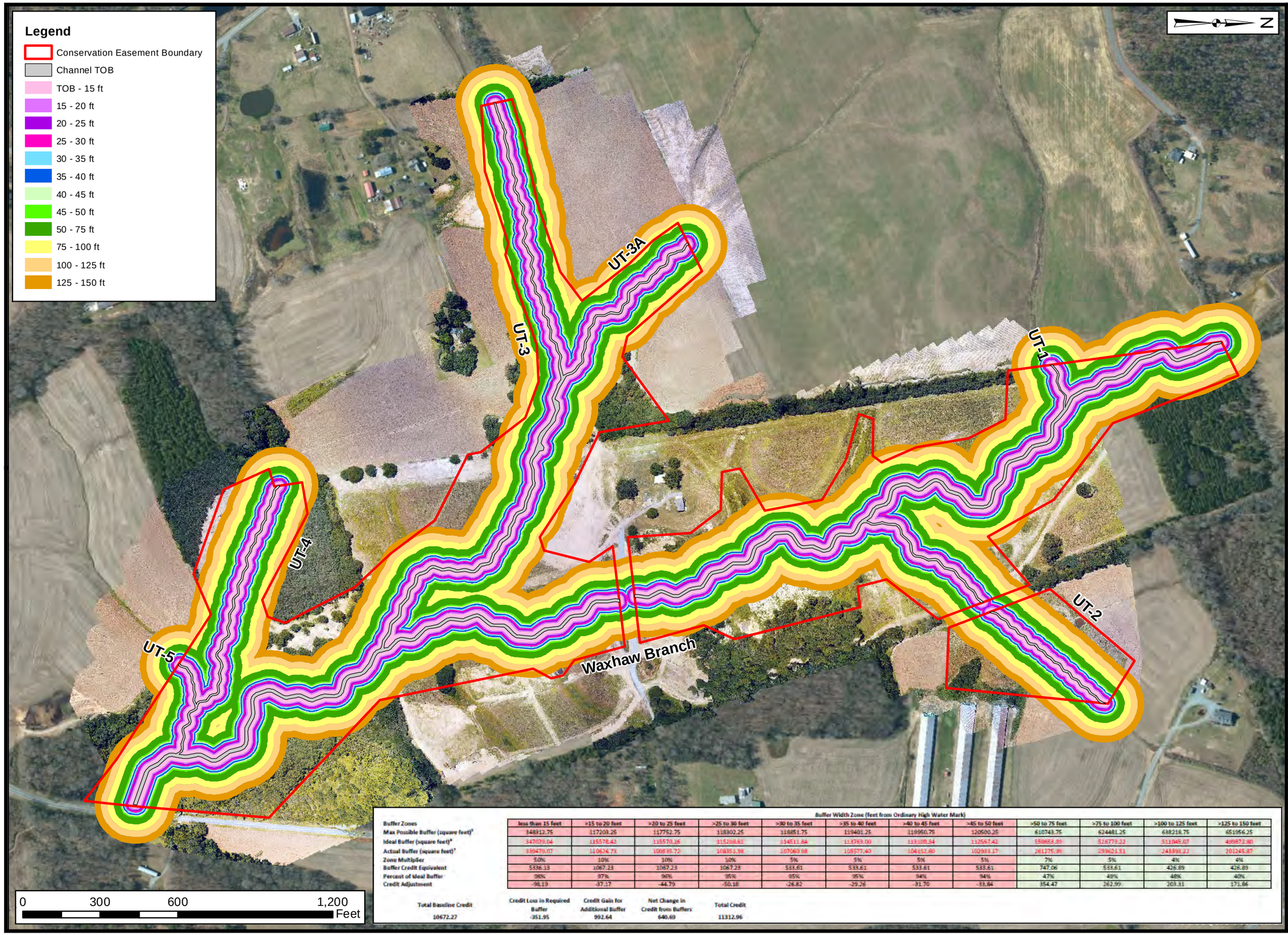
Date: OCT 2022

Scale: 1:4200

Project No.: 20-011

FIGURE

**3A**




Buffer Width Zone (feet from Ordinary High Water Mark)

| Buffer Zones | less than 15 feet | >15 to 20 feet | >20 to 25 feet | >25 to 30 feet | >30 to 35 feet | >35 to 40 feet | >40 to 45 feet | >45 to 50 feet | >50 to 75 feet | >75 to 100 feet | >100 to 125 feet | >125 to 150 feet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max Possible Buffer (square feet)* | 348812.75 | 117203.25 | 117752.75 | 118302.25 | 118851.75 | 119401.25 | 119950.75 | 120500.25 | 610743.75 | 624481.25 | 638218.75 | 651956.25 |
| Ideal Buffer (square feet)* | 347079.04 | 115578.42 | 115570.26 | 115708.61 | 114511.84 | 113763.00 | 113109.34 | 112567.41 | 550858.39 | 518779.22 | 511045.07 | 499872.80 |
| Actual Buffer (square feet)* | 339479.07 | 110674.73 | 108835.72 | 108351.39 | 107060.98 | 106577.40 | 104152.80 | 102983.17 | 261275.99 | 239621.51 | 243899.22 | 201245.87 |
| Zone Multiplier | 50% | 10% | 10% | 10% | 5% | 5% | 5% | 5% | 7% | 5% | 4% | 4% |
| Buffer Credit Equivalent | 5336.13 | 1067.23 | 1067.23 | 1067.23 | 533.61 | 533.61 | 533.61 | 533.61 | 747.06 | 533.61 | 426.89 | 426.89 |
| Percent of Ideal Buffer | 98% | 97% | 96% | 95% | 95% | 95% | 94% | 94% | 47% | 48% | 48% | 40% |
| Credit Adjustment | -98.19 | -37.17 | -44.79 | -50.18 | -26.82 | -29.26 | -31.70 | -33.84 | 354.47 | 262.99 | 203.31 | 171.86 |

| Total Baseline Credit | Credit Loss in Required Buffer | Credit Gain for Additional Buffer | Net Change in Credit from Buffers | Total Credit |
|---|---|---|---|---|
| 10672.27 | -351.95 | 992.64 | 640.69 | 11312.96 |

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

**WITS END SITE**

Union County, NC

Title:

**STREAM BUFFER CREDIT ADJUSTMENT OUTPUT (IDEAL BUFFER)**

Drawn by: KRJ

Date: OCT 2022

Scale: 1:4200

Project No.: 20-011

FIGURE

**3B**

## Wilmington District Stream Buffer Credit Calculator

| | |
|---|---|
| **Site Name:** | Wits End |
| **USACE Action ID:** | NA |
| **NCDWR Project Number:** | NA |
| **Sponsor:** | Restoration Systems |
| **Number of Exempt Terminal Stream Ends[1]:** | 7 |
| **County:** | Union |
| **Minimum Required Buffer Width[2]:** | 50 |

| Mitigation Type | Mitigation Ratio Multiplier[3] | Creditable Stream Length[4] | Include in Buffer Calculations | Baseline Stream Credit | Buffered Stream Length | Credit From Buffered Streams |
|---|---|---|---|---|---|---|
| **Restoration (1:1)** | 1 | 10323 | Yes | 10323.00 | 10323.00 | 10323.00 |
| **Enhancement I (1.5:1)** | 1.5 | 232 | Yes | 154.67 | 232.00 | 154.67 |
| **Enhancement II (2.5:1)** | 2.5 | | | | | |
| **Preservation (5:1)** | 5 | | | | | |
| **Other (7.5:1)** | 7.5 | | | | | |
| **Other (10:1)** | 10 | | | | | |
| **Custom Ratio 1** | 5 | 973 | Yes | 194.60 | 973.00 | 194.60 |
| **Custom Ratio 2** | | | | | | |
| **Custom Ratio 3** | | | | | | |
| **Custom Ratio 4** | | | | | | |
| **Custom Ratio 5** | | | | | | |
| **Totals** | | **11528.00** | | 10672.27 | 11528.00 | 10672.27 |

**Buffer Width Zone (feet from Ordinary High Water Mark)**

| Buffer Zones | less than 15 feet | >15 to 20 feet | >20 to 25 feet | >25 to 30 feet | >30 to 35 feet | >35 to 40 feet | >40 to 45 feet | >45 to 50 feet | >50 to 75 feet | >75 to 100 feet | >100 to 125 feet | >125 to 150 feet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Max Possible Buffer (square feet)[5]** | 348312.75 | 117203.25 | 117752.75 | 118302.25 | 118851.75 | 119401.25 | 119950.75 | 120500.25 | 610743.75 | 624481.25 | 638218.75 | 651956.25 |
| **Ideal Buffer (square feet)[6]** | 347079.04 | 115578.42 | 115570.26 | 115208.61 | 114511.84 | 113763.00 | 113109.34 | 112567.42 | 550653.99 | 526773.22 | 511045.07 | 499872.80 |
| **Actual Buffer (square feet)[7]** | 339479.07 | 110624.73 | 109535.72 | 108351.98 | 107060.98 | 105577.40 | 104192.60 | 102983.17 | 261275.99 | 259621.51 | 243393.22 | 201245.87 |
| **Zone Multiplier** | 50% | 10% | 10% | 10% | 5% | 5% | 5% | 5% | 7% | 5% | 4% | 4% |
| **Buffer Credit Equivalent** | 5336.13 | 1067.23 | 1067.23 | 1067.23 | 533.61 | 533.61 | 533.61 | 533.61 | 747.06 | 533.61 | 426.89 | 426.89 |
| **Percent of Ideal Buffer** | 98% | 97% | 96% | 95% | 95% | 95% | 94% | 94% | 47% | 49% | 48% | 40% |
| **Credit Adjustment** | -98.19 | -37.17 | -44.79 | -50.18 | -26.82 | -29.26 | -31.70 | -33.84 | 354.47 | 262.99 | 203.31 | 171.86 |

| Total Baseline Credit | Credit Loss in Required Buffer | Credit Gain for Additional Buffer | Net Change in Credit from Buffers | Total Credit |
|---|---|---|---|---|
| **10672.27** | **-351.95** | **992.64** | **640.69** | **11312.96** |

[1]Number of terminal stream ends, including all points where streams enter or exit the project boundaries, but not including internal crossings even if they are not protected by the easement.

[2]Minimum standard buffer width measured from the top of bank (50 feet in piedmont and coastal plain counties or 30 feet in mountain counties)

[3]Use the Custom Ratio fields to enter non-standard ratios, which are equal to the number of feet in the feet-to-credit mitigation ratio (e.g., for a perservation ratio of 8 feet to 1 credit, the multiplier would be 8).

[4]Equal to the number of feet of stream in each Mitigation Type. If stream reaches are not creditable, they should be excluded from this measurement, even if they fall within the easement.

[5]This amount is the maximum buffer area possible based on the linear footage of stream length if channel were perfectly straight with full buffer width and no internal crossings. This number is not used in calculations, but is provided as a reference.

[6]Maximum potential size (in square feet) of each buffer zone measured around all creditable stream reaches, calculated using GIS, including areas outside of the easement. The inner zone (0-15') should be measured from the top of the OHWM or the edge of the average stream width if OHWM is not known. Non-creditable stream reaches within the easement should be removed prior to calculating this area wtih GIS.

[7]Square feet in each buffer zone, as measured by GIS, excluding non-forested areas, all other credit type (e.g., wetland, nutrient offset, buffer), easement exceptions, open water, areas failing to meet the vegetation performance standard, etc. Additional credit is given to 150 feet in buffer width, so areas within the easement that are more than 150 feet from creditable streams should not be included in this measurement. Non-creditable stream reaches within the easement should be removed prior to calculating this area wtih GIS.


UT3A
Sta 742.17
Elev 586.39
Elev 586.38
Elev 586.35
Elev 586.35
Top of Drop Structure
Elev 586.34
UT3
Bottom Drop Structe
At Grade
Elev 583.32
Sta 1101
Elev 586.51
Elev 586.35
Elev 586.40


585
UT3
Tie to existing
Elev 580.80
Elev 580.15

FILED ELECTRONICALLY
UNION COUNTY NC
CRYSTAL D. GILLIARD

| | |
|---|---|
| FILED | Jul 22, 2022 |
| AT | 11:31:00 AM |
| BOOK | 08531 |
| START PAGE | 0085 |
| END PAGE | 0088 |
| INSTRUMENT # | 26083 |
| EXCISE TAX | $0.00 |


Prepared By: J. Patrick Bailey, Jr., Manning, Fulton & Skinner, P.A.
P.O. Box 20389, Raleigh, NC 27619

After Recording Return to: Department of Administration, State Property Office
1321 Mail Service Center, Raleigh, NC 27699-1321
SPO File 90-BN and 90-BO / DMS PROJECT No. 100164

STATE OF NORTH CAROLINA
COUNTY OF UNION

# RELEASE AND REMOVAL OF TRAILS FROM CONSERVATION EASEMENT

THIS RELEASE AND REMOVAL OF TRAILS FROM CONSERVATION EASEMENT (hereinafter, "Release"), is made as of the date set forth in the notary acknowledgment below, by RESTORATION SYSTEMS, LLC, a North Carolina limited liability company ("Grantor"), and the STATE OF NORTH CAROLINA ("Grantee").

## RECITALS:

A. Grantor conveyed a conservation easement to Grantee in that certain instrument dated the 22nd day of June 2021, recorded in Book 8144, Page 757, Union County Registry (the "Conservation Easement").

B. A portion of certain real property owned by Grantor is preserved and protected by the Conservation Easement for the purposes as set forth therein.

C. The property that is subject to preservation and protection under the Conservation Easement consists of a total of approximately 56.839 acres and is more particularly identified and described therein as the "Conservation Easement Area" or "Easement Area."

D. A Plat of Survey prepared by Carolina Surveyors, Inc. and recorded on June 1, 2021, in Plat Cabinet P, Pages 903-904, Union County Registry, depicted two 6' trails in the Easement Area and as shown on EXHIBIT A.

E. Grantor has agreed to release all rights to the 6' trails and thereby quitclaims, releases, and abandons the 6' trails as depicted on EXHIBIT A (the "Release Areas"), attached hereto, and incorporated herein by this reference, from the rights to use, repair, or reconstruct so that Grantee may possess the Release Areas and the Conservation Easement unencumbered by the 6' trails.

F. Based on the foregoing, the North Carolina Department of Environmental Quality, Division of Mitigation Services has accepted the release of rights to these 6' trails and the execution of this instrument for the purposes set forth herein.

G. Authority to accept this Release on behalf of the North Carolina Department of Environmental Quality, Division of Mitigation Services was delegated to the North Carolina Department of Administration by resolution adopted by the Governor and Council of State at a meeting held in the City of Raleigh, North Carolina, on the 13th day of September 2011.

NOW THEREFORE, for and in receipt of Ten Dollars ($10.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, Grantor does hereby execute this Release and agrees as follows:

1. The recitals stated above are substantive and are incorporated in full by this reference.

2. All capitalized terms appearing in this Release and not otherwise defined shall have the meaning ascribed to such terms in the Conservation Easement.

3. Grantor, for itself and its heirs, successors, and assigns, does hereby irrevocably and completely remise, release, and quitclaim unto Grantee, its successors and assigns, all right, title, claim, and interests to and in the Release Areas.

4. This Release shall apply only to the 6' trails in the Release Areas and the remainder of the Conservation Easement Area shall continue to be subject to all retained rights, and said Conservation Easement shall otherwise remain in full force and effect.

TO HAVE AND TO HOLD, the Release Areas, together with all privileges and appurtenances thereunto belonging, to Grantee, its successors and assigns, free, discharged, and released from the right to use the 6' trails.

[signatures on following page]

**IN TESTIMONY WHEREOF**, Grantor has hereunto set its hand and seal, the day and year herein notarized.

**GRANTOR:**

**Restoration Systems, LLC,**
a North Carolina limited liability company

By: _____ (SEAL)

Name: George Howard (SEAL)

Title: CEO (SEAL)

**NORTH CAROLINA**

**COUNTY OF** Wake

I, John Duncan Hamby, a Notary Public in and for the County and State aforesaid, do hereby certify that George Howard personally appeared before me this day and acknowledged the execution of the foregoing instrument.

**IN WITNESS WHEREOF**, I have hereunto set my hand and Notary Seal this the 21st day of July, 2022.

_____
Notary Public

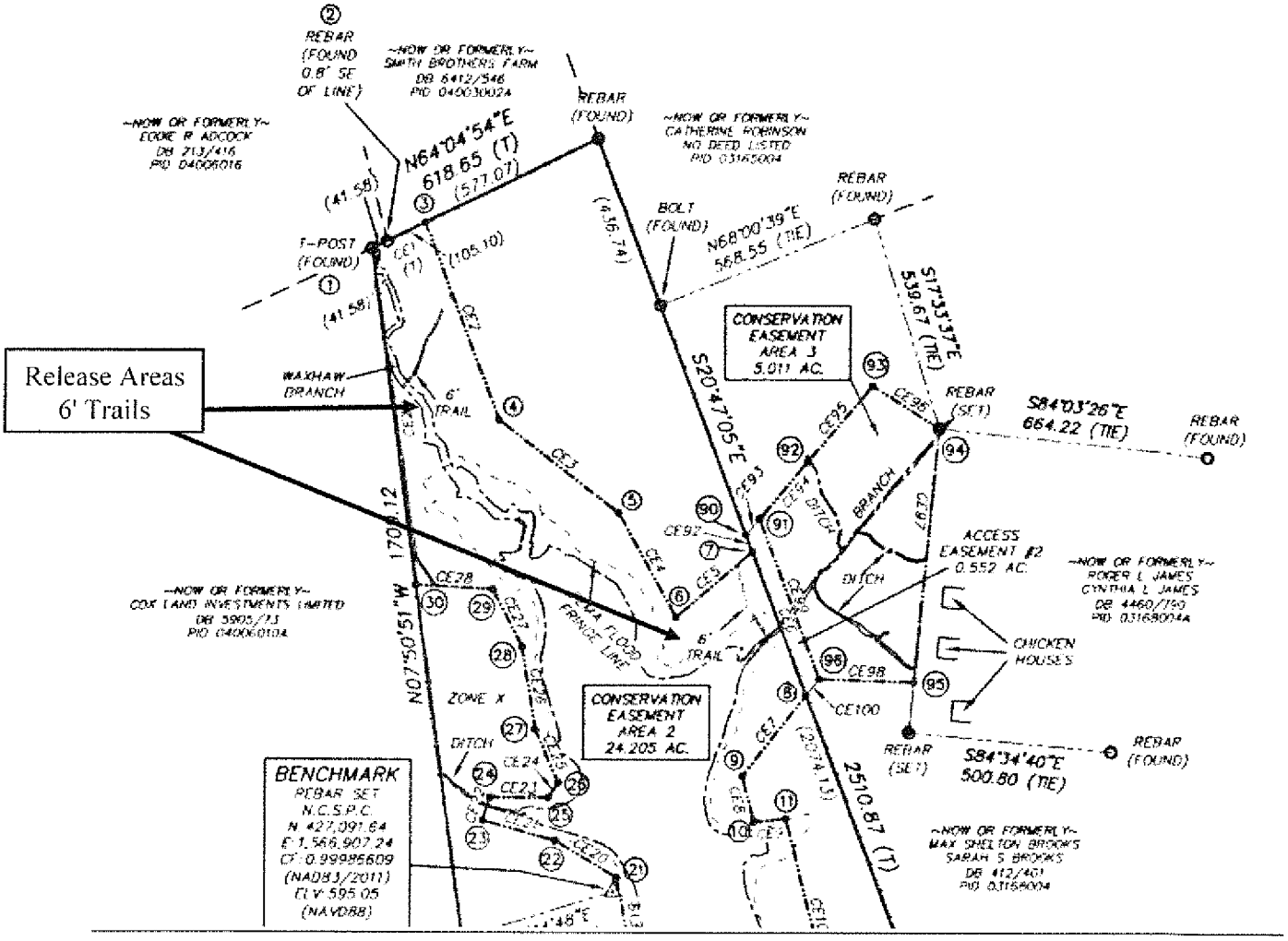
JOHN DUNCAN HAMBY NOTARY PUBLIC WAKE COUNTY, NC

My commission expires:

11-15-26

**EXHIBIT A**

Release Areas – 6' Trails




THIS MAP MAY NOT BE A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS AND HAS NOT BEEN REVIEWED FOR COMPLIANCE WITH RECORDING REQUIREMENTS FOR PLATS.

## Appendix G: Record Drawings & As-built Survey

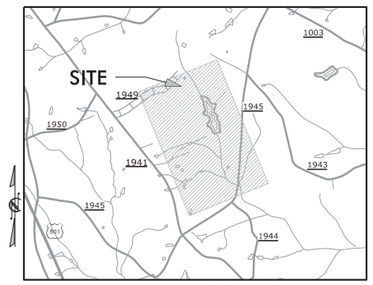
09/08/59

# NC DEPARTMENT OF ENVIRONMENTAL QUALITY
# DIVISION OF MITIGATION SERVICES
# AS–BUILT PLANS
# WITS END SITE

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | WITS END SITE | 1 | |

***LOCATION: UNION COUNTY, NORTH CAROLINA***

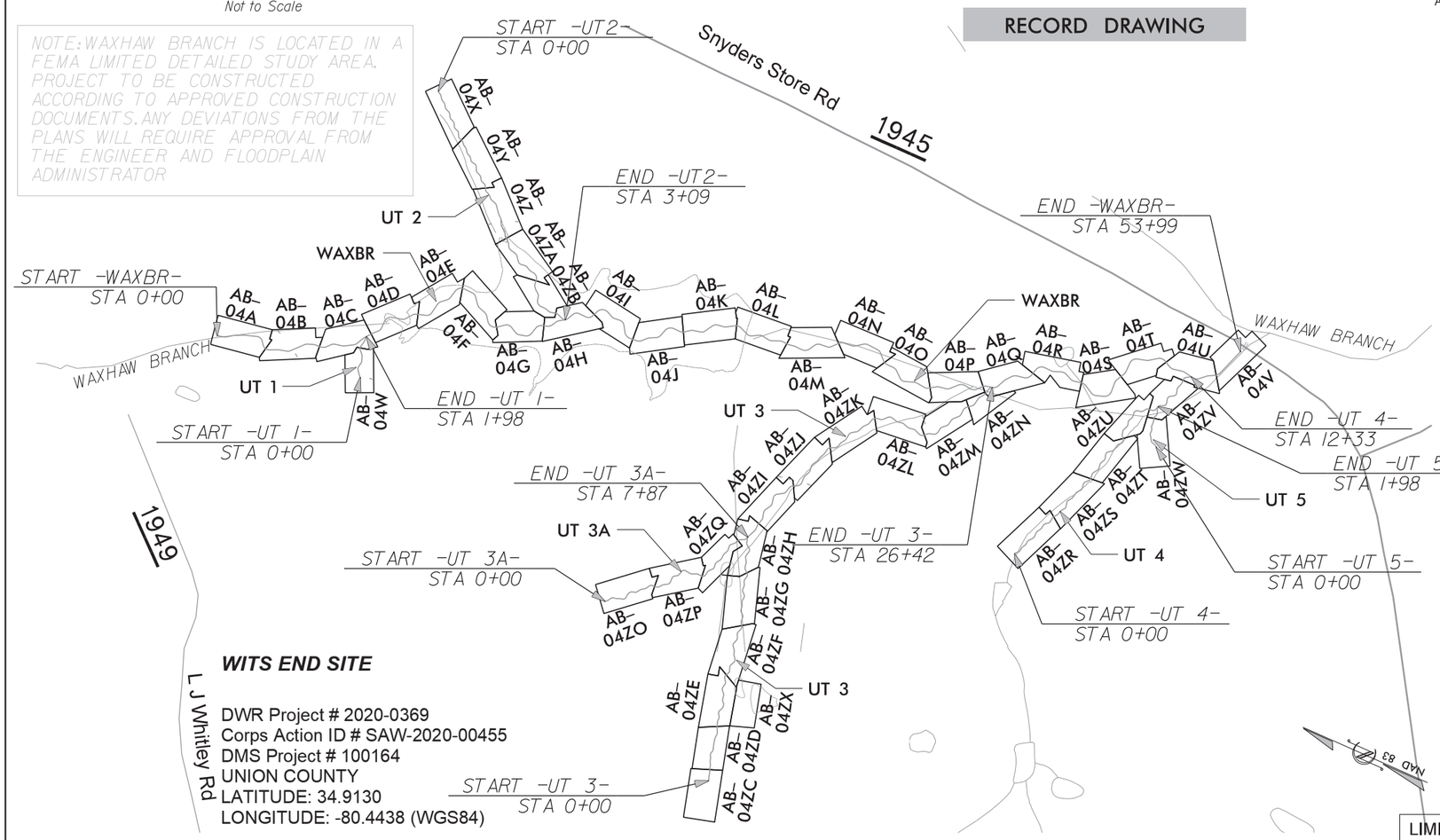
***TYPE OF WORK: STREAM RESTORATION AND ENHANCEMENT (CLEARING, GRUBBING, GRADING, EROSION CONTROL AND PLANTING)***




VICINITY MAP
Not to Scale

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

RECORD DRAWING




***WITS END SITE***

DWR Project # 2020-0369
Corps Action ID # SAW-2020-00455
DMS Project # 100164
UNION COUNTY
LATITUDE: 34.9130
LONGITUDE: -80.4438 (WGS84)

***CONTRACT: WITS END SITE***

## INDEX OF SHEETS

| SHEET NUMBER | SHEET |
|---|---|
| AB-01 | Title Sheet |
| AB-02 | Symbology |
| AB-03 | Easement |
| AB-03A THRU AB-03G | As-Built Vegetation Plot, Groundwater Wells |
| AB-03H | Bridge As-Built |
| AB-04A THRU AB-04ZX | As-Built Structures |
| AB-04ZY | As-Built Planting List |

**SURVEYORS CERTIFICATION(S)**

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground utilities or any other features above, or below ground other than those shown. However, no visible evidence of cemeteries or utilities, aboveground or otherwise, was observed by the undersigned (other than those shown).

I certify that the survey is of an existing parcel or parcels of land or one or more existing easements and does not create a new street or change an existing street.

I JOHN A. RUDOLPH , certify that this plat was prepared under my supervision from an actual field survey made under my supervision, of as-built conditions.

That the boundaries not surveyed are clearly indicated as such and were plotted from information as referenced hereon; That the ratio of precision as calculated was 1:7,500+ and that the global navigational satellite system (GNSS) was used to perform this survey and the following information was used:
Class of Survey: CLASS B (HORIZONTAL) CLASS B (VERTICAL)
Positional Accuracy: 0.12 feet (HORIZONTAL)
Type of GPS field procedure: RTK
Dates of survey: May and June 2022
Datum/Epoch: NAD 1983(2011)
Published/Fixed Control Use: OPUS
Geoid Model: 2012B CONUS
Combined Grid Factor: 0.99995565 GROUND TO GRID
Units: US SURVEY FEET

That this plat meets the requirements of the standards of practice for land surveying in North Carolina. Witness my hand and seal this 29th day of July , 2022.

SEAL OR STAMP

DocuSigned by:
A71BB30246D54EC...

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

10/7/2022
Professional Land Surveyor

L-4194
License Number

***GRAPHIC SCALES***

20 10 0 20 40
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

4 2 0 4 8
PROFILE (VERTICAL)

| | |
|---|---|
| PROPOSED LENGTH OF -WAXBR- = 5403 | PROPOSED LENGTH OF -UT 3A- = 780 |
| PROPOSED LENGTH OF -UT 1- = 189 | PROPOSED LENGTH OF -UT 4- = 1223 |
| PROPOSED LENGTH OF -UT 2- = 1240 | PROPOSED LENGTH OF -UT 5- = 192 |
| PROPOSED LENGTH OF -UT 3- = 2629 | |

**TOTAL STREAM LENGTHS (LF) = 11656**

| RESTORATION LEVEL | STREAM (linear footage) | RIPARIAN WETLAND (acreage) | NONRIPARIAN WETLAND (acreage) |
|---|---|---|---|
| RESTORATION | 10,289 | 22.833 (Reestablishment) | 0.000 |
| ENHANCEMENT I | 232 | 1.442 (Rehabilitation) | 0.000 |
| ENHANCEMENT II | 976 | 0.000 | 0.000 |
| PRESERVATION | 0 | 4.916 | |
| CREATION | 0 | 0.351 | |
| TOTALS | 11,497 | 29.602 | 0.000 |
| MITIGATION UNITS | 11,525.946 SMUs | 24.163 RIPARIAN WMUs | NONRIPARIAN WMUs |

LIMITS OF DISTURBANCE: 89.85 AC

Axiom Environmental, Inc.
Axiom Environmental
218 Snow Ave
Raleigh, NC 27603
GRANT LEWIS
*PROJECT DESIGNER*

RESTORATION SYSTEMS LLC
Restoration Systems
1101 Haynes St.
Suite 211
Raleigh, NC 27604
WORTH CREECH
*SITE CONSTRUCTION MANAGER*

*Prepared in the Office of:*
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890
JOSHUA G. DALTON, P.E.
*PROJECT ENGINEER*

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
*DATE:*

10/6/2022
Wits End_psh_AB-01.dgn
jharvey

# CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale* **S.U.E. = Subsurface Utility Engineering*

**RECORD DRAWING**

## BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Property Monument (ECM)
- Parcel/Sequence Number (123)
- Existing Fence Line
- Proposed Fence Gate
- Proposed Barbed Wire Fence
- Existing Wetland Boundary (WLB)
- Proposed Wetland Boundary (WLB)
- Existing Endangered Animal Boundary (EAB)
- Existing Endangered Plant Boundary (EPB)
- Existing Historic Property Boundary (HPB)

## BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign (S)
- Well (W)
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

## HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream (JS)
- Buffer Zone 1 (BZ 1)
- Buffer Zone 2 (BZ 2)
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch (FLOW)

## RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point

- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line (RW)
- New Right of Way Line with Pin and Cap (RW)
- New Right of Way Line with Concrete or Granite R/W Marker (RW)
- New Control of Access Line with Concrete C/A Marker (CA)
- Existing Control of Access (CA)
- New Control of Access (CA)
- Existing Easement Line (E)
- New Conservation Easement (E)
- New Temporary Drainage Easement (TDE)
- New Permanent Drainage Easement (PDE)
- New Permanent Drainage / Utility Easement (DUE)
- New Permanent Utility Easement (PUE)
- New Temporary Utility Easement (TUE)
- New Aerial Utility Easement (AUE)

## ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut (C)
- Proposed Slope Stakes Fill (F)
- Proposed Curb Ramp (CR)
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

## VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard (Vineyard)

## EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert (CONC)
- Bridge Wing Wall, Head Wall and End Wall (CONC WW)

MINOR:

- Head and End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB (CB)
- Paved Ditch Gutter
- Storm Sewer Manhole (S)
- Storm Sewer (S)

## UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole (P)
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) (P)
- U/G Power Line LOS C (S.U.E.*) (P)
- U/G Power Line LOS D (S.U.E.*) (P)

TELEPHONE:

- Existing Telephone Pole

WATER:

- Water Manhole (W)
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) (W)
- U/G Water Line LOS C (S.U.E*) (W)
- U/G Water Line LOS D (S.U.E*) (W)
- Above Ground Water Line (A/G Water)

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) (G)
- U/G Gas Line LOS C (S.U.E.*) (G)
- U/G Gas Line LOS D (S.U.E.*) (G)
- Above Ground Gas Line (A/G Gas)

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line (SS)
- Above Ground Sanitary Sewer (A/G Sanitary Sewer)
- SS Forced Main Line LOS B (S.U.E.*) (FSS)
- SS Forced Main Line LOS C (S.U.E.*) (FSS)
- SS Forced Main Line LOS D (S.U.E.*) (FSS)

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box (S)
- Utility Unknown U/G Line LOS B (S.U.E.*) (?UTL)
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. (UST)
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records (AATUR)
- End of Information (E.O.I.)
- Existing Contour Major
- Existing Contour Minor
- Contour Interval = 1 ft
- Riffle Rip Rap
- Log Vane
- Log Cross Vane
- Step Pool Structure (Begin / End)
- Stream Plug
- Floodplain Interceptor
- Proposed Fence
- Limits of Disturbance (LOD)

## AS-BUILT:

- Stream Centerline
- Stream Top of Bank
- Stream Gauge
- Groundwater Gauge (#)
- Benthic & Water Quality Station (1)
- Origin Point on CVS Plots
- CVS Plots (#)
- Cross Section (XS-10R)
- Adjusted Stream Structure
- Not Constructed

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1183
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
UNION COUNTY, NC

**SYMBOLOGY**



PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-02
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB-02**

10/6/2022
Wits End_PSH_AB-02.dgn
Jarvis

SURVEY INFORMATION PROPERTY/ EASEMENT PROVIDED BY:
CAROLINA SURVEYORS, INC.
P.O. BOX 267
PINEVILLE, NC 28134

200′ 100′ 0 200′ 400′
SCALE: 1″ = 400′

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

NAD 83

Snyders Store Rd
1945

L J Whitley Rd
1949

WAXHAW BRANCH

WAXHAW BRANCH

UT 1

UT 2

UT 3

UT 3A

UT 4

UT 5

WAXBR

WAXBR

CE

CE — CONSERVATION EASEMENT

RECORD DRAWING

10/6/2022
Wits End_psh_AB-03.dgn
jharvey

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.1363
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.



**WITS END**
UNION COUNTY, NC

**AS-BUILT EASEMENT**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-03
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–03***

50′ 25′ 0 50′ 100′

SCALE: 1″=100′

RECORD DRAWING

NAD 83

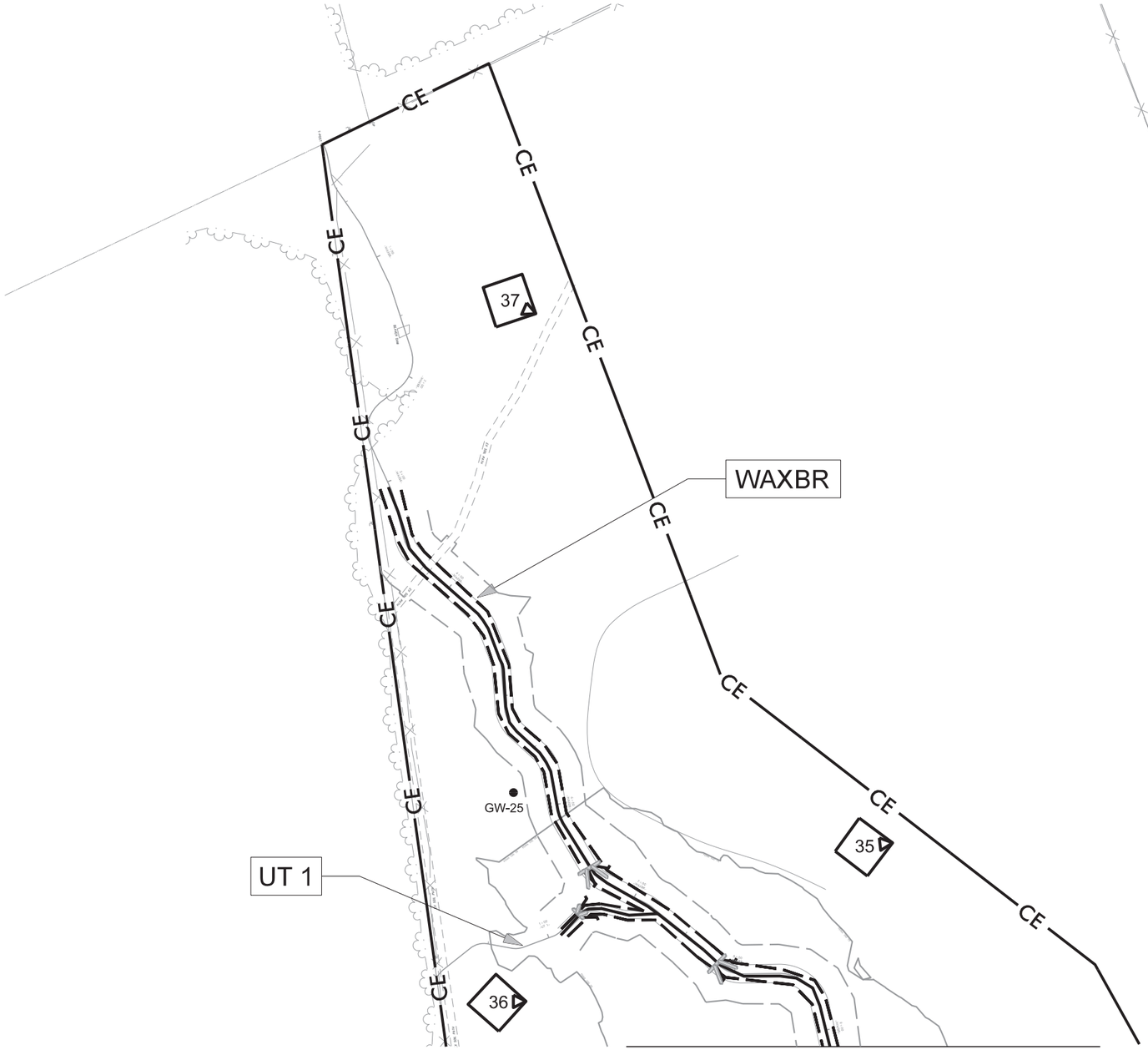
DocuSigned by:
Josh Dalton
1089AD8C14994C3...

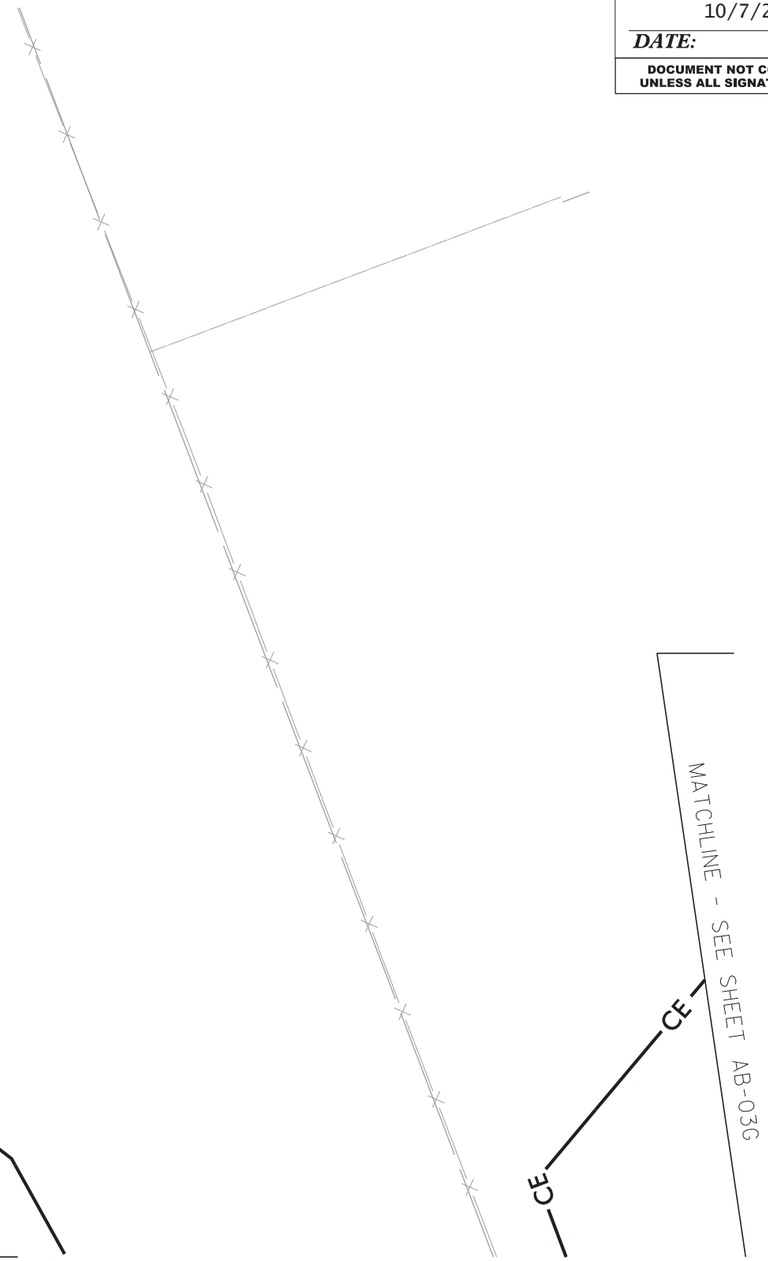
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

*DATE:*

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: (919) 859-2243
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**

| | |
|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-03A |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–03A*** |



10/6/2022
Wits End_psh_AB-03A.dgn
JRH

50′ 25′ 0 50′ 100′
SCALE: 1″=100′

RECORD DRAWING

NAD 83

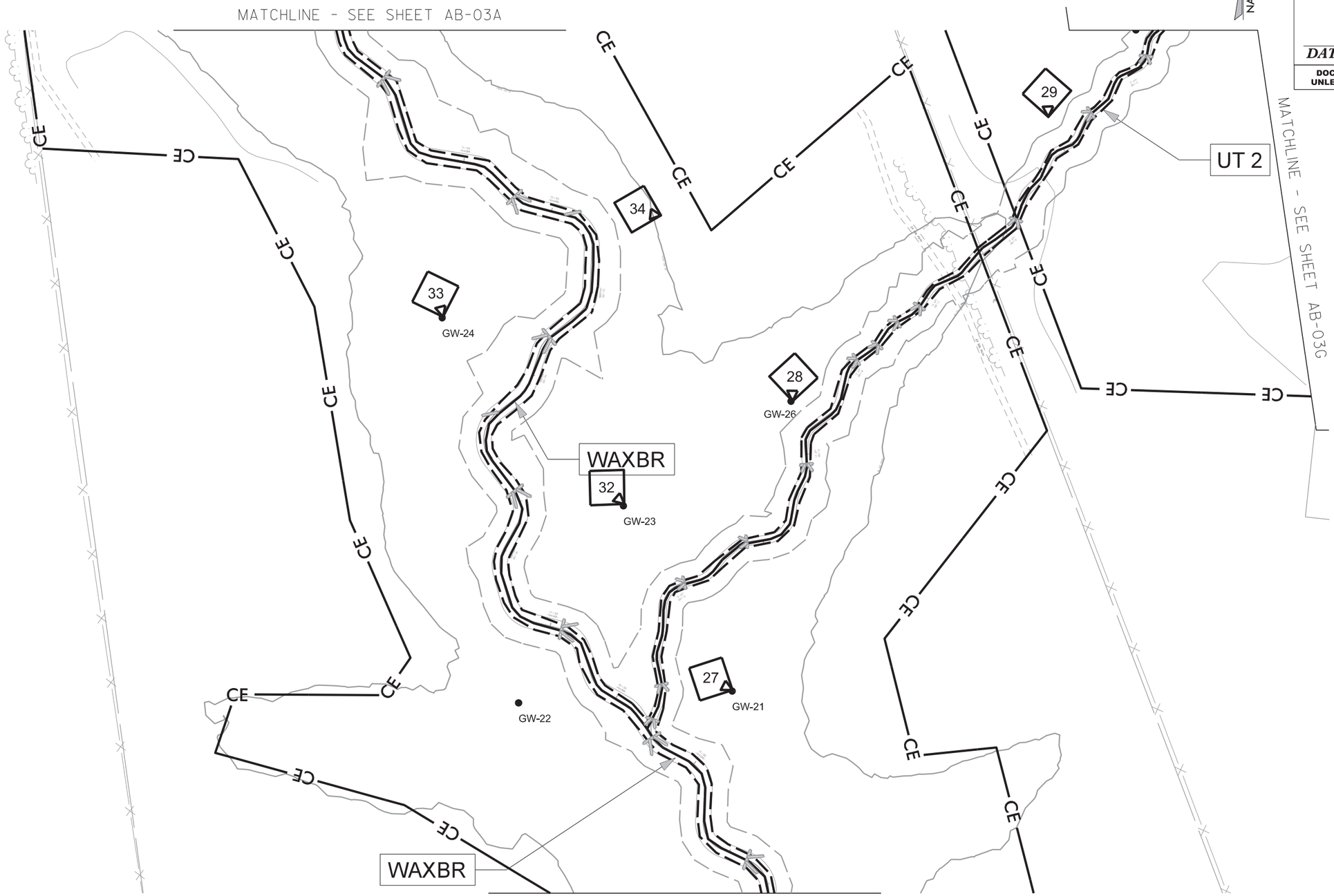
DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA
PROFESSIONAL
SEAL
26971
ENGINEER
JOSHUA G. DALTON

10/7/2022

*DATE:*

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**

*PROJECT # :* I22I-20024
*DRAWING NAME:* WITS END PSH AB03B
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–03B***



10/6/2022
Wits End_psh_AB-03B.dgn
jharvell

50′ 25′ 0 50′ 100′
SCALE: 1″=100′

RECORD DRAWING

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
*DATE:*

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MATCHLINE - SEE SHEET AB-03B

CE

26
GW-20

24
WAXBR
GW-19

25
GW-18

GW-17
23

(2) 36" CPP
24" CPP
(2) 36" CPP
24" CPP

DRIVEWAY REALIGNMENT

MATCHLINE - SEE SHEET AB-03D

MATCHLINE - SEE SHEET AB-03C

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: (919) 859-2243
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB03C |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |

SHEET NO.
***AB–03C***

10/6/2022
Wits End_psh_AB-03C.dgn
jharvell

50′ 25′ 0 50′ 100′
SCALE: 1″=100′

RECORD DRAWING

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
*DATE:*

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MATCHLINE - SEE SHEET AB-03C

MATCHLINE - SEE SHEET AB-03G

MATCHLINE - SEE SHEET AB-03E

24"CMP
INV: 577.74

24"CMP
INV: 577.29

CE

12

22

GW-16

21

GW-15

10

11

GW-9

UT 3

7

GW-7

WAXBR

8

GW-8

9

6

1945 Snyders Store Rd

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.9263
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB03D |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–03D*** |

10/6/2022
Wits End_psh_AB-03D.dgn
Darren

50′ 25′ 0 50′ 100′
SCALE: 1″=100′

NAD 83

**RECORD DRAWING**

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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MATCHLINE - SEE SHEET AB-03D

UT 3

UT 4

UT 5

WAXBR

GW-2
GW-3
GW-4
GW-5
GW-6

2
3
4
5

CE

1945 Snyders Store Rd

MATCHLINE - SEE SHEET AB-03F

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905 JONES FRANKLIN ROAD
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TEL: 919.859.9263
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Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**

| | |
|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB03E |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–03E*** |



10/6/2022
Wits End_psh_AB-03E.dgn
Jarvis

50′ 25′ 0 50′ 100′
SCALE: 1″=100′

RECORD DRAWING

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
*DATE:*

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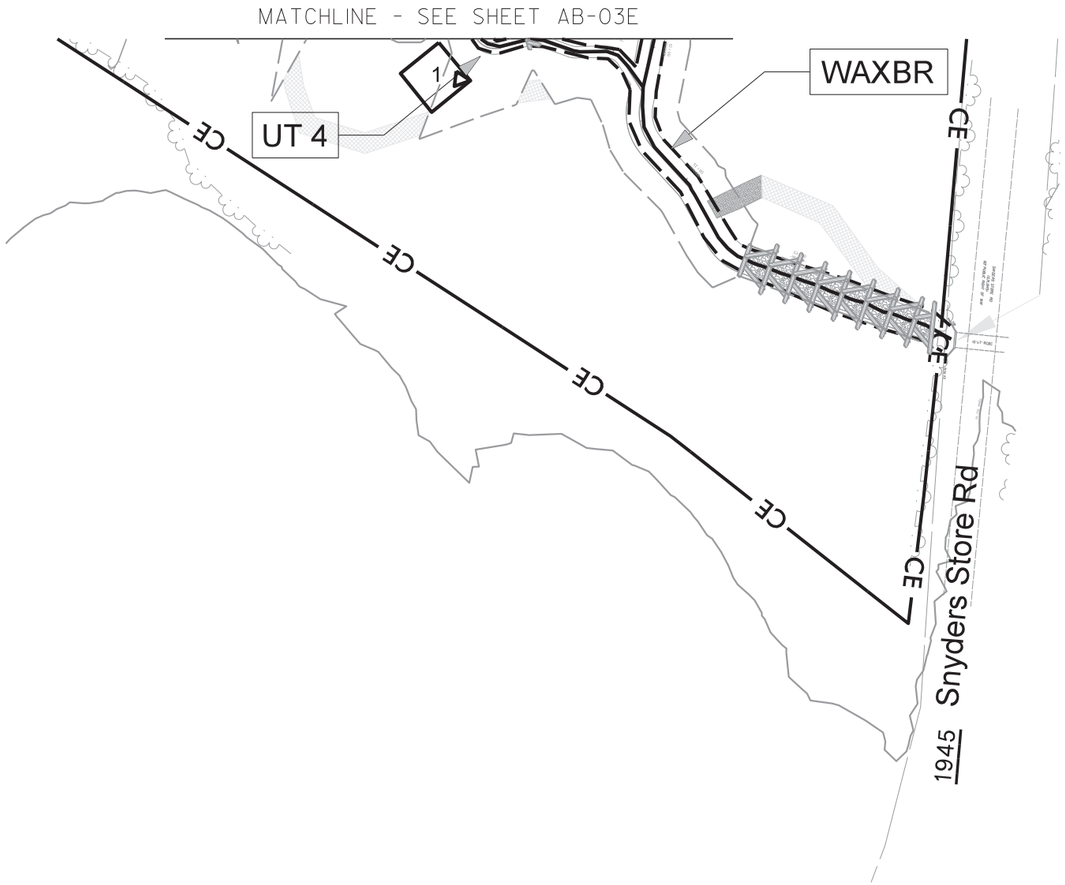


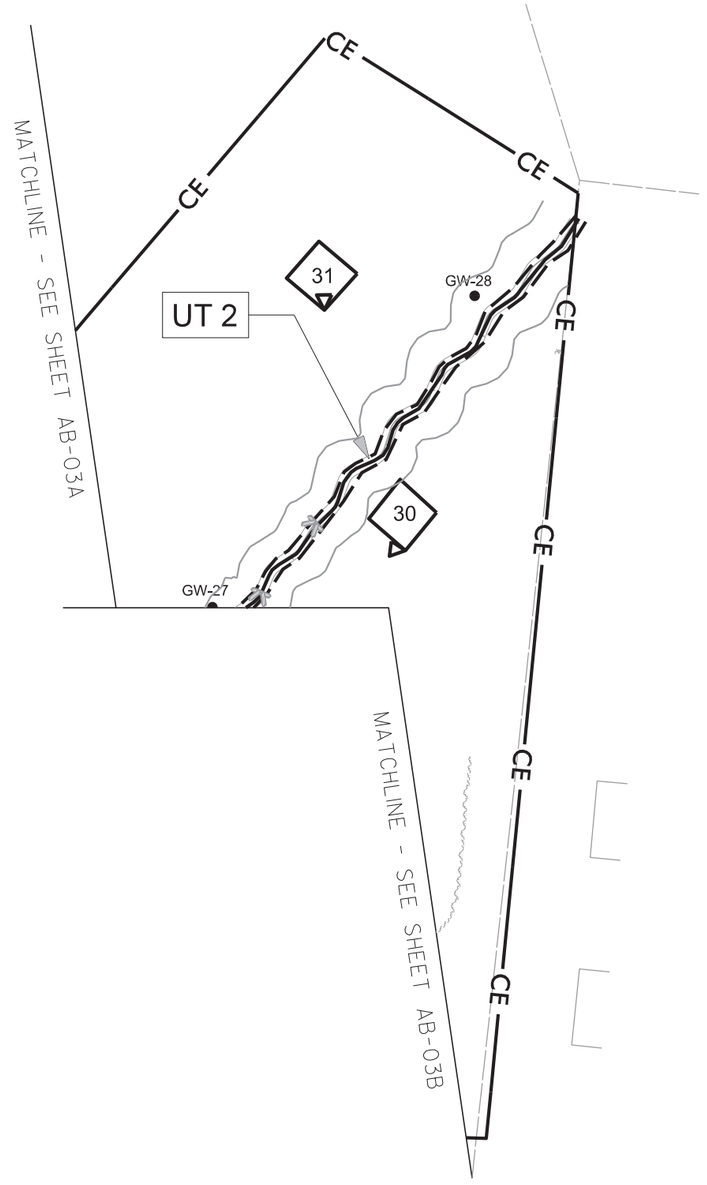


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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.0523
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

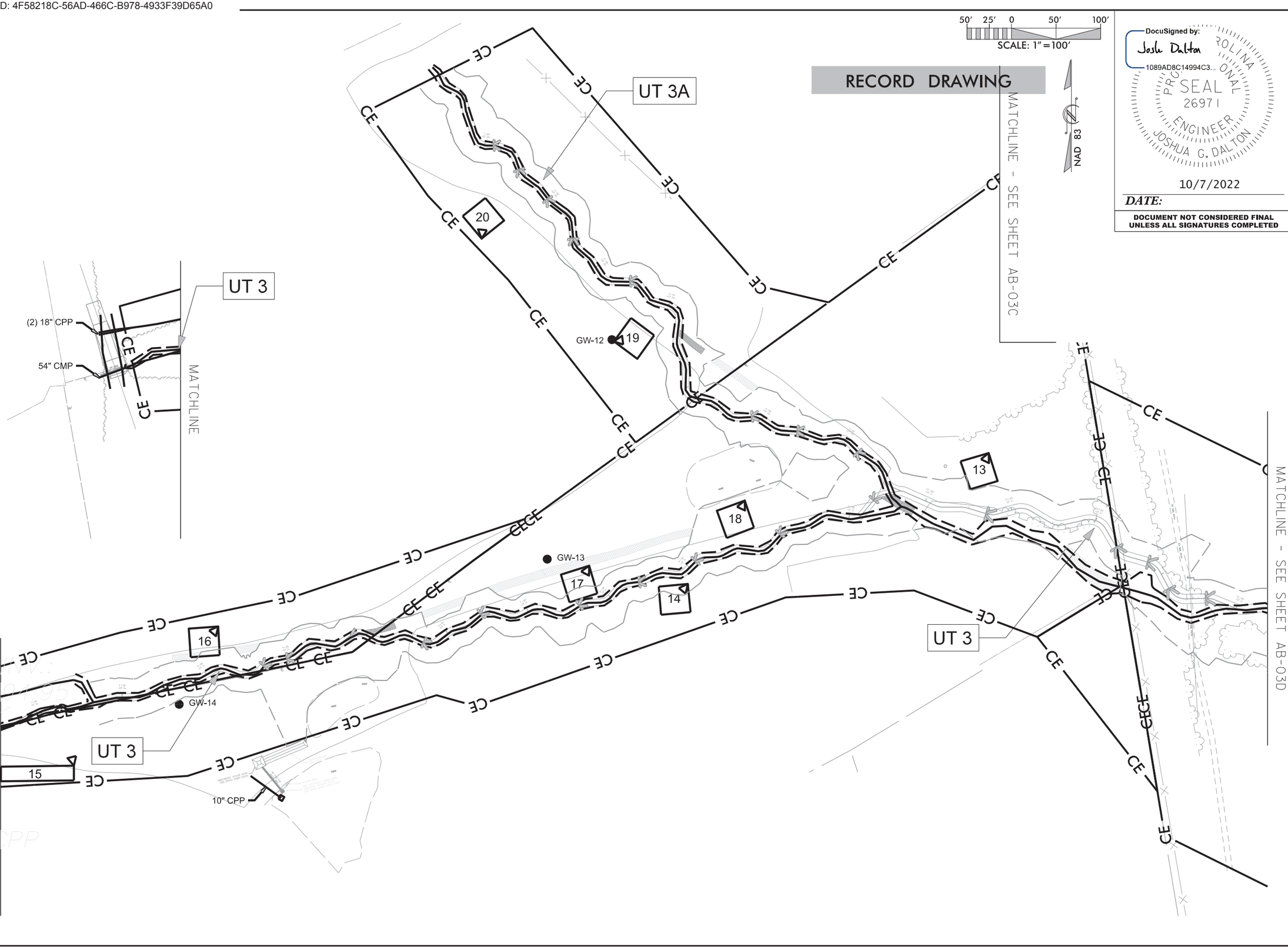
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS**



| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-03F |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–03F*** |

10/6/2022
Wits End_psh_AB-03F.dgn
jharvey




DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1003
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.

# WITS END
UNION COUNTY, NC

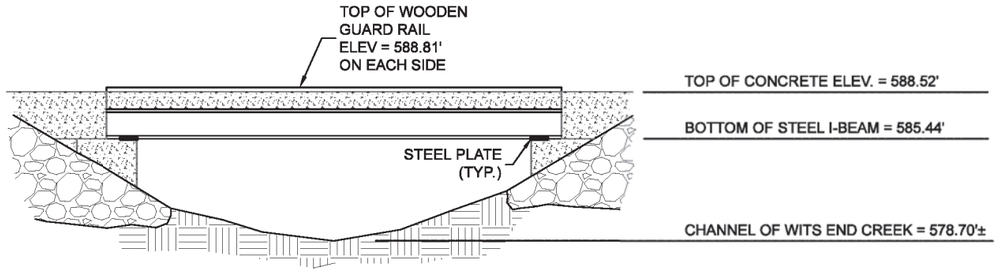
## AS-BUILT VEGETATION PLOTS, GROUNDWATER WELLS

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-03G |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–03G*** |



10/6/2022
Wits End_psh_AB-03G.dgn
harveu

RECORD DRAWING

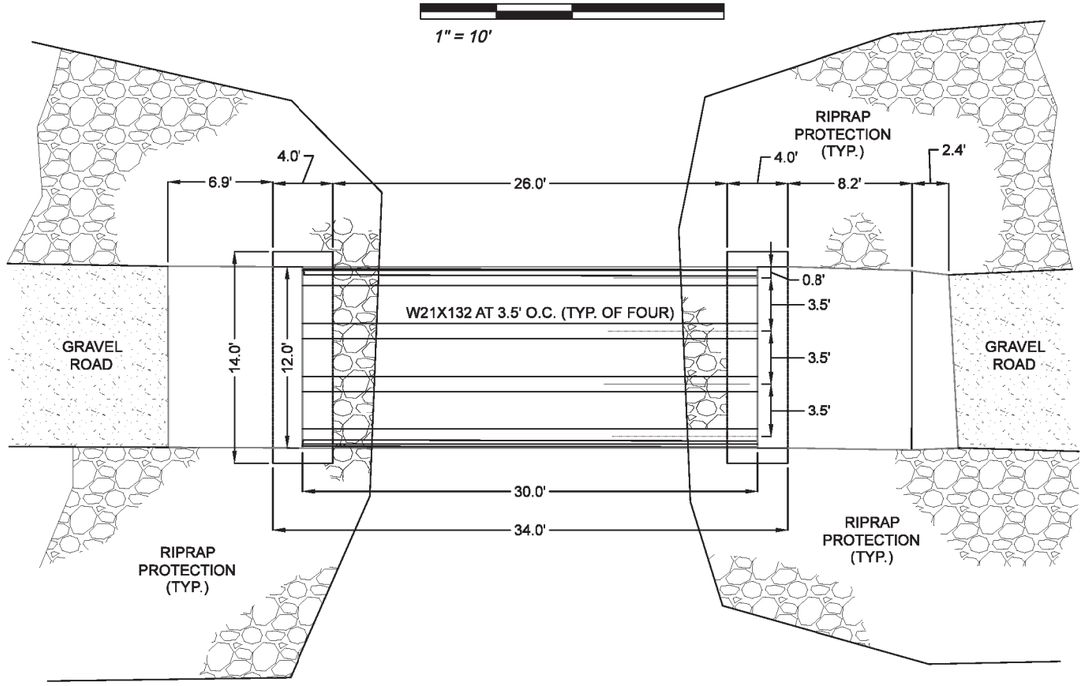



- ELEVATIONS REFERENCED TO NAVD 1988

## LONGITUDINAL SECTION

0 5 10 20

1" = 10'




## PLAN VIEW

0 5 10 20

1" = 10'

NORTH
NC GRID
NAD 83(2011)

## EXISTING BRIDGE

SEPTEMBER 2022

**ENGINEERS CERTIFICATION(S)**

Witness my original signature, registration number and seal this 26th day of September, A.D., 2022

Seal or Stamp

DocuSigned by:
5AC2D94587B94F6...

SEAL
16835
PROFESSIONAL
ENGINEER
GALARD CARTER MOORE III
VIRGINIA

Professional Engineer

10/7/2022

**SURVEYORS CERTIFICATION(S)**

Witness my original signature, registration number and seal this 26th day of September, A.D., 2022

Seal or Stamp

DocuSigned by:
A71BB30246D54EC...

SEAL
L-4194
PROFESSIONAL
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

Professional Land Surveyor

10/7/2022

*AB–03H*

774 S. Beston Road
La Grange, NC 28551
252.582.3097
www.k2designgroup.com
Firm license no.: C-2111

k2 design group

RESTORATION SYSTEMS, LLC
1101 HAYNES STREET
SUITE 211
RALEIGH, NC 27604

Client

Project
WITS END SITE
Union County,
North Carolina

Title
BRIDGE AS-BUILT
Plan View and
Longitudinal view

| | |
|---|---|
| DRAWN BY: | FGR |
| DATE: | 9/23/22 |
| SURVEYED BY: | J.A.R. |
| DWG. NO. | RSS580AB22 |
| SHEET | 1 OF 1 |

20' 10' 0 20' 40'
SCALE: 1" = 20'

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RECORD DRAWING

~NOW OR FORMERLY~
WITS END FARM LLC
DB 4568/779
PID 04006015
TITLE COMMITMENT TRACT 2
83.434 AC.
(NET OVERLAP)

REMOVE FENCE

START ENHANCEMENT II
STA 1+24 -WAXBR-

EIP

STA 0+00 -WAXBR-

1+00 -WAXBR-

BEAVER DAM

2+00 -WAXBR-

CE

PL

T-POST

REMOVE FENCE

EASEMENT LINE

MATCHLINE STA 2+50 -WAXBR- SEE SHEET AB-04B

~NOW OR FORMERLY~
COX LAND INVESTMENTS LIMITED
DB 5905/73
PID 04006010A

~NOW OR FORMERLY~
EDDIE R ADCOCK
NO DEED LISTED
PID 04006016

WAXBR

EXST GROUND AT PROP THALWEG

START ENHANCEMENT II

PI = 1+23.92 EL = 591.4
PI = 1+27.62 EL = 591.4
PI = 1+77.85 EL = 591.4
PI = 2+19.22 EL = 591.4
PI = 2+30.03 EL = 591.4
PI = 1+89.41 EL = 590.56
PI = 2+04.76 EL = 590.56
PI = 2+48.57 EL = 590.62

MATCHLINE STA 2+50 -WAXBR- SEE SHEET AB-04B

594 592 590 588 586 584

0 20 40 60 80 1+00 1+20 1+40 1+60 1+80 2+00 2+20 2+40

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL 919.859.1363
ENG FIRM LICENSE NO. C-3590

Axiom Environmental, Inc.

WITS END
UNION COUNTY, NC

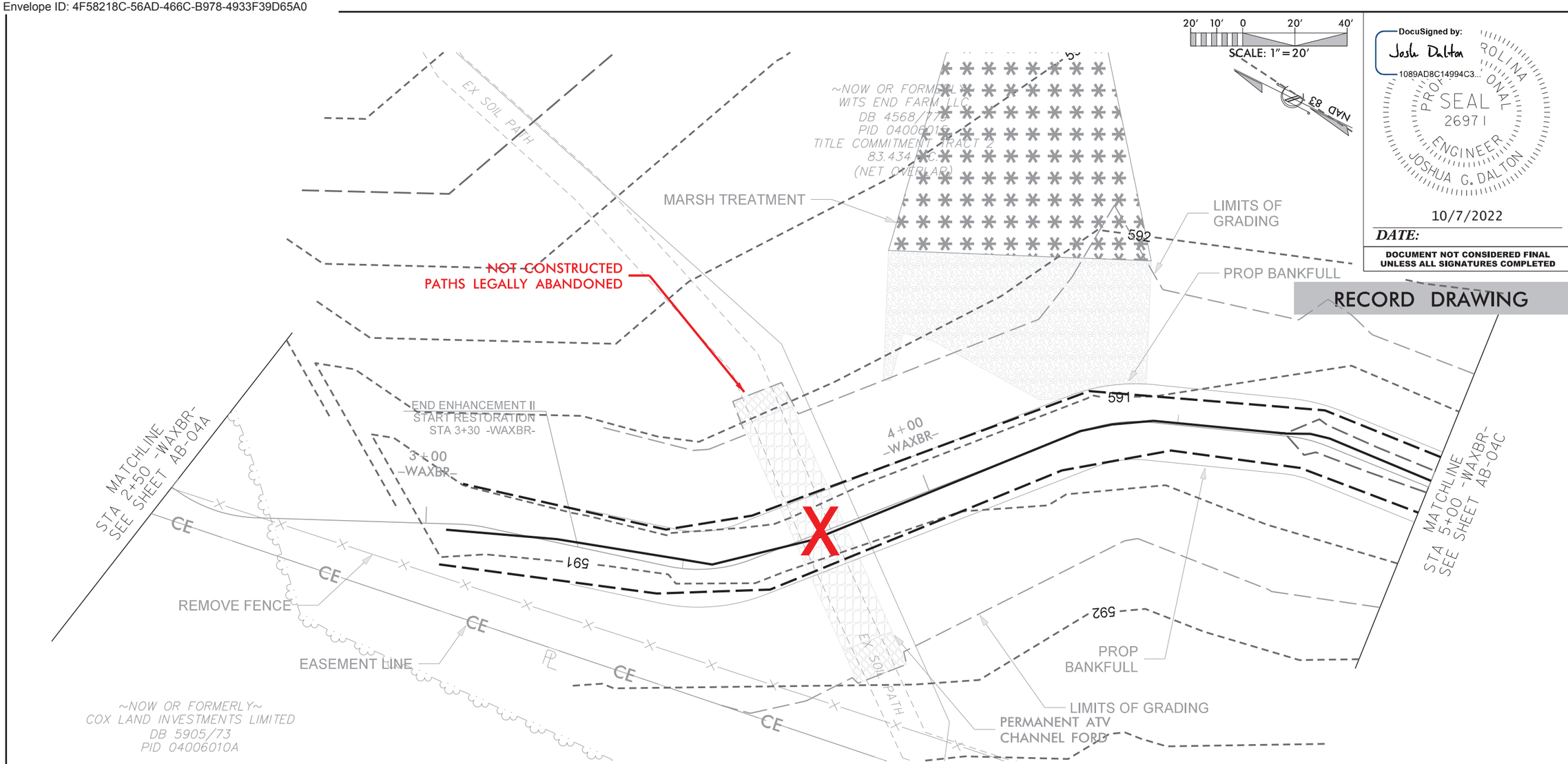
AS-BUILT STRUCTURES

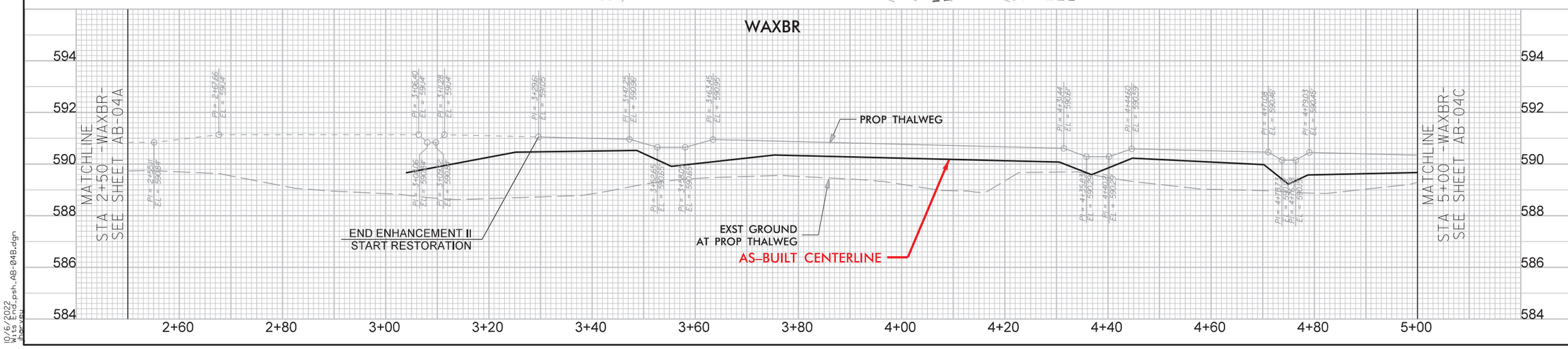
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04A
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–04A



10/6/2022
Wits End_psh_AB-04A.dgn
jharvey




DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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**RECORD DRAWING**

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.851.1213
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

# WITS END
UNION COUNTY, NC

# AS-BUILT STRUCTURES

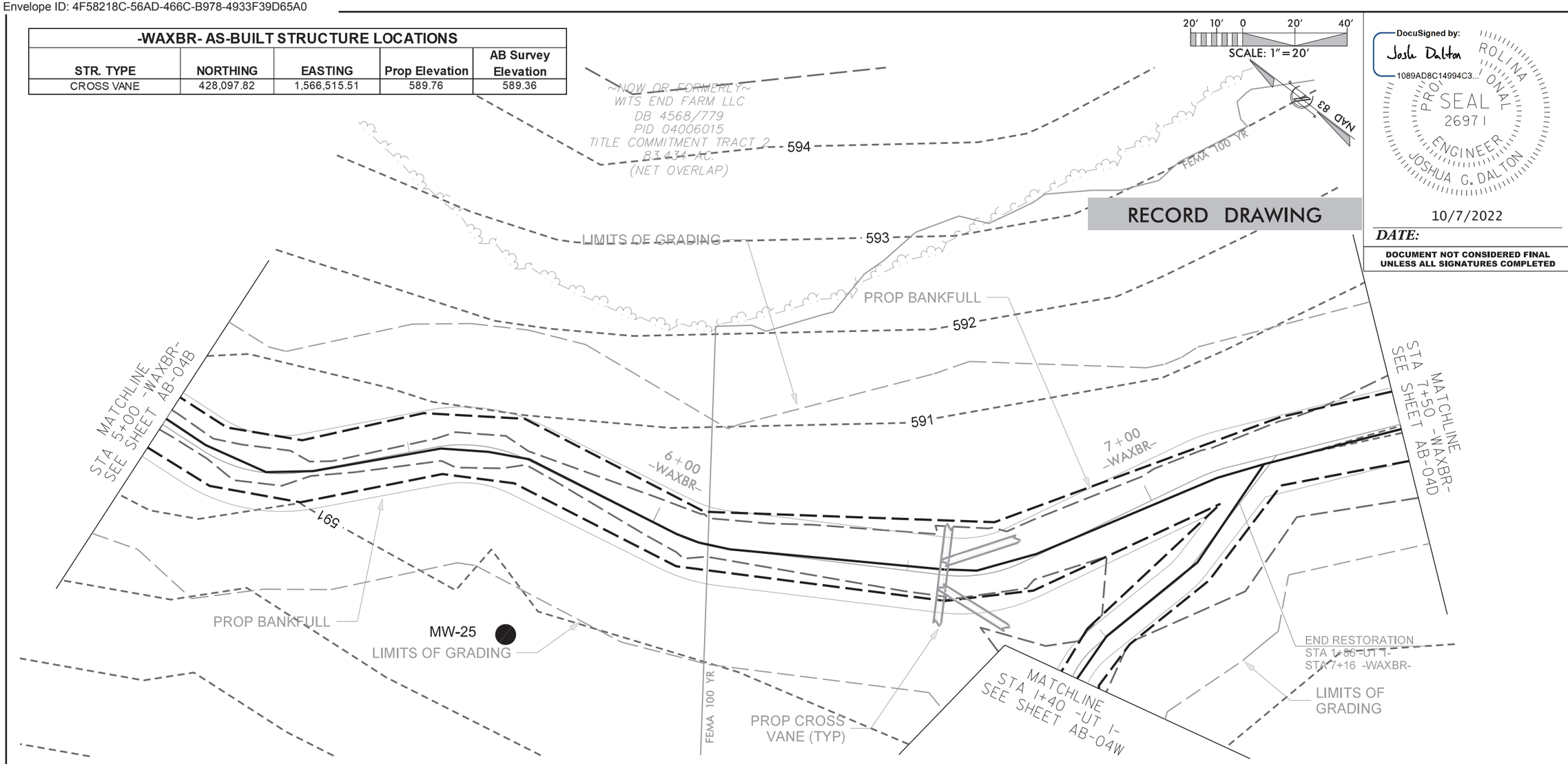
| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04B |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | AB–04B |

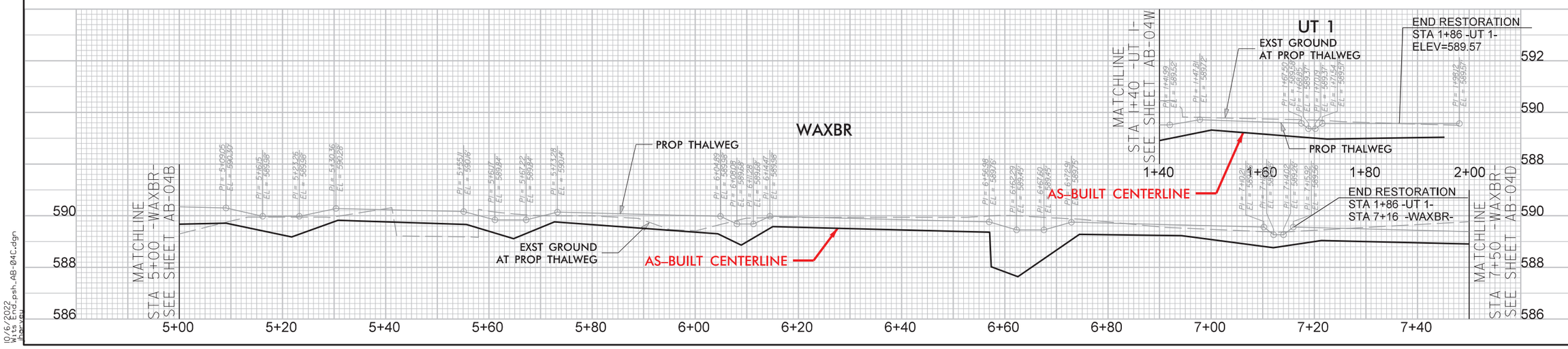


10/6/2022
Wits End_psh_AB-04B.dgn
Harvey

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 428,097.82 | 1,566,515.51 | 589.76 | 589.36 |




DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL ENGINEER SEAL 26971 JOSHUA G. DALTON NORTH CAROLINA

10/7/2022

**DATE:**

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.1353
ENG FIRM LICENSE NO. C-3950

Axiom Environmental, Inc.



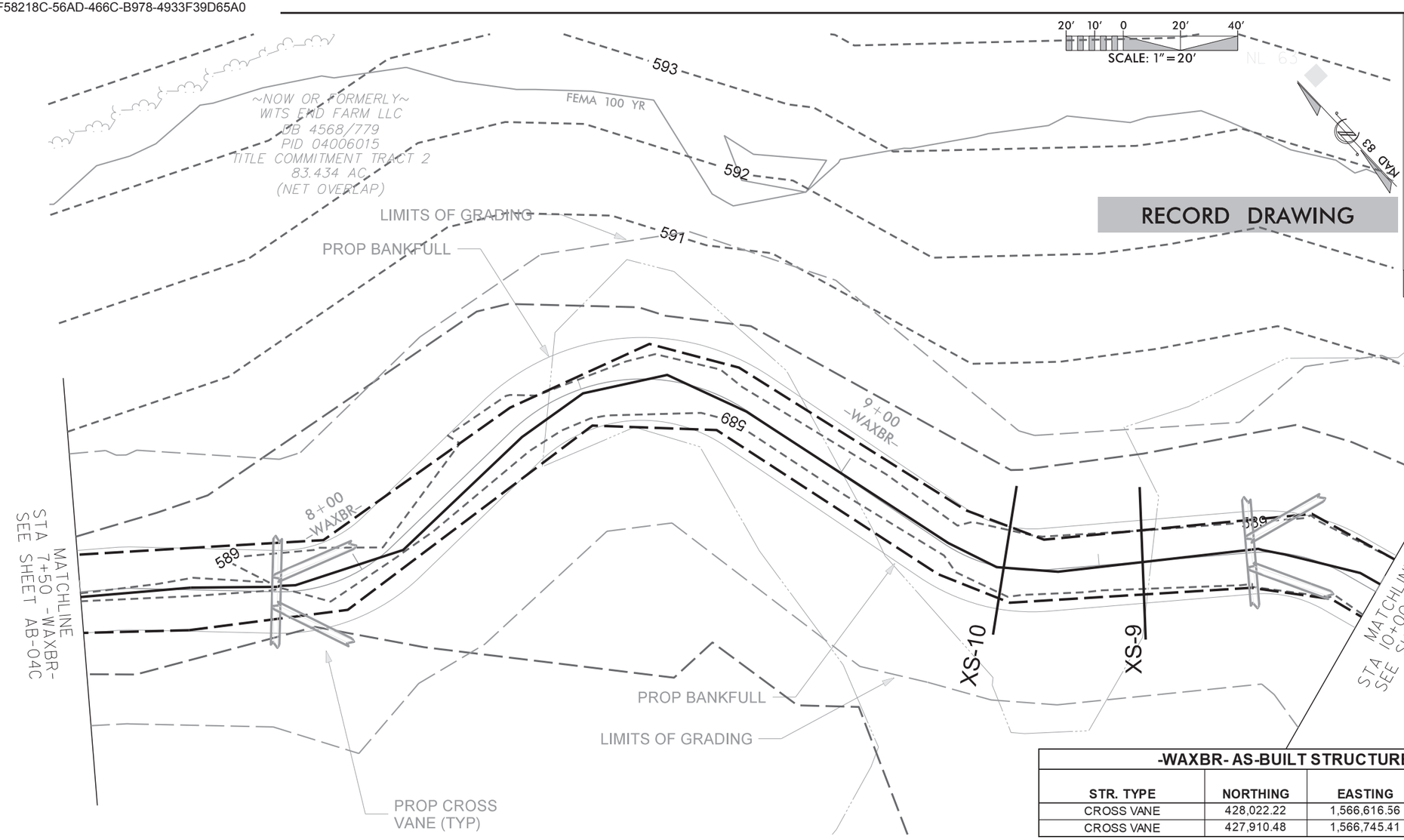
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04C
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB-04C**

10/6/2022
Wits End_psh_AB-04C.dgn
jharvey




RECORD DRAWING

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1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
*DATE:*

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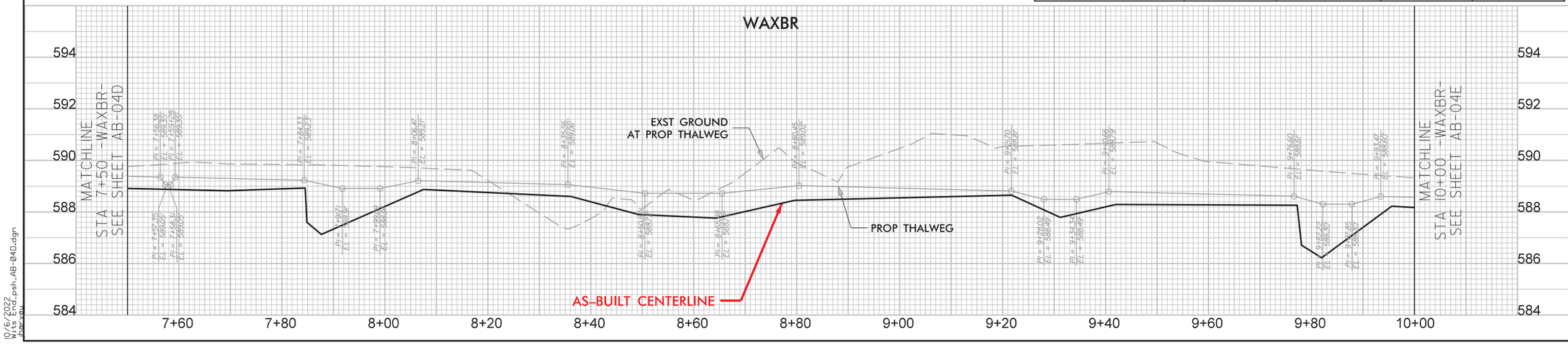
**-WAXBR- AS-BUILT STRUCTURE LOCATIONS**

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 428,022.22 | 1,566,616.56 | 589.23 | 588.93 |
| CROSS VANE | 427,910.48 | 1,566,745.41 | 588.61 | 588.26 |

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.852.1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04D
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

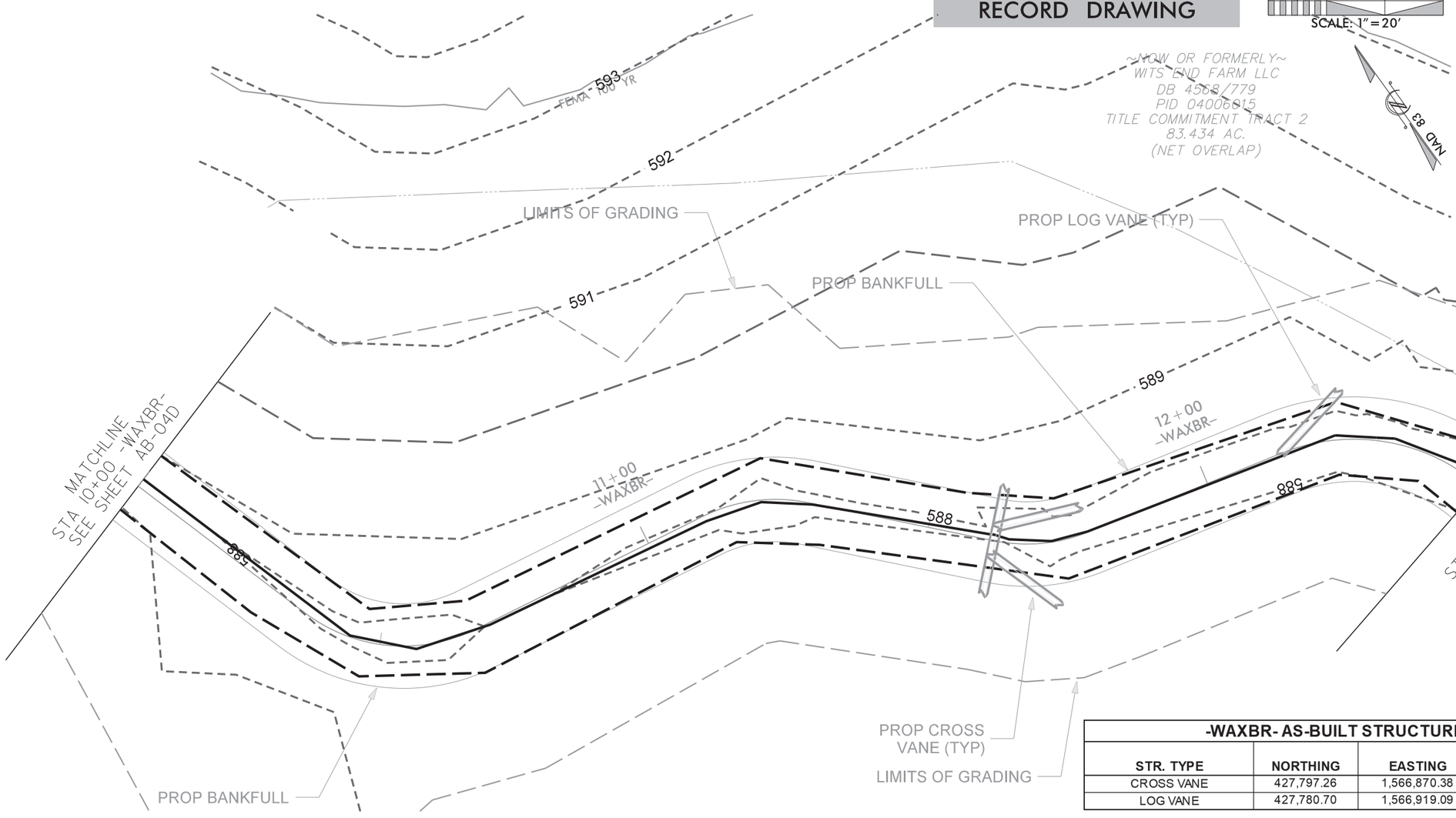
SHEET NO. *AB–04D*



10/6/2022
Wits End_psh_AB-04D.dgn
jharvell

# RECORD DRAWING

SCALE: 1" = 20'

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NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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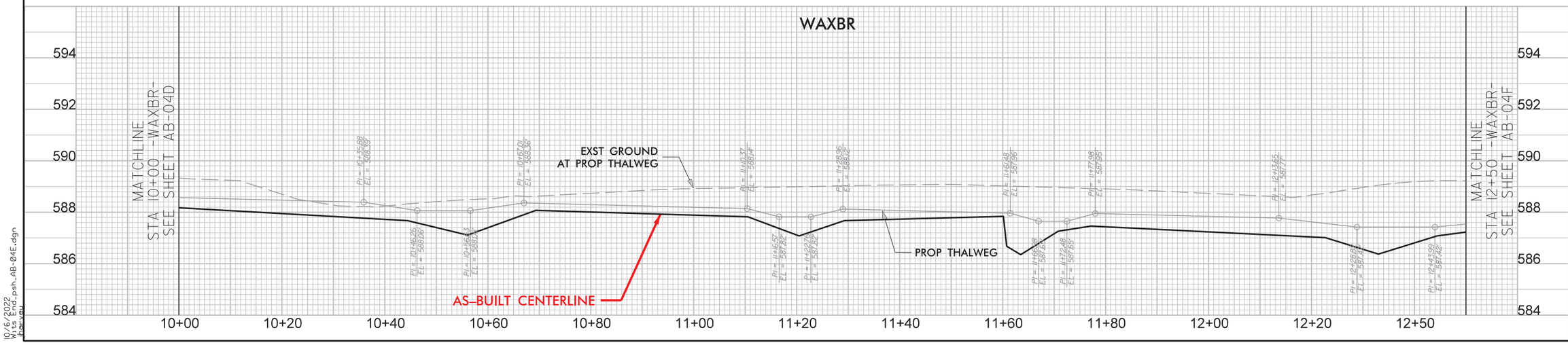
## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 427,797.26 | 1,566,870.38 | 587.96 | 587.84 |
| LOG VANE | 427,780.70 | 1,566,919.09 | 587.77 | 587.29 |

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ENG FIRM LICENSE NO. C-890

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**WITS END**
**UNION COUNTY, NC**

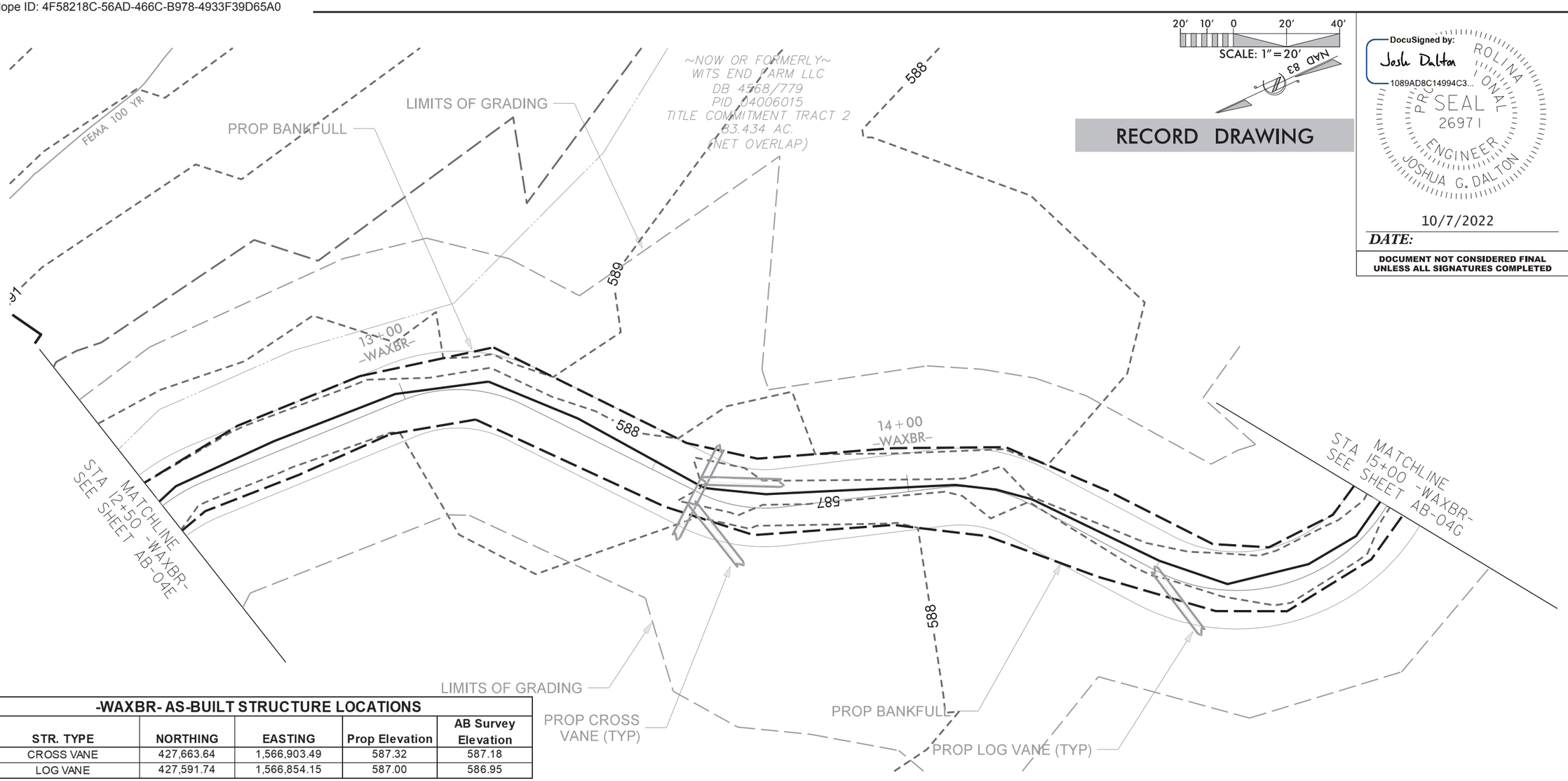
**AS-BUILT STRUCTURES**

PROJECT # :
1221-20024
DRAWING NAME:
WITS END PSH AB-04E
DATE:
2022
DRAWN BY:
JRH
REVIEWED BY:
JGD
REVISIONS:

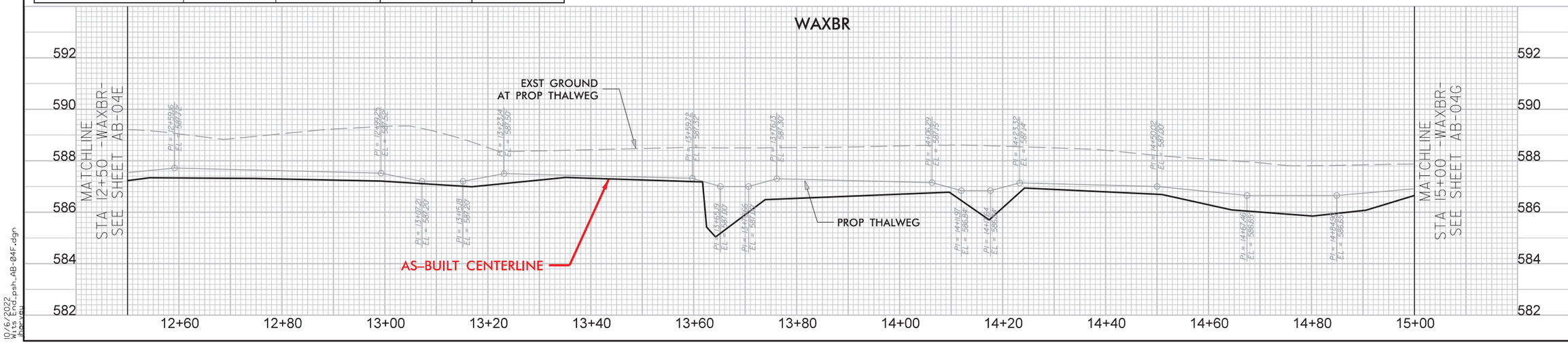
SHEET NO.
***AB–04E***



10/6/2022
Wits End_psh_AB-04E.dgn
jharvey




| -WAXBR- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 427,663.64 | 1,566,903.49 | 587.32 | 587.18 |
| LOG VANE | 427,591.74 | 1,566,854.15 | 587.00 | 586.95 |

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ENG FIRM LICENSE NO. C-990
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WITS END
UNION COUNTY, NC

AS-BUILT STRUCTURES

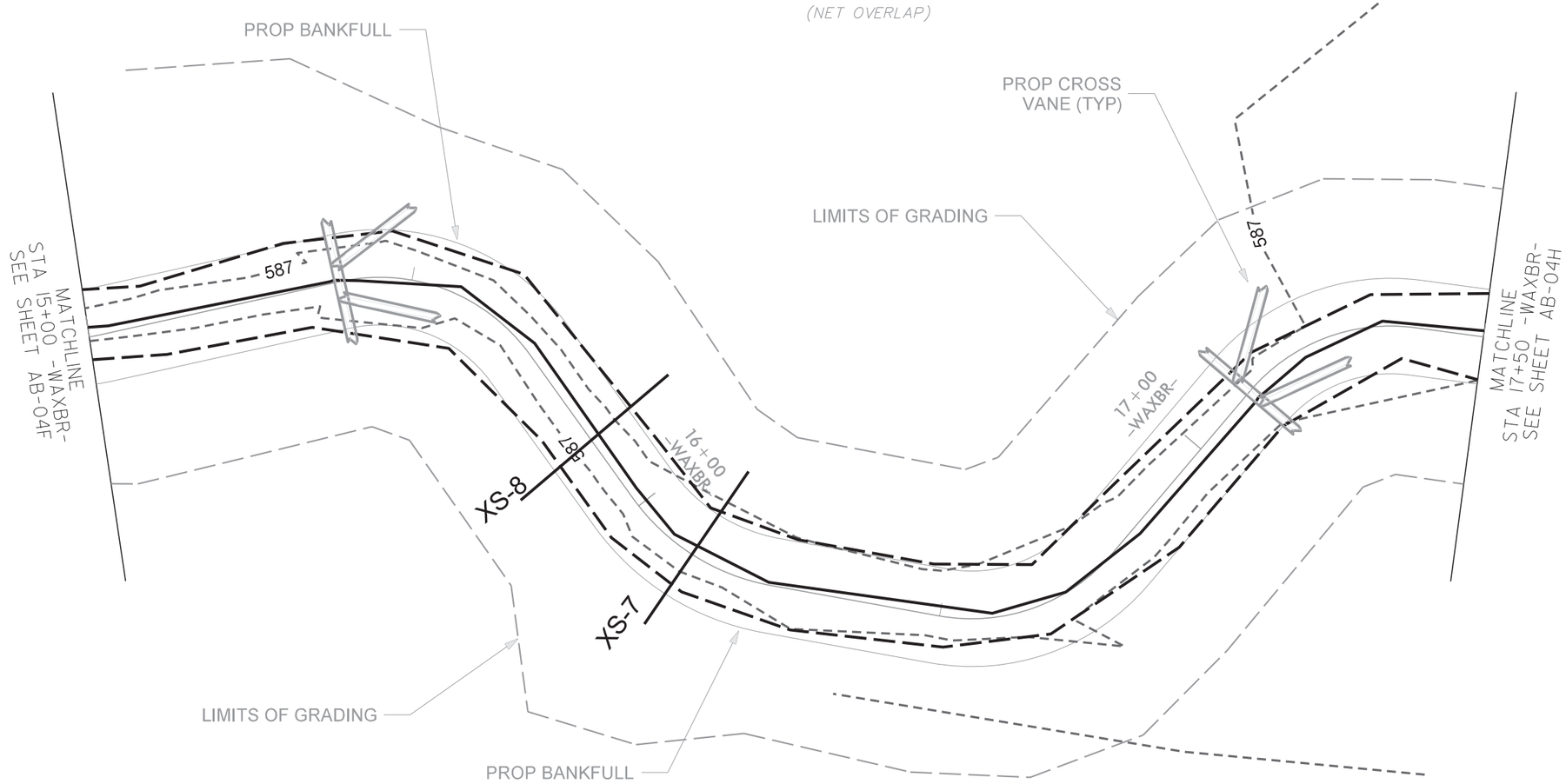
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04F
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04F

10/6/2022
Wits End_psh_AB-04F.dgn
jharvell

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 427,516.35 | 1,566,870.82 | 586.77 | 586.47 |
| CROSS VANE | 427,384.53 | 1,566,915.61 | 586.26 | 586.51 |




20' 10' 0 20' 40'
SCALE: 1" = 20'

NAD 83

**RECORD DRAWING**

DocuSigned by: Josh Dalton 1089AD8C14994C3...

ROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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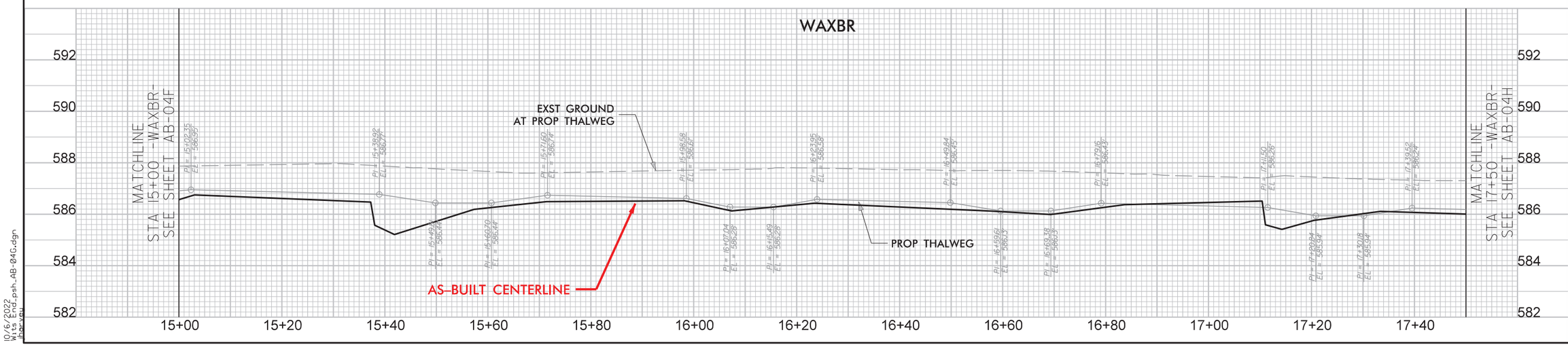


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RALEIGH, NORTH CAROLINA 27606
TEL (919) 852-1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

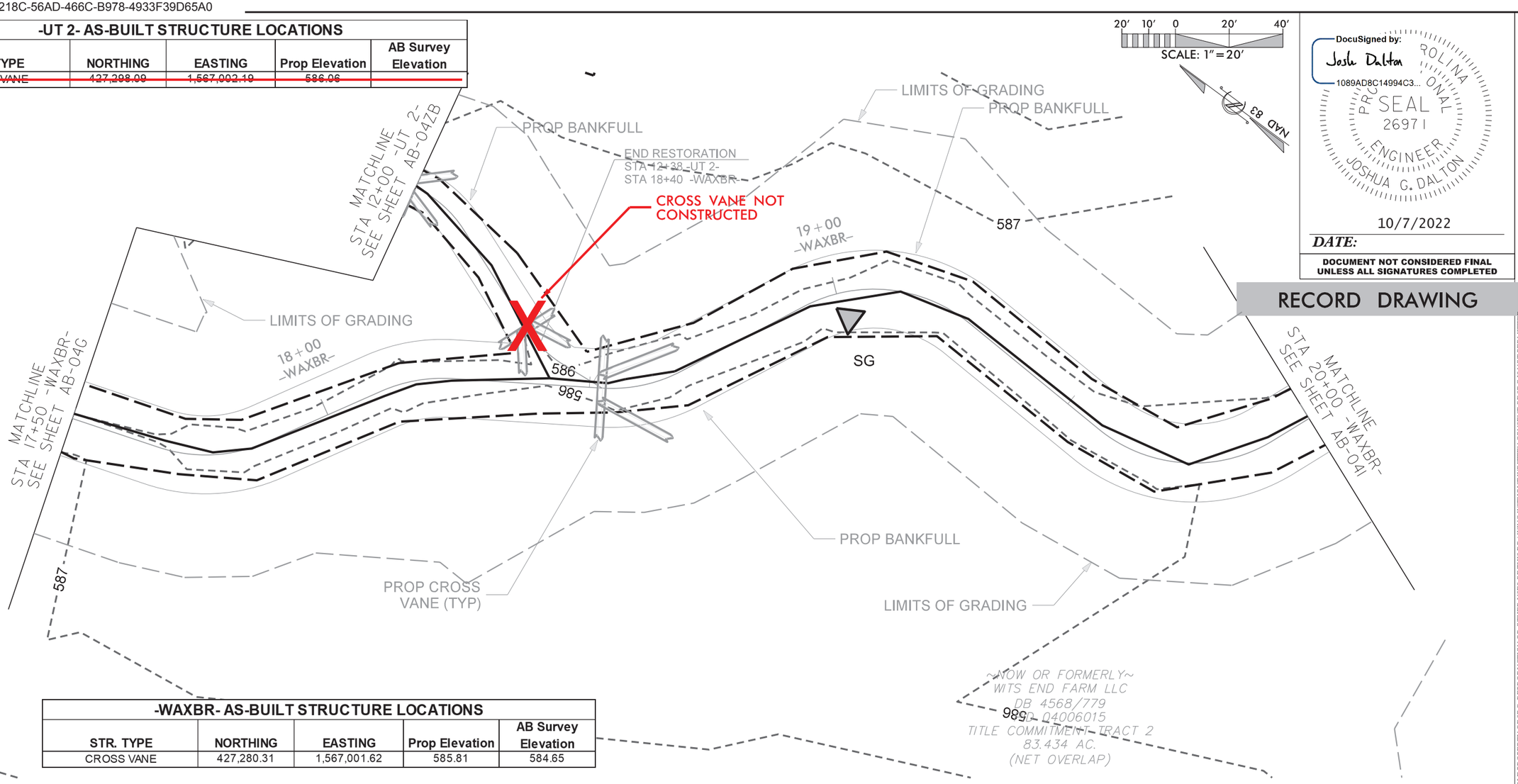
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04G
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–04G***

10/6/2022
Wits End_psh_AB-04G.dgn
jharvey

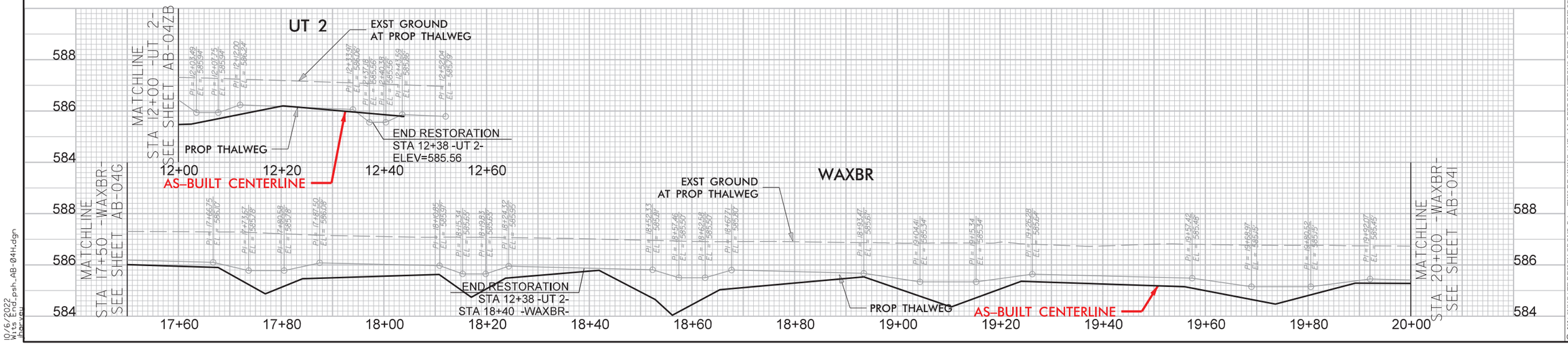
## -UT 2- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| ~~CROSS VANE~~ | ~~427,298.09~~ | ~~1,567,093.19~~ | ~~586.06~~ | |




## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 427,280.31 | 1,567,001.62 | 585.81 | 584.65 |

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10/7/2022

**DATE:**

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**RECORD DRAWING**

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RALEIGH, NORTH CAROLINA 27606
PH: 919.859.9545
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



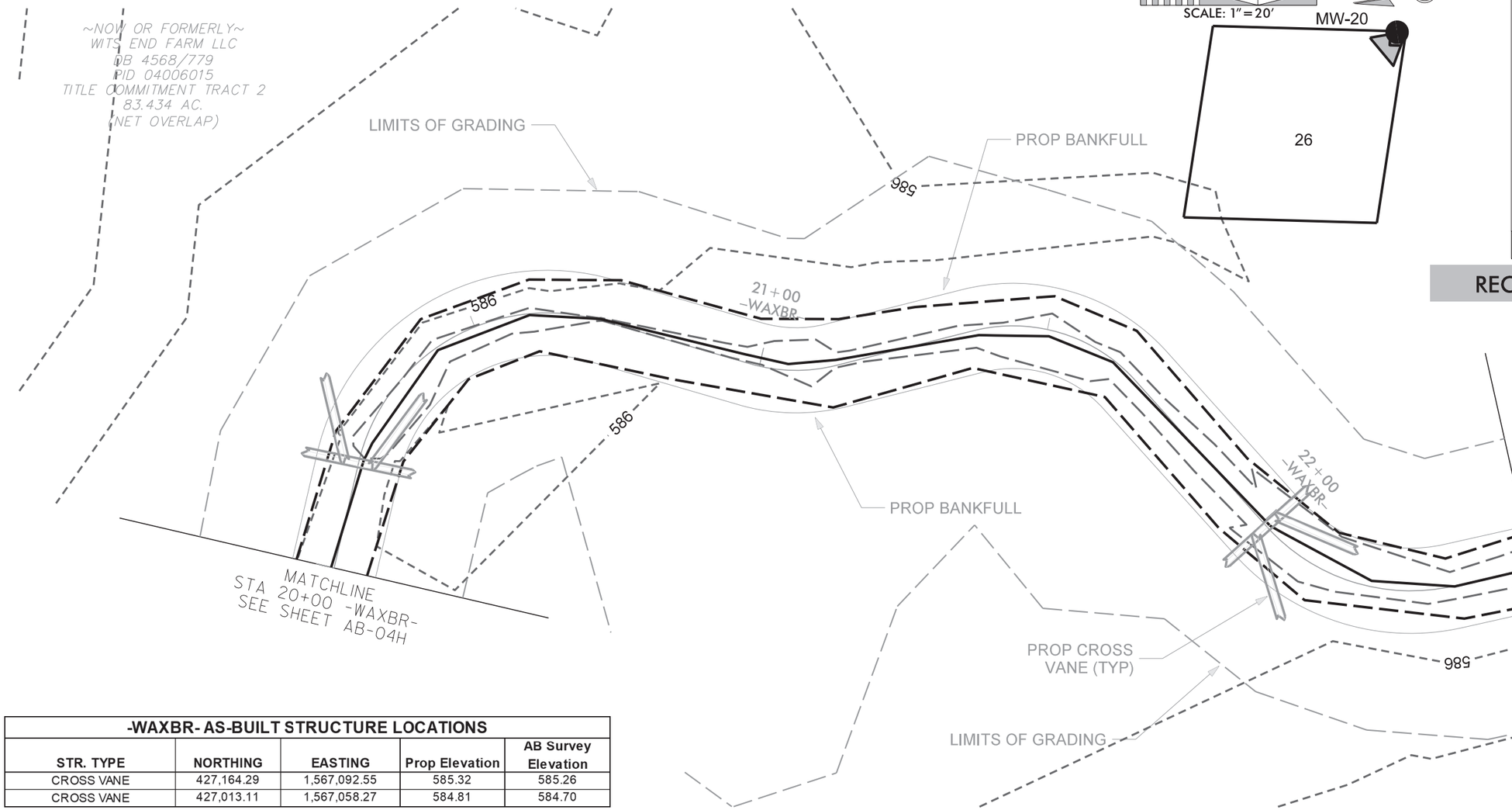
**WITS END**
UNION COUNTY, NC

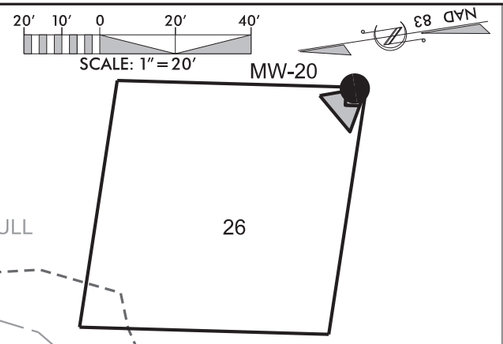
**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04H
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04H**

10/6/2022
Wits End_psh_AB-04H.dgn
jharvell




DocuSigned by:
Josh Dalton
1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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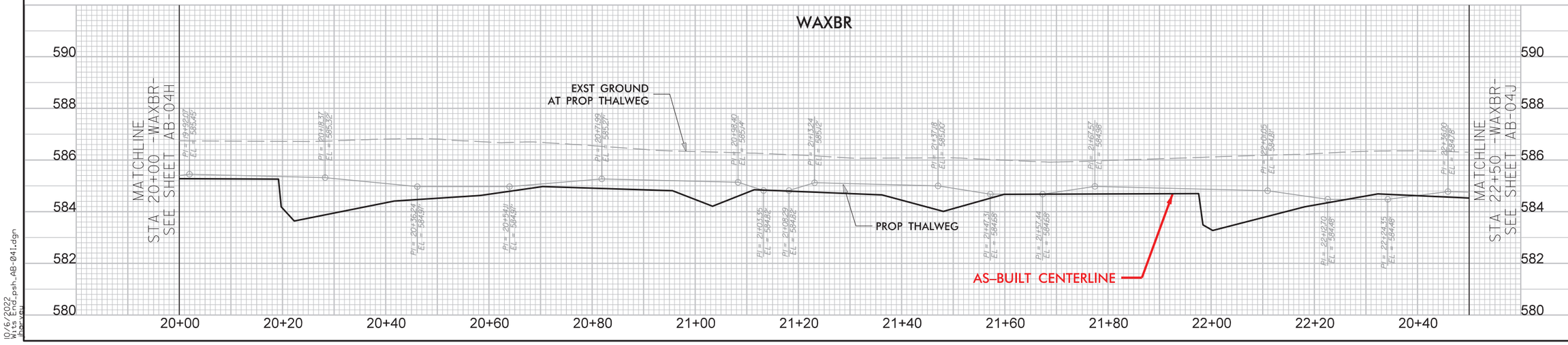
## RECORD DRAWING

### -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 427,164.29 | 1,567,092.55 | 585.32 | 585.26 |
| CROSS VANE | 427,013.11 | 1,567,058.27 | 584.81 | 584.70 |

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TEL 919.851.9545
ENG FIRM LICENSE NO. C-3890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURE**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-041
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–04I***



10/6/2022
Wits End_psh_AB-041.dgn
jharvey

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,876.87 | 1,567,093.83 | 584.23 | 584.32 |
| CROSS VANE | 426,853.19 | 1,567,139.76 | 583.99 | 583.91 |

20' 10' 0 20' 40'
SCALE: 1" = 20'
NAD 83

**RECORD DRAWING**

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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~NOW OR FORMERLY~
WITS END FARM LLC
DB 4568/779
PID 04006015
TITLE COMMITMENT TRACT 2
83.434 AC.
(NET OVERLAP)

PROP BANKFULL
LIMITS OF GRADING
23+00 -WAXBR-
24+00 -WAXBR-
MATCHLINE STA 22+50 -WAXBR- SEE SHEET AB-041
MATCHLINE STA 25+00 -WAXBR- SEE SHEET AB-04K
584
585
587
PROP CROSS VANE (TYP)
PROP BANKFULL
LIMITS OF GRADING

WAXBR

EXST GROUND AT PROP THALWEG
PROP THALWEG
AS-BUILT CENTERLINE

590
588
586
584
582
580

22+60 22+80 23+00 23+20 23+40 23+60 23+80 24+00 24+20 24+40 24+60 24+80 25+00

10/6/2022
Wits End_psh_AB-04J.dgn
jharvell

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RALEIGH, NORTH CAROLINA 27606
PH: (919) 859-1353
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04J
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–04J***

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,750.37 | 1,567,184.71 | 583.23 | 583.17 |
| CROSS VANE | 426,668.53 | 1,567,243.34 | 582.34 | 582.29 |
| CROSS VANE | 426,620.77 | 1,567,260.71 | 581.81 | 581.71 |
| CROSS VANE | 426,577.27 | 1,567,284.60 | 581.49 | 581.32 |

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83

**RECORD DRAWING**

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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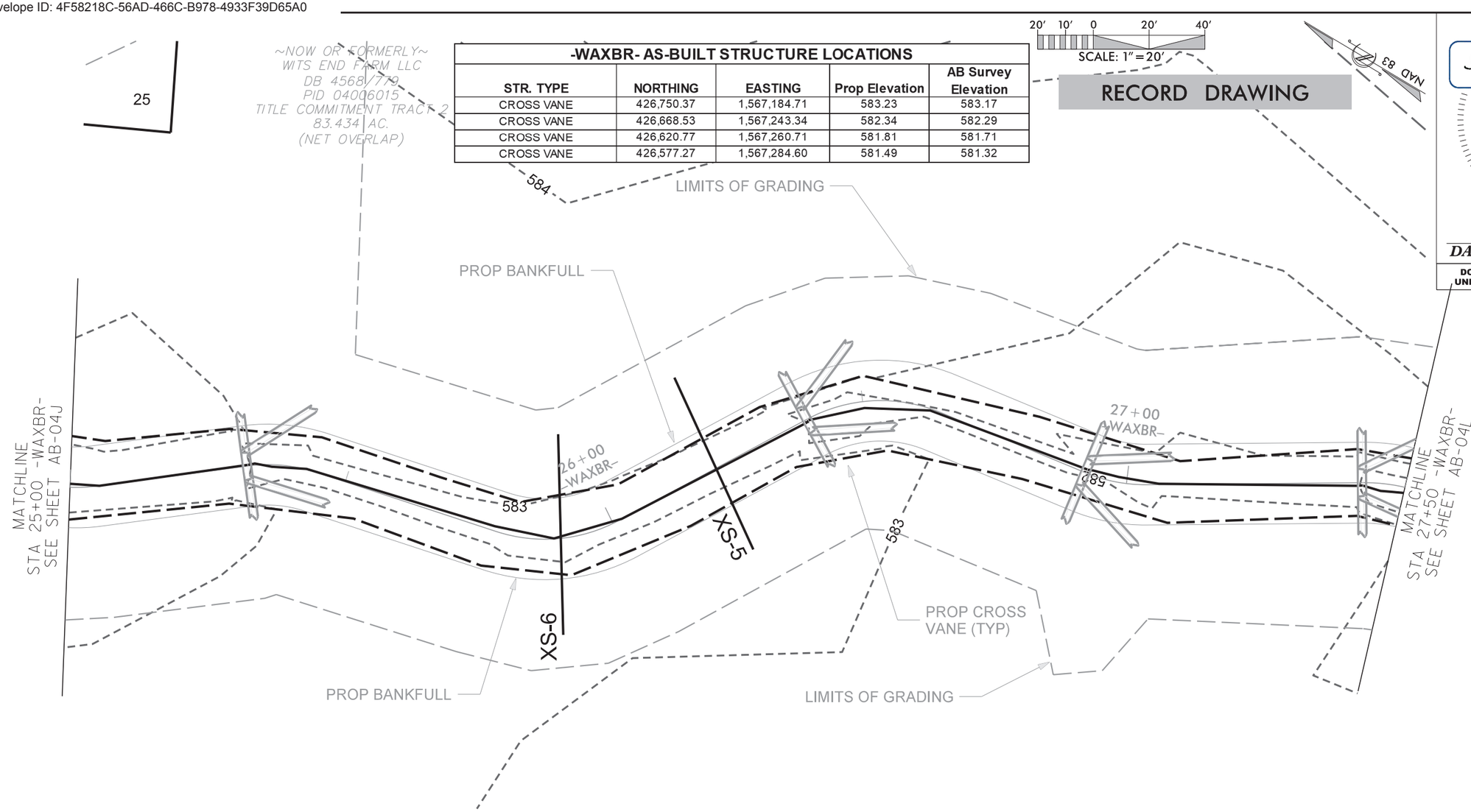


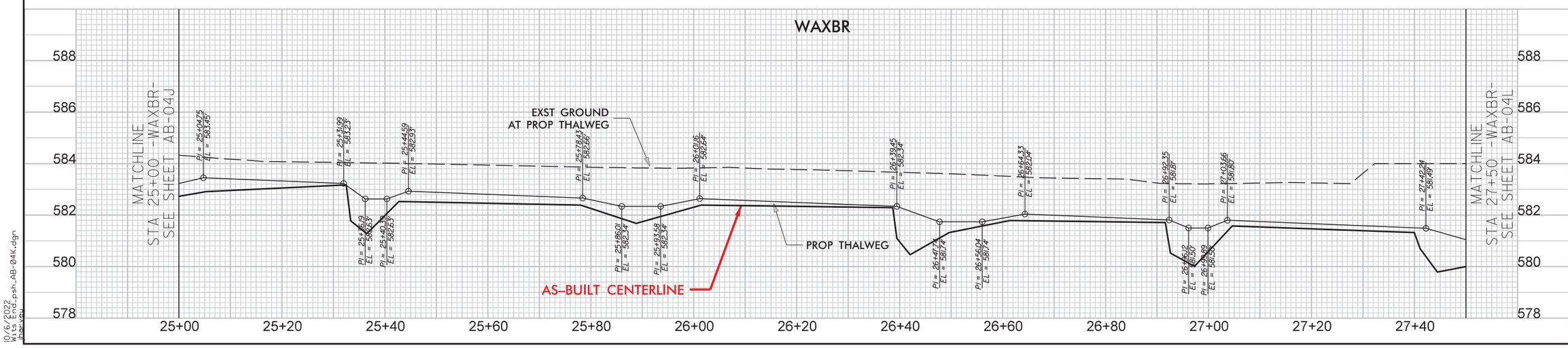


10/6/2022
Wits End_psh_AB-04K.dgn
jharvell

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

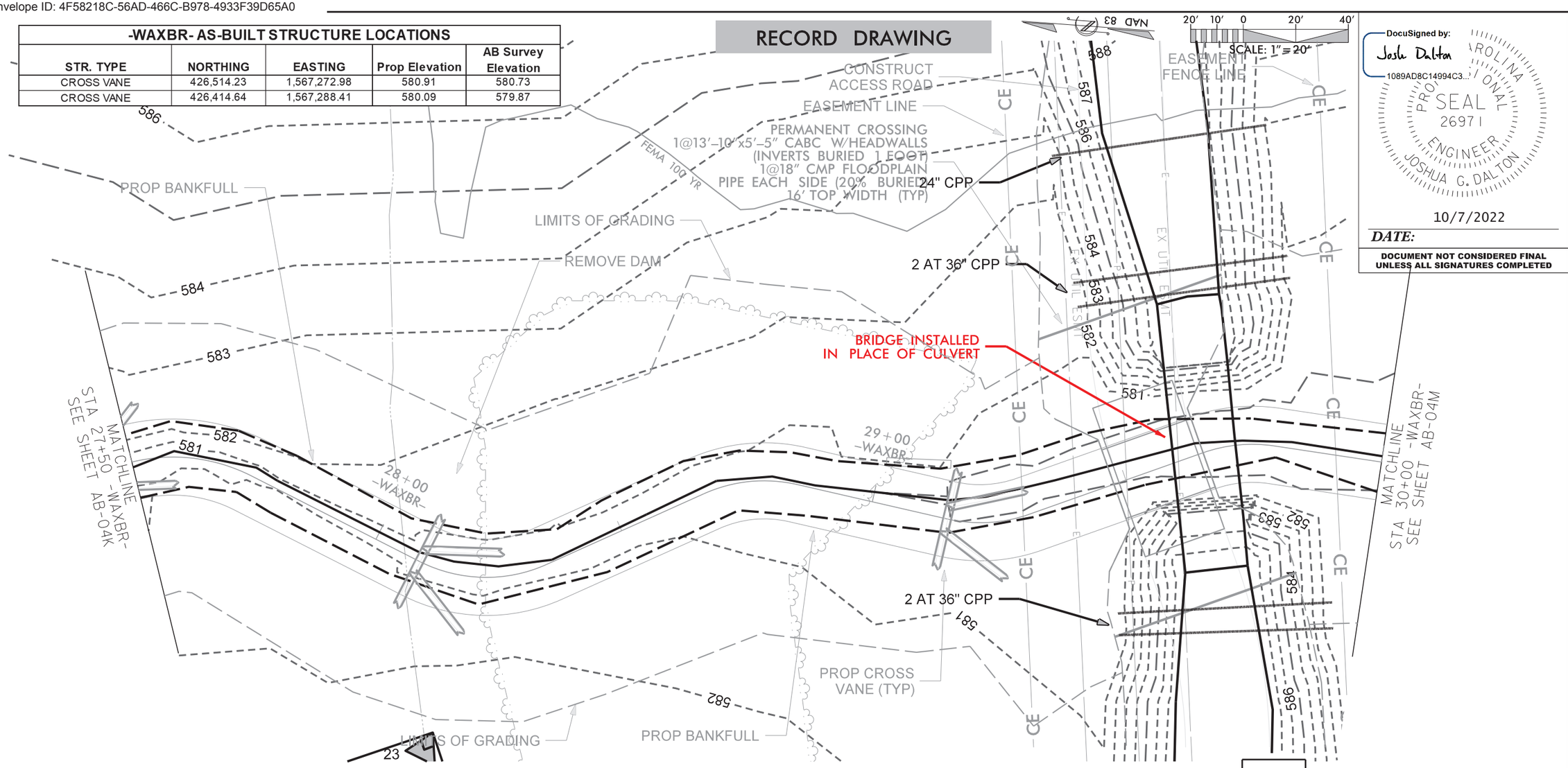
**AS-BUILT STRUCTURES**

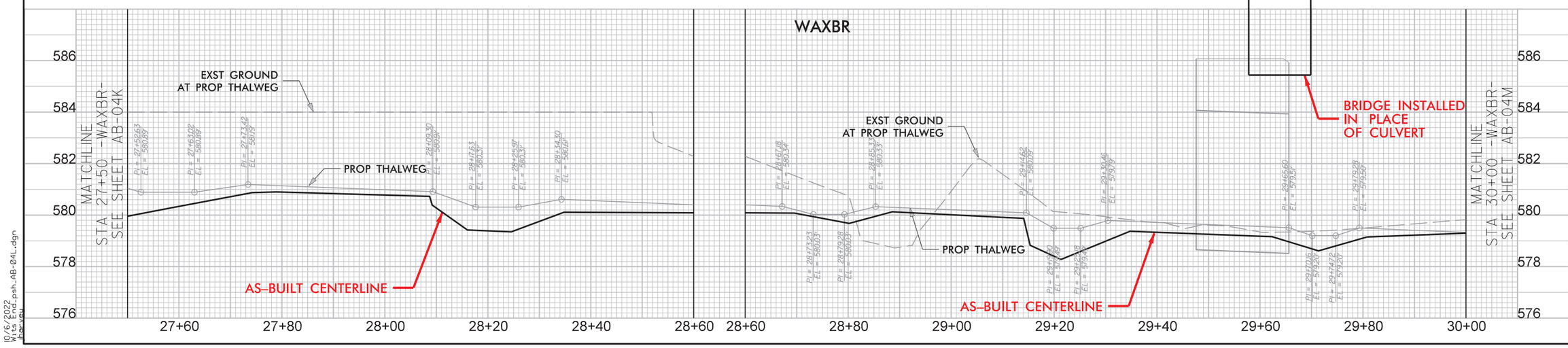
| | |
|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB-04K |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04K*** |

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,514.23 | 1,567,272.98 | 580.91 | 580.73 |
| CROSS VANE | 426,414.64 | 1,567,288.41 | 580.09 | 579.87 |

**RECORD DRAWING**




DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA C. DALTON

10/7/2022

**DATE:**

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RALEIGH, NORTH CAROLINA 27606
PH: 919.851.1444
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
UNION COUNTY, NC

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04L
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB-04L**

10/6/2022
Wits End_psh_AB-04L.dgn
jharvell

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,296.67 | 1,567,309.58 | 579.08 | 579.07 |

20′ 10′ 0 20′ 40′
SCALE: 1" = 20′

NAD 83

**RECORD DRAWING**

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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FEMA 100 YR
582
MOVE ACCESS ROAD TO UNDER POWER LINE
581
LIMITS OF GRADING
EX ASPH DWY
PROP CROSS VANE (TYP)
PROP BANKFULL
REMOVE
24" RCP
MATCHLINE STA 30+00 -WAXBR- SEE SHEET AB-04L
31+00 -WAXBR-
579
32+00 -WAXBR-
MATCHLINE STA 32+50 -WAXBR- SEE SHEET AB-04N
22
LIMITS OF GRADING
PROP BANKFULL
STREAM PLUG
LIMITS OF GRADING
FILL EXISTING CHANNEL

### WAXBR

EXST GROUND AT PROP THALWEG
PROP THALWEG
AS-BUILT CENTERLINE
MATCHLINE STA 30+00 -WAXBR- SEE SHEET AB-04L
MATCHLINE STA 32+50 -WAXBR- SEE SHEET AB-04N

584
582
580
578
576
574

30+00 30+20 30+40 30+60 30+80 31+00 31+20 31+40 31+60 31+80 32+00 32+20 32+40

SUNGATE DESIGN GROUP, P.A.
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PHONE (919) 859-1363
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

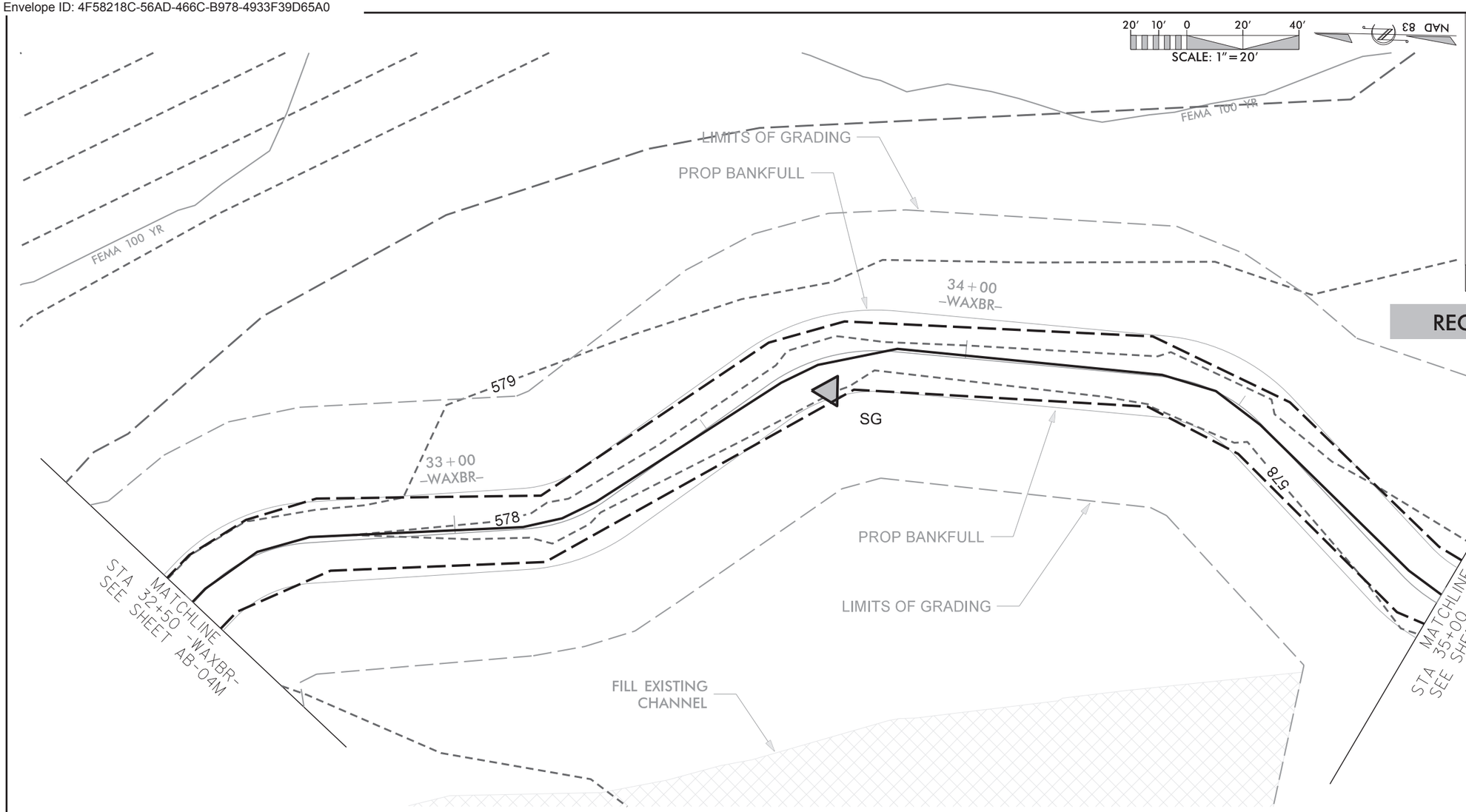
**AS-BUILT STRUCTURES**

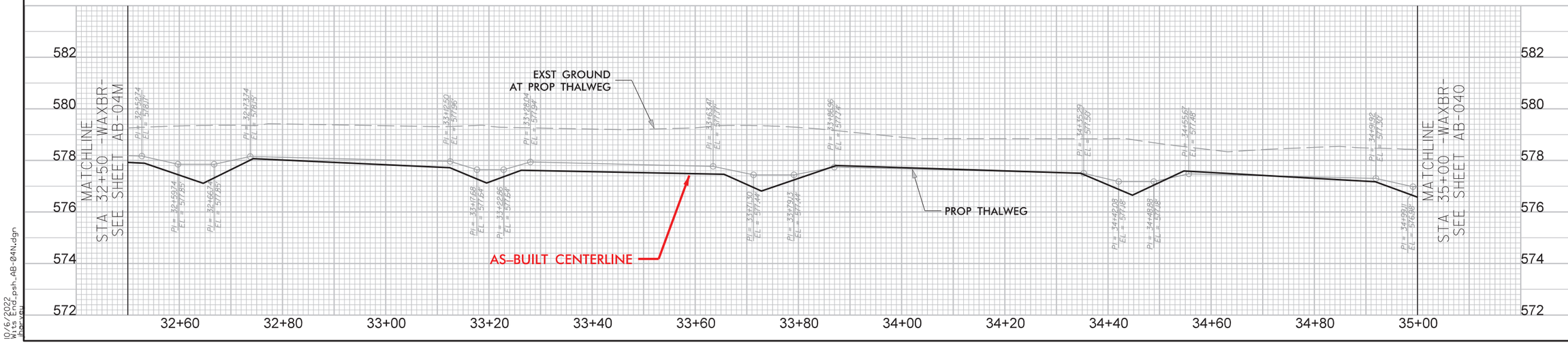
PROJECT # : I221-20024
DRAWING NAME: WITS END PSH AB-04M
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–04M***



10/6/2022
Wits End_psh_AB-04M.dgn
Jarvis




DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL ENGINEER SEAL 26971 JOSHUA G. DALTON

10/7/2022

**DATE:**

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**RECORD DRAWING**

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.1353
ENG FIRM LICENSE NO. C-890

Avlorn Environmental, Inc.

**WITS END**
UNION COUNTY, NC

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04N
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04N**



10/6/2022
Wits End_psh_AB-04N.dgn
Jarvis

SCALE: 1" = 20'

NAD 83

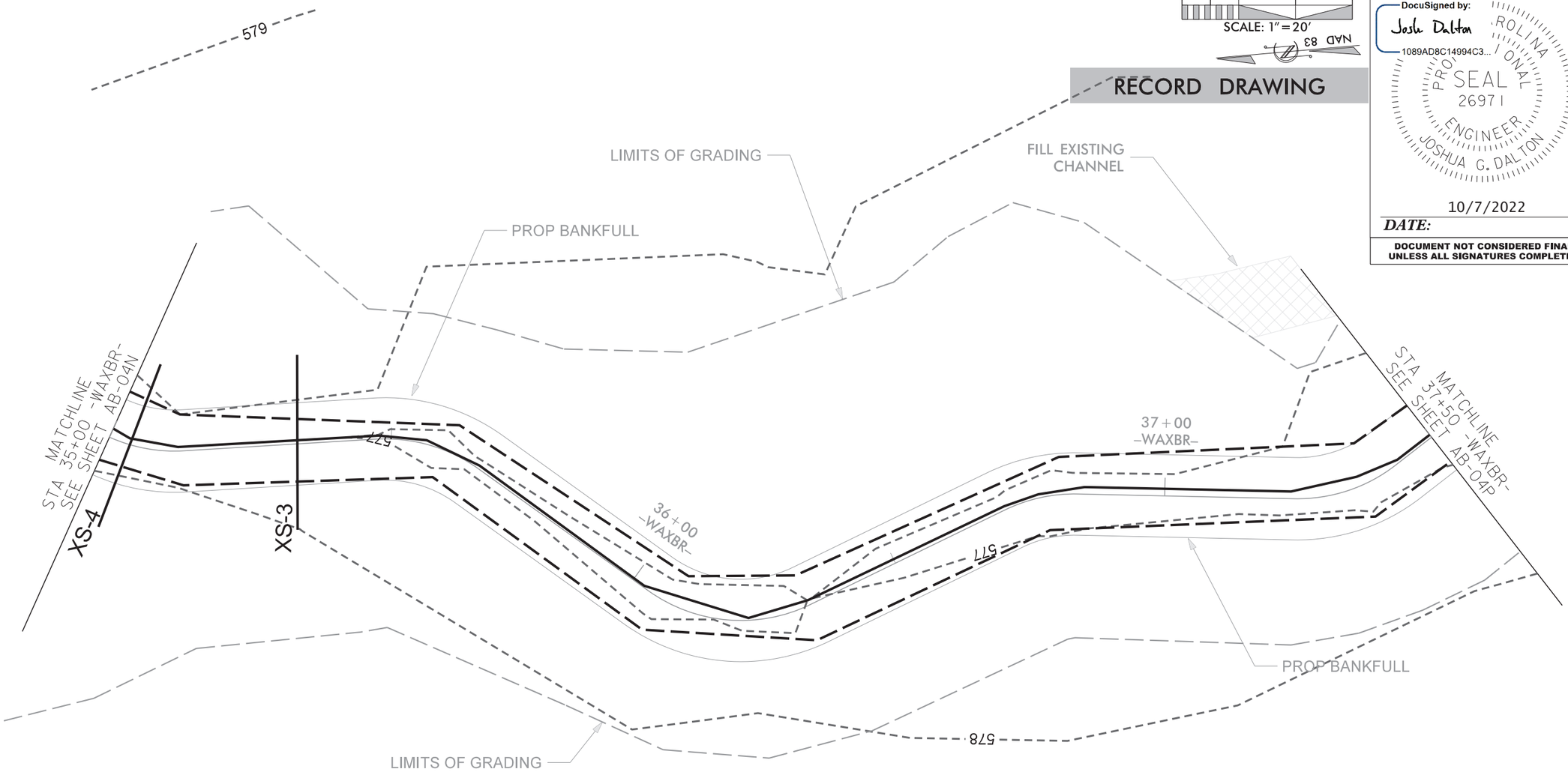
**RECORD DRAWING**

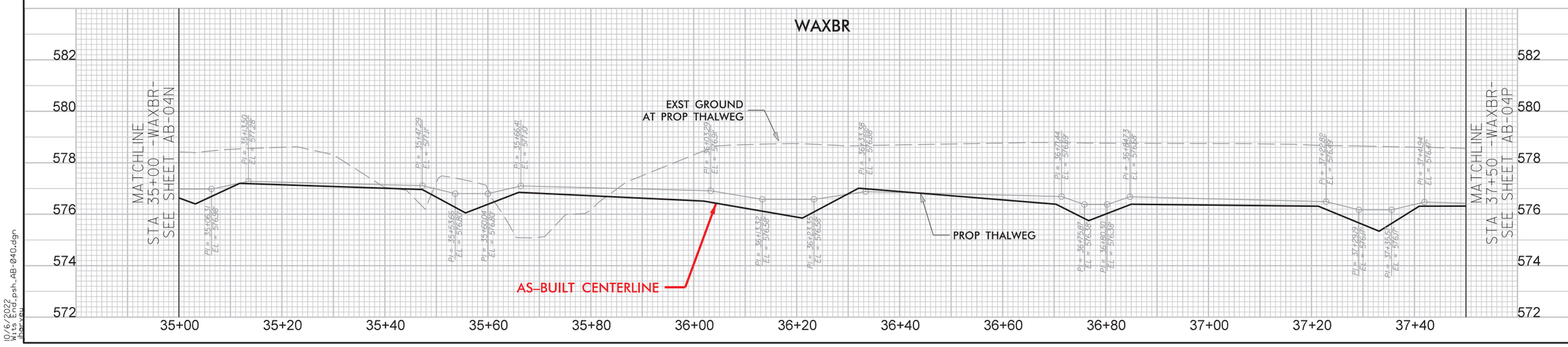
DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**




**SUNGATE DESIGN GROUP, P.A.**
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.9263
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-040 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–040*** |

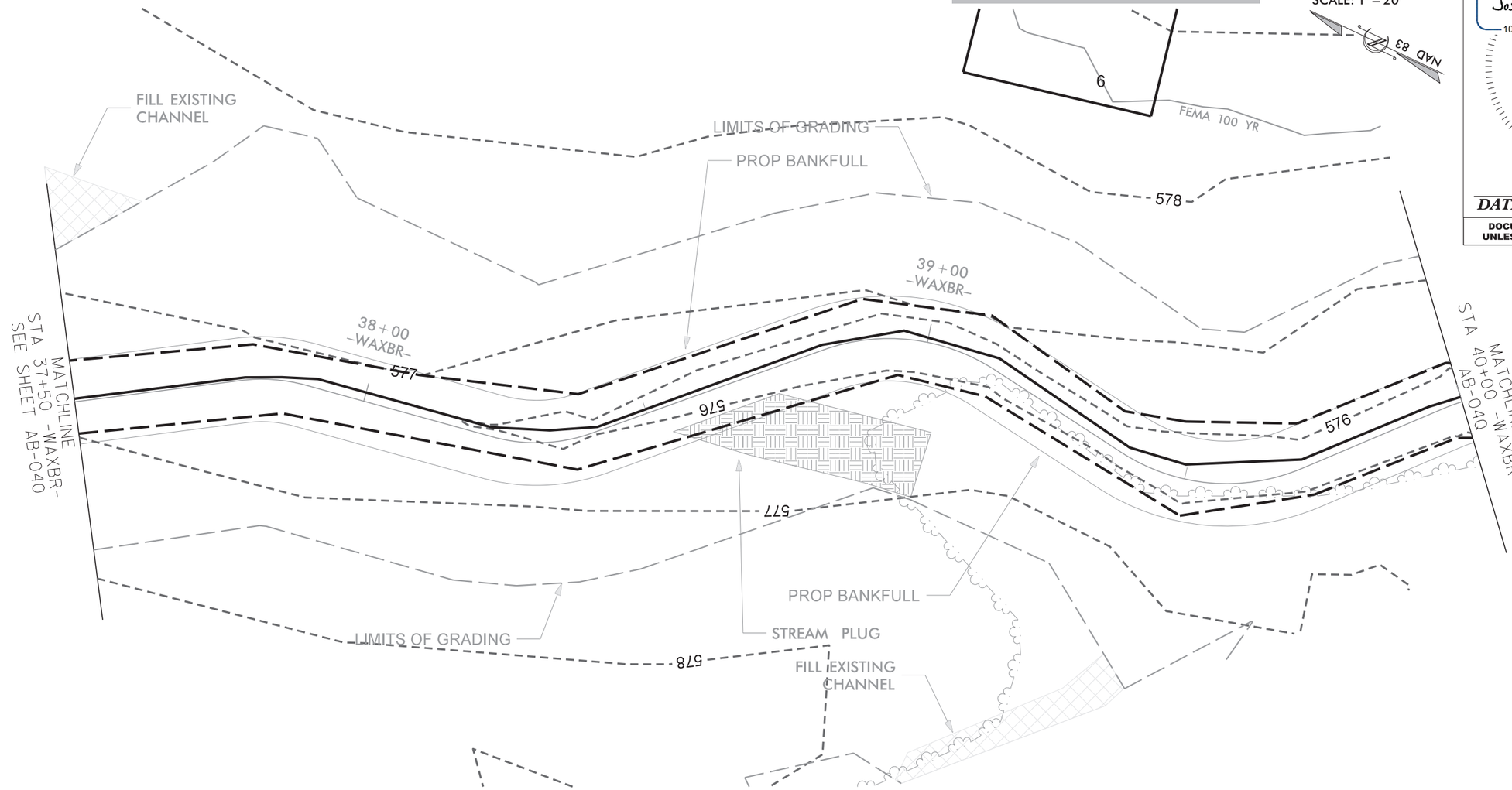


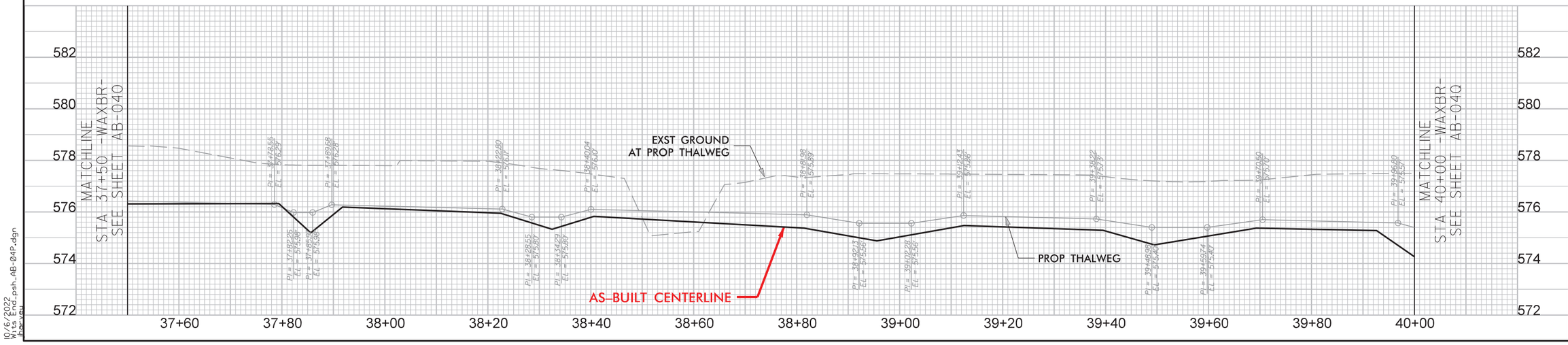
10/6/2022
Wits End_psh_AB-040.dgn
jharvell

RECORD DRAWING

SCALE: 1" = 20'

NAD 83




DocuSigned by: Josh Dalton
1089AD8C14994C3...

PROFESSIONAL ENGINEER SEAL 26971 JOSHUA G. DALTON

10/7/2022

**DATE:**

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.1353
ENG FIRM LICENSE NO. C-3590

Avlorn Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

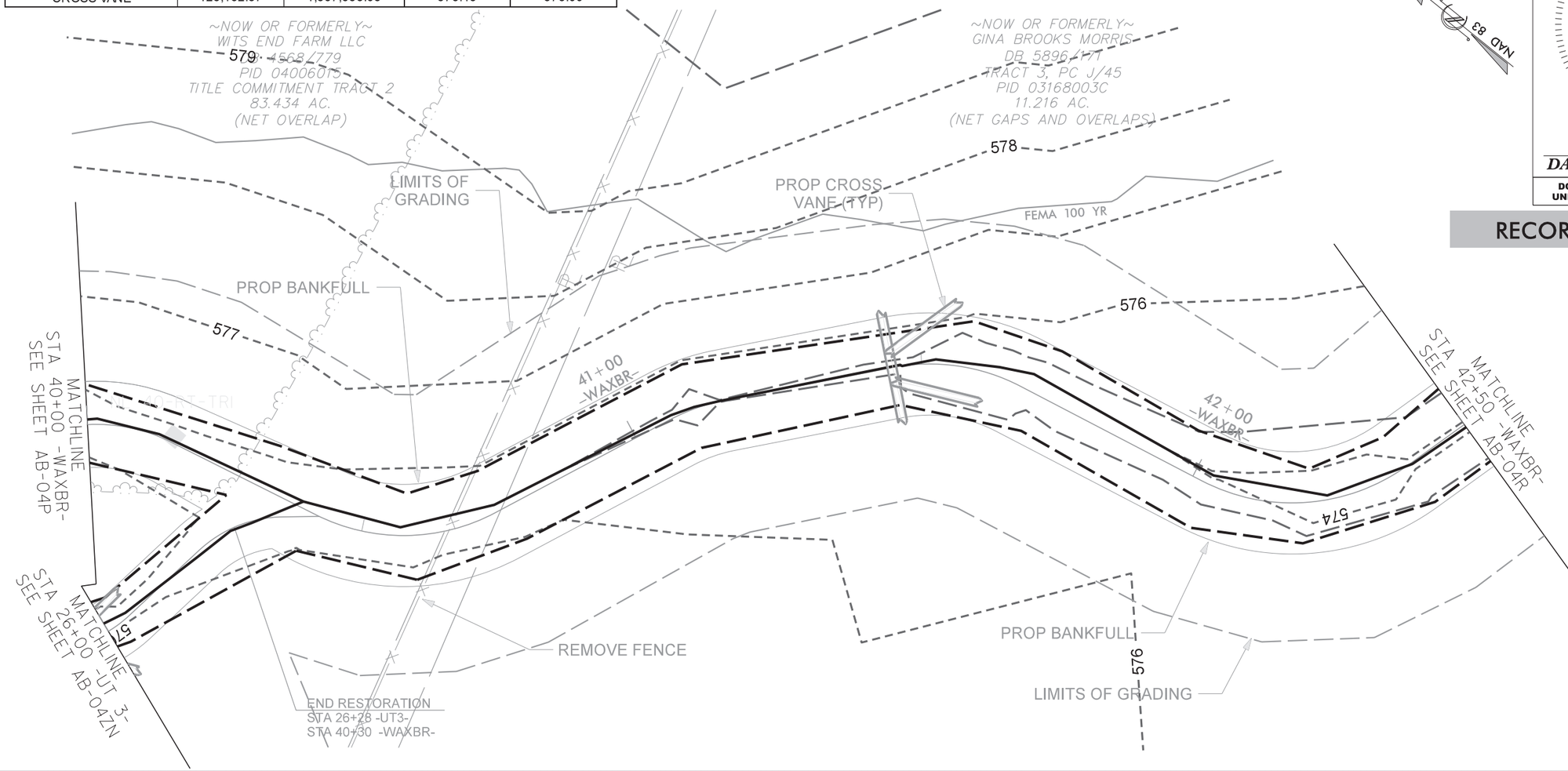
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04P
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

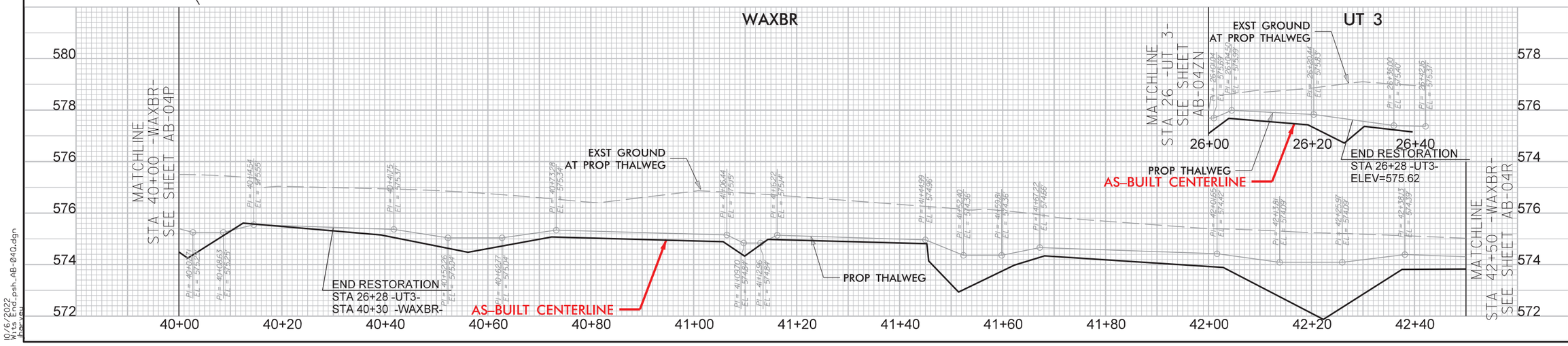
SHEET NO.
**AB–04P**

10/6/2022
Wits End_psh_AB-04P.dgn
Parker

## -WAXBR- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,269.54 | 1,567,651.67 | 574.17 | 573.85 |
| CROSS VANE | 425,162.87 | 1,567,688.08 | 573.43 | 573.00 |




SCALE: 1" = 20'

NAD 83

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA C. DALTON

10/7/2022

**DATE:**

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**RECORD DRAWING**

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RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.9545
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-040
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04Q**



10/6/2022
Wits End_psh_AB-040.dgn
jharvell

RECORD DRAWING

SCALE: 1" = 20'

NAD 83

~NOW OR FORMERLY~
GINA BROOKS MORRIS
DB 5896/171
TRACT 3, PC J/45
PID 03168003C
11.216 AC.
(NET GAPS AND OVERLAPS)

POND DAMS TO BE RECONTOURED APPROXIMATELY LEVEL WITH THE SURROUNDING FLOODPLAIN. A SMALL VERNAL DEPRESSION WILL BE LEFT FOR AQUATIC SPECIES HABITAT. POTENTIAL PONDING AREA DEPTH MUST BE SET BETWEEN 0.5-1.0 FOOT.

PROP CROSS VANE (TYP)

LIMITS OF GRADING

PROP BANKFULL

FEMA 100 YR

43+00 -WAXBR-

44+00 -WAXBR-

577

574

573

MATCHLINE STA 42+50 -WAXBR- SEE SHEET AB-04Q

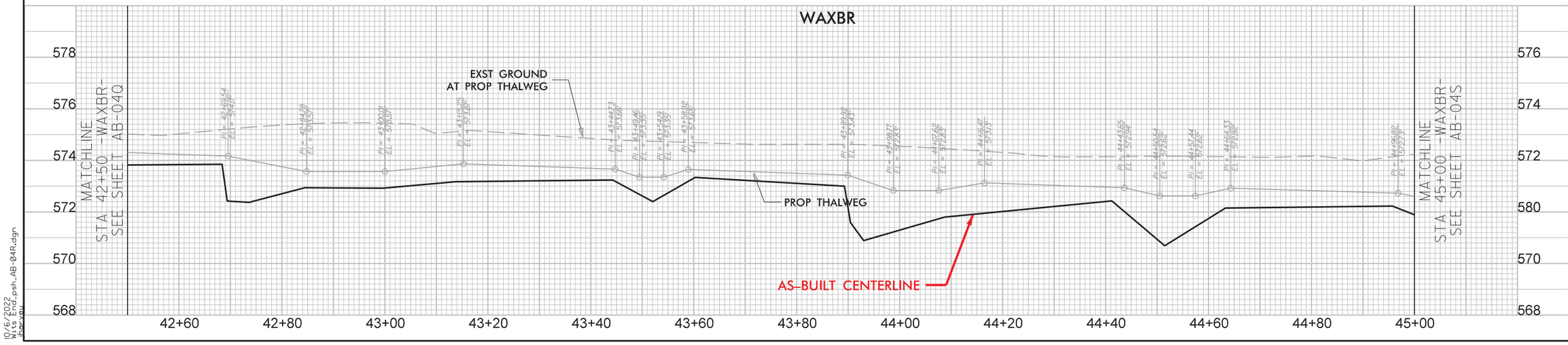
MATCHLINE STA 45+00 -WAXBR- SEE SHEET AB-04S

PROP BANKFULL

574

PROP BANKFULL

| -WAXBR- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 425,269.54 | 1,567,651.67 | 574.17 | 573.85 |
| CROSS VANE | 425,162.87 | 1,567,688.08 | 573.43 | 573.00 |




DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

DATE:

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1183
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



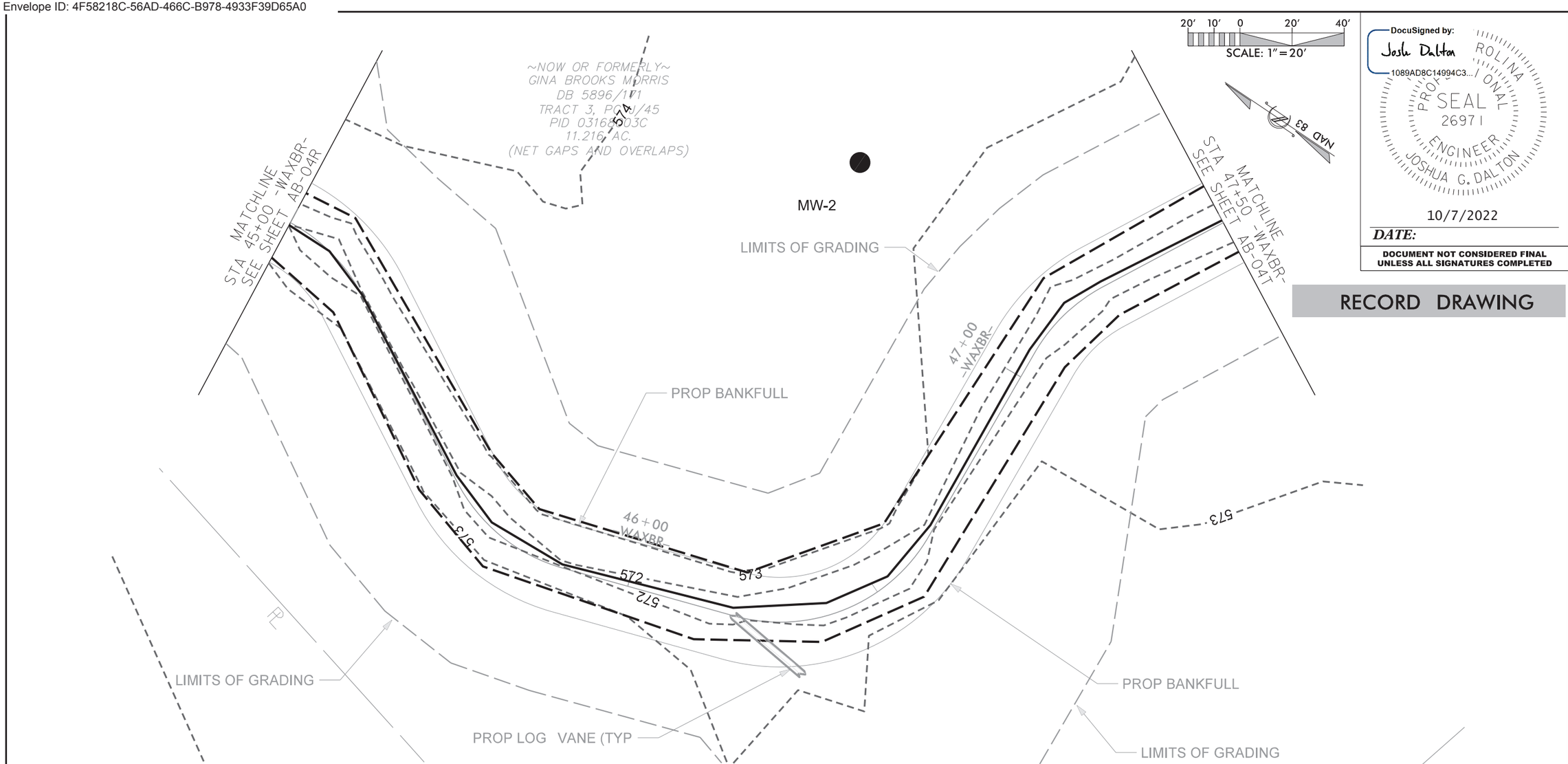
WITS END
UNION COUNTY, NC

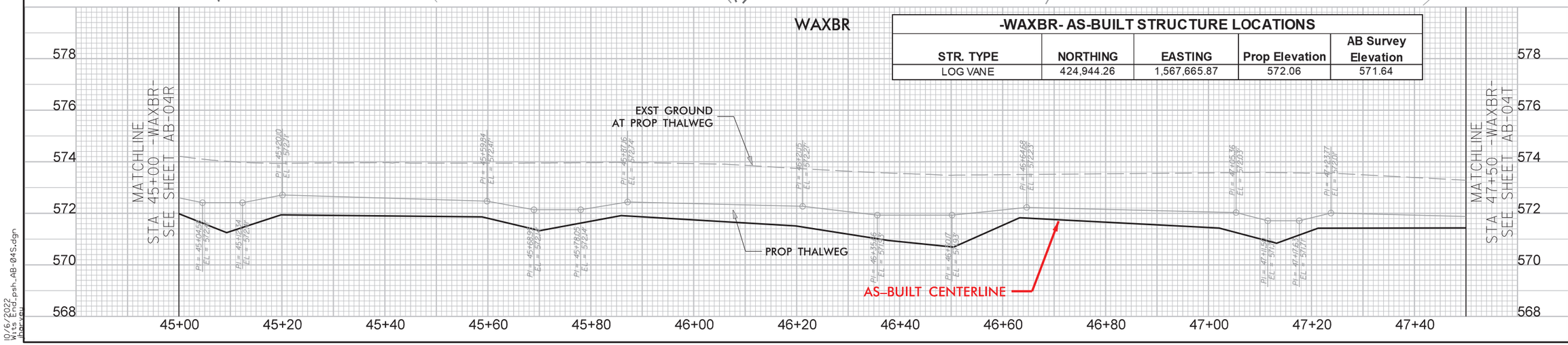
AS-BUILT STRUCTURES

PROJECT # : 121-20024
DRAWING NAME: WITS END PSH AB-04R
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. AB-04R

10/6/2022
Wits End_psh_AB-04R.dgn
jharvell




**-WAXBR- AS-BUILT STRUCTURE LOCATIONS**

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| LOG VANE | 424,944.26 | 1,567,665.87 | 572.06 | 571.64 |

DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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**RECORD DRAWING**

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.1353
ENG FIRM LICENSE NO. C-3590

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04S
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–04S***

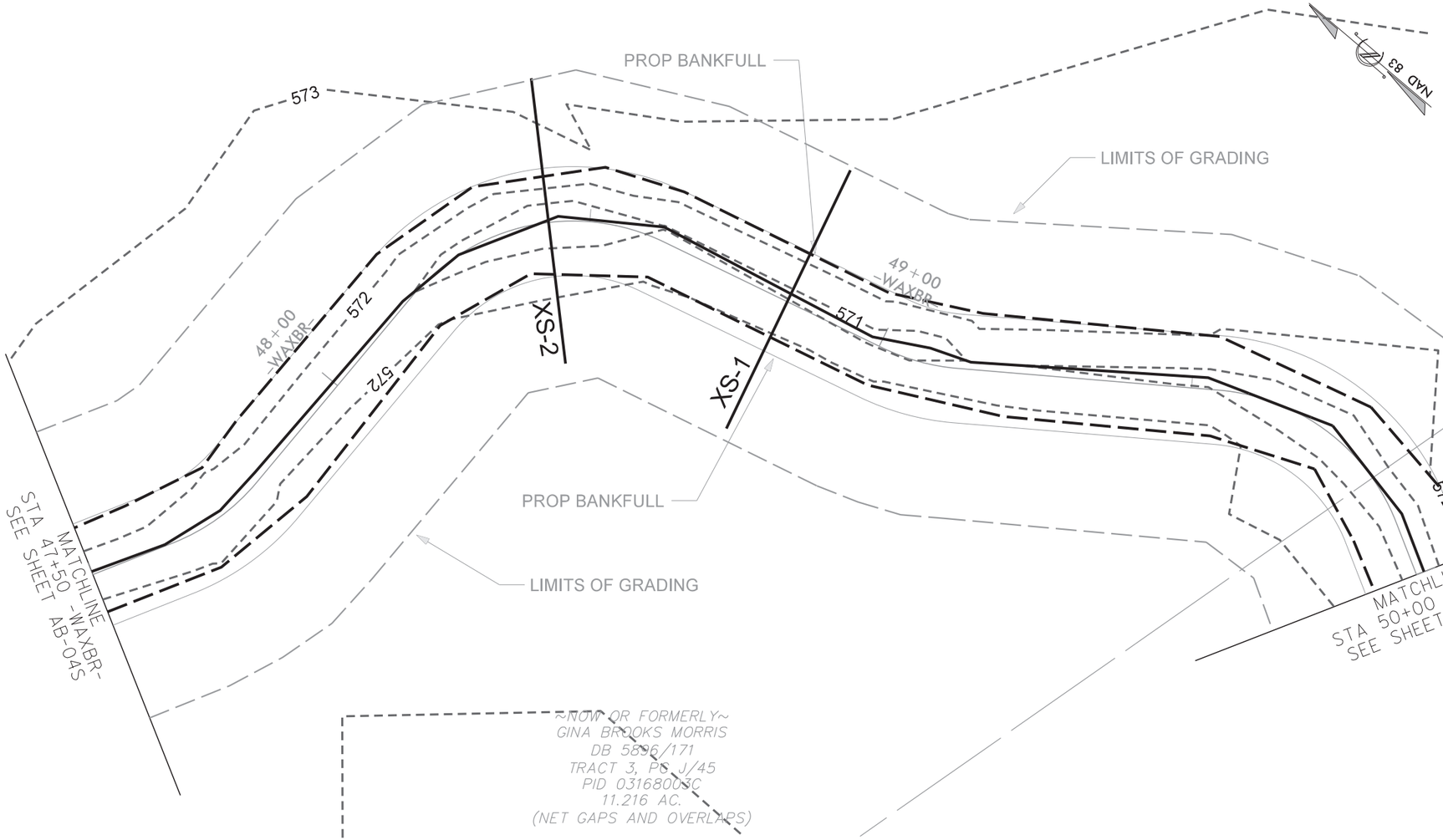


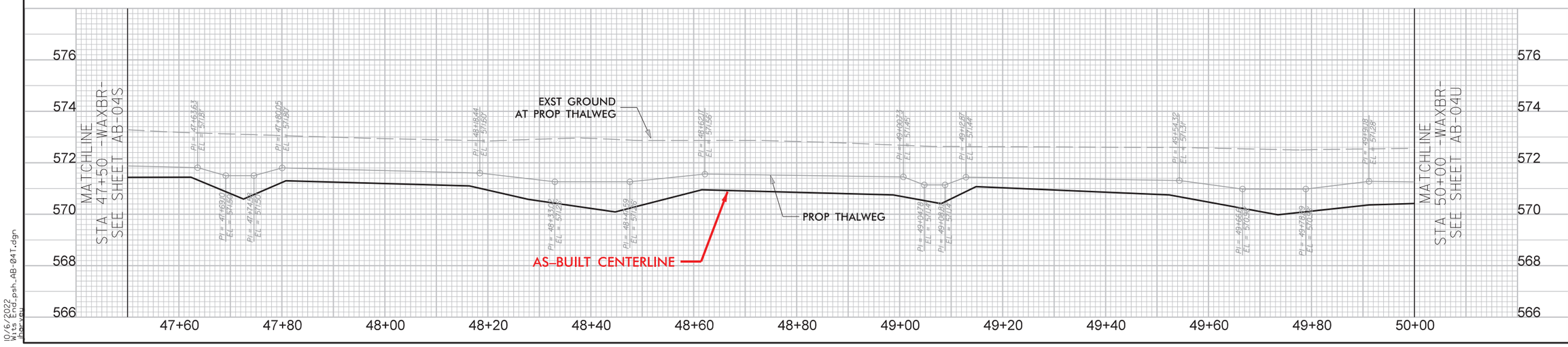
10/6/2022
Wits End_psh_AB-04S.dgn
Jarvis

RECORD DRAWING

SCALE: 1" = 20'

NAD 83




DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.0523
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04T |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | **AB–04T** |

10/6/2022
Wits End_psh_AB-04T.dgn
jharvey

RECORD DRAWING

20' 10' 0 20' 40'
SCALE: 1" = 20'
NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
DATE:

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~NOW OR FORMERLY~
BIBI MARIAM NIAZI-SAI REVOCABLE TRUST
DB 7073/202
TRACT 4, PC J/45
PID 03168003D

FILL EXISTING CHANNEL
STREAM PLUG
LIMITS OF GRADING
PROP BANKFULL
572
571
MATCHLINE STA 50+00 -WAXBR- SEE SHEET AB-04T
MATCHLINE STA 52+50 -WAXBR- SEE SHEET AB-04V
51+00 -WAXBR-
52+00 -WAXBR-
12+00 -UT 4-
MATCHLINE STA 11+90 -UT 4- SEE SHEET AB-04Z
END RESTORATION STA 12+20 -UT4- STA 51+24 -WAXBR-

WAXBR
UT 4
EXST GROUND AT PROP THALWEG
PROP THALWEG
AS-BUILT CENTERLINE
END RESTORATION STA 12+20 -UT4- ELEV=571.02
610
600
590
570
568
566
572
50+00
50+20
50+40
50+60
50+80
51+00
51+20
51+40
51+60
51+80
52+00
52+20
52+40
12+00
12+20
12+40

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1183
ENG FIRM LICENSE NO. C-3890

Axiom Environmental, Inc.

WITS END
UNION COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04U
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04U

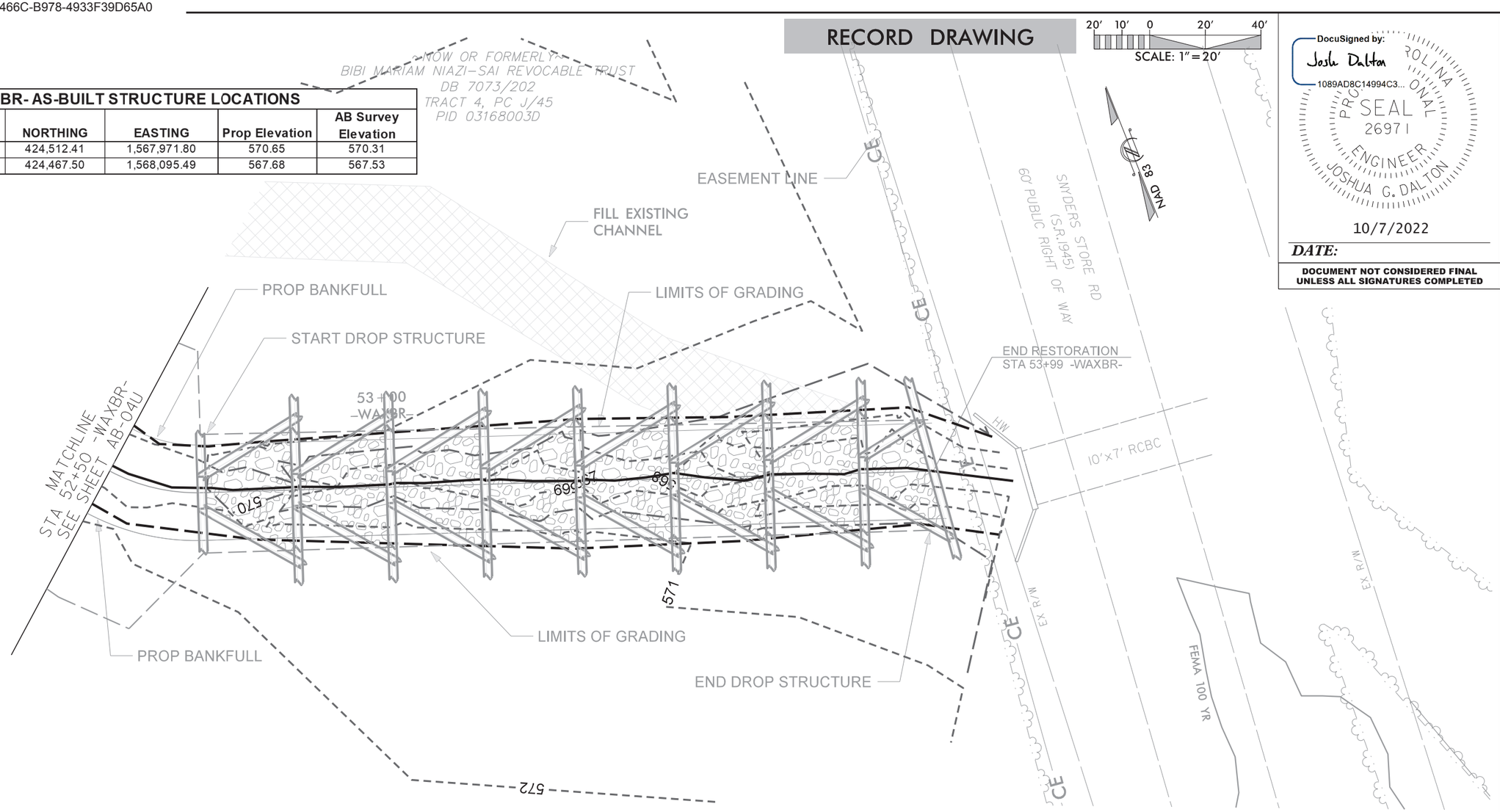


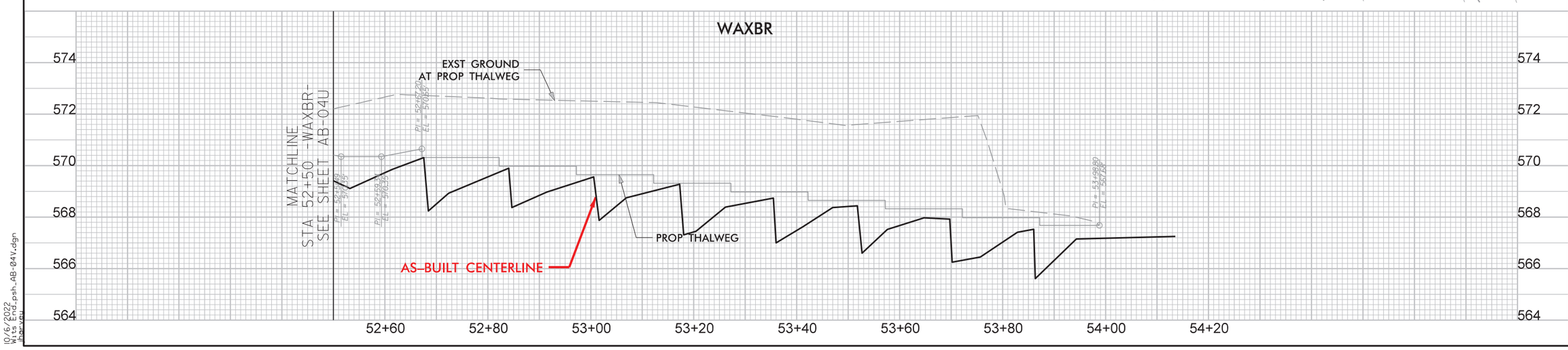
10/6/2022
Wits End_psh_AB-04U.dgn
Harvell

RECORD DRAWING

SCALE: 1" = 20'

| -WAXBR- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| DROP STRUCTURE | 424,512.41 | 1,567,971.80 | 570.65 | 570.31 |
| DROP STRUCTURE | 424,467.50 | 1,568,095.49 | 567.68 | 567.53 |




DocuSigned by: Josh Dalton
1089AD8C14994C3...

PROFESSIONAL ENGINEER SEAL 26971 JOSHUA G. DALTON

10/7/2022

***DATE:***

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.859.1353
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04V
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

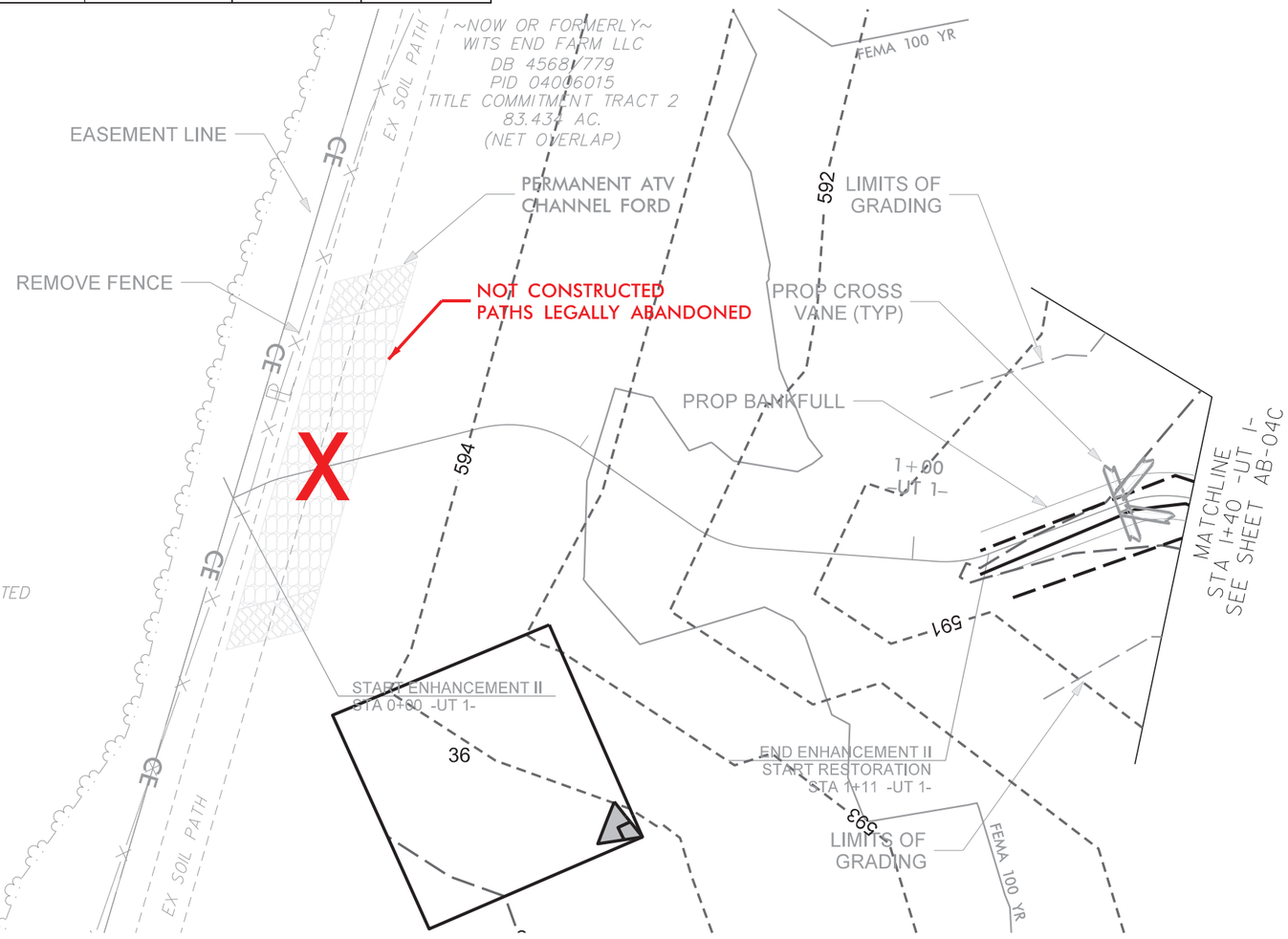
SHEET NO. ***AB-04V***

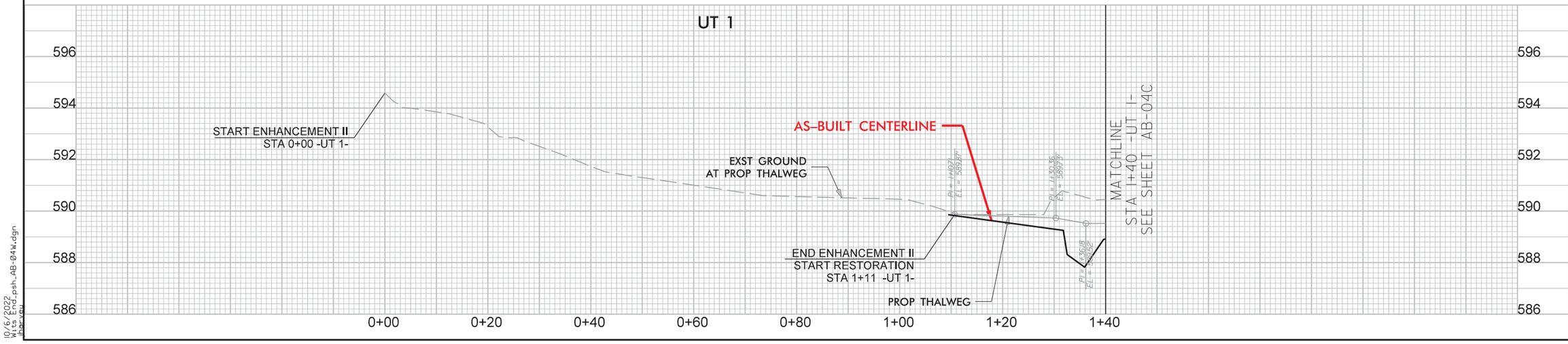


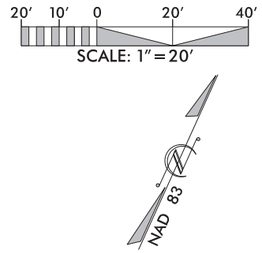
10/6/2022
Wits End_psh_AB-04V.dgn
jharvell

## -UT 1- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 428,061.74 | 1,566,506.76 | 589.73 | 589.25 |




DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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**RECORD DRAWING**

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.9545
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB-04W |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | AB–04W |



10/6/2022
Wits End_psh_AB-04W.dgn
Jarvis

# RECORD DRAWING

SCALE: 1" = 20'

NAD 83

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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~NOW OR FORMERLY~
ROGER L JAMES
CYNTHIA L JAMES
BK 4460 PG 790
PID 03168004A

EASEMENT LINE

CE

PL (GIS)

LIMITS OF GRADING

PROP BANKFULL

1+00 -UT 2-

2+00 -UT 2-

SG

MW-28

START RESTORATION
STA 0+00 -UT 2-

~NOW OR FORMERLY~
MAX SHELTON BROOKS
SARAH S BROOKS
NO DEED LISTED
PID 03168004

MATCHLINE
STA 2+50 -UT 2-
SEE SHEET AB-04Y

XS-28

59

30

595

596

597

598

599

## UT 2

EXST GROUND AT PROP THALWEG

START RESTORATION
STA 0+00 -UT 2-

AS-BUILT CENTERLINE

PROP THALWEG

MATCHLINE
STA 2+50 -UT 2-
SEE SHEET AB-04Y

600
598
596
594
592
590

0 20 40 60 80 1+00 1+20 1+40 1+60 1+80 2+00 2+20 2+40

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1003
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 121-20024
DRAWING NAME: WITS END PSH AB-04X
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04X**



10/6/2022
Wits End_psh_AB-04X.dgn
jharvey

## -UT 2- AS-BUILT STRUCTURE LOCATIONS

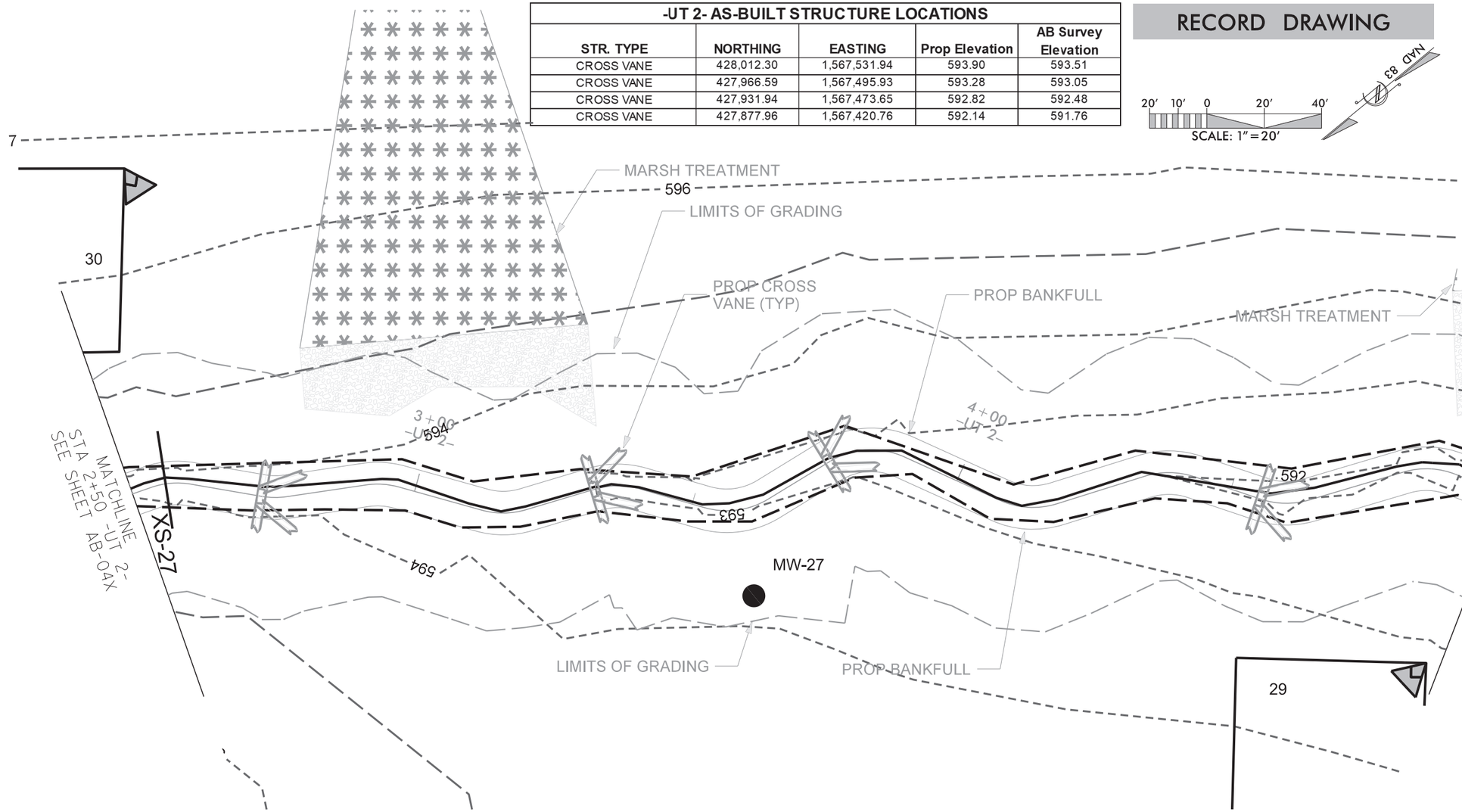
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 428,012.30 | 1,567,531.94 | 593.90 | 593.51 |
| CROSS VANE | 427,966.59 | 1,567,495.93 | 593.28 | 593.05 |
| CROSS VANE | 427,931.94 | 1,567,473.65 | 592.82 | 592.48 |
| CROSS VANE | 427,877.96 | 1,567,420.76 | 592.14 | 591.76 |

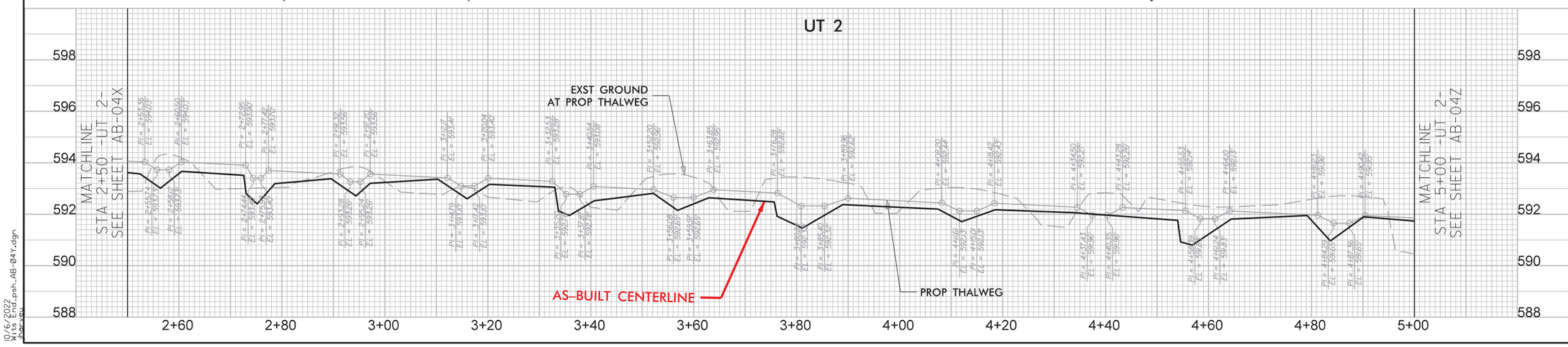
**RECORD DRAWING**

NAD 83

20′ 10′ 0 20′ 40′

SCALE: 1″=20′




DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL ENGINEER SEAL 26971 JOSHUA C. DALTON

10/7/2022

***DATE:***

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.1415
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB-04Y |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04Y*** |



10/6/2022
Wits End_psh_AB-04Y.dgn
Harvey

RECORD DRAWING

SCALE: 1" = 20'

NAD 83

~NOW OR FORMERLY~
MAX SHELTON BROOKS
SARAH S BROOKS
NO DEED LISTED
PID 03168004

EASEMENT LINE

LIMITS OF GRADING

PROP CROSS VANE (TYP)

MARSH TREATMENT

CROSS VANE LOCATION ADJUSTED TO BE INSIDE EASEMENT

PROP BANKFULL

6+00 -UT 2-

7+00 -UT 2-

MATCHLINE STA 5+00 -UT 2- SEE SHEET AB-04Y

MATCHLINE STA 5+00 -UT 2- SEE SHEET AB-04ZA

PERMANENT CHANNEL FORD

REMOVE FENCE

EX SOIL PATH

FEMA 100 YR

NOT CONSTRUCTED PATHS LEGALLY ABANDONED

LIMITS OF GRADING

PERMANENT ATV CHANNEL FORD

~NOW OR FORMERLY~
WITS END FARM LLC
LB 4568/779
PID 04006015
TITLE COMMITMENT TRACT 2
83.454 AC.
(NET OVERLAP)

| -UT 2- AS-BUILT STRUCTURE LOCATIONS | | | | | |
|---|---|---|---|---|---|
| | STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| | CROSS VANE | 427,788.29 | 1,567,354.13 | | 591.23 |
| 29 | CROSS VANE | 427,692.75 | 1,567,257.04 | 590.04 | 589.83 |
| | CROSS VANE | 427,678.12 | 1,567,235.86 | 589.68 | 589.37 |

UT 2

PROP THALWEG

EXST GROUND AT PROP THALWEG

AS-BUILT CENTERLINE

MATCHLINE STA 5+00 -UT 2- SEE SHEET AB-04Y

MATCHLINE STA 7+50 -UT 2- SEE SHEET AB-04ZA

10/6/2022
Wits End_psh_AB-04Z.dgn
Jarvis

DocuSigned by: Josh Dalton
1089AD8C14994C3...

10/7/2022

DATE:

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PHONE 919.859.1353
ENG FIRM LICENSE NO. C-2890

Axiom Environmental, Inc.

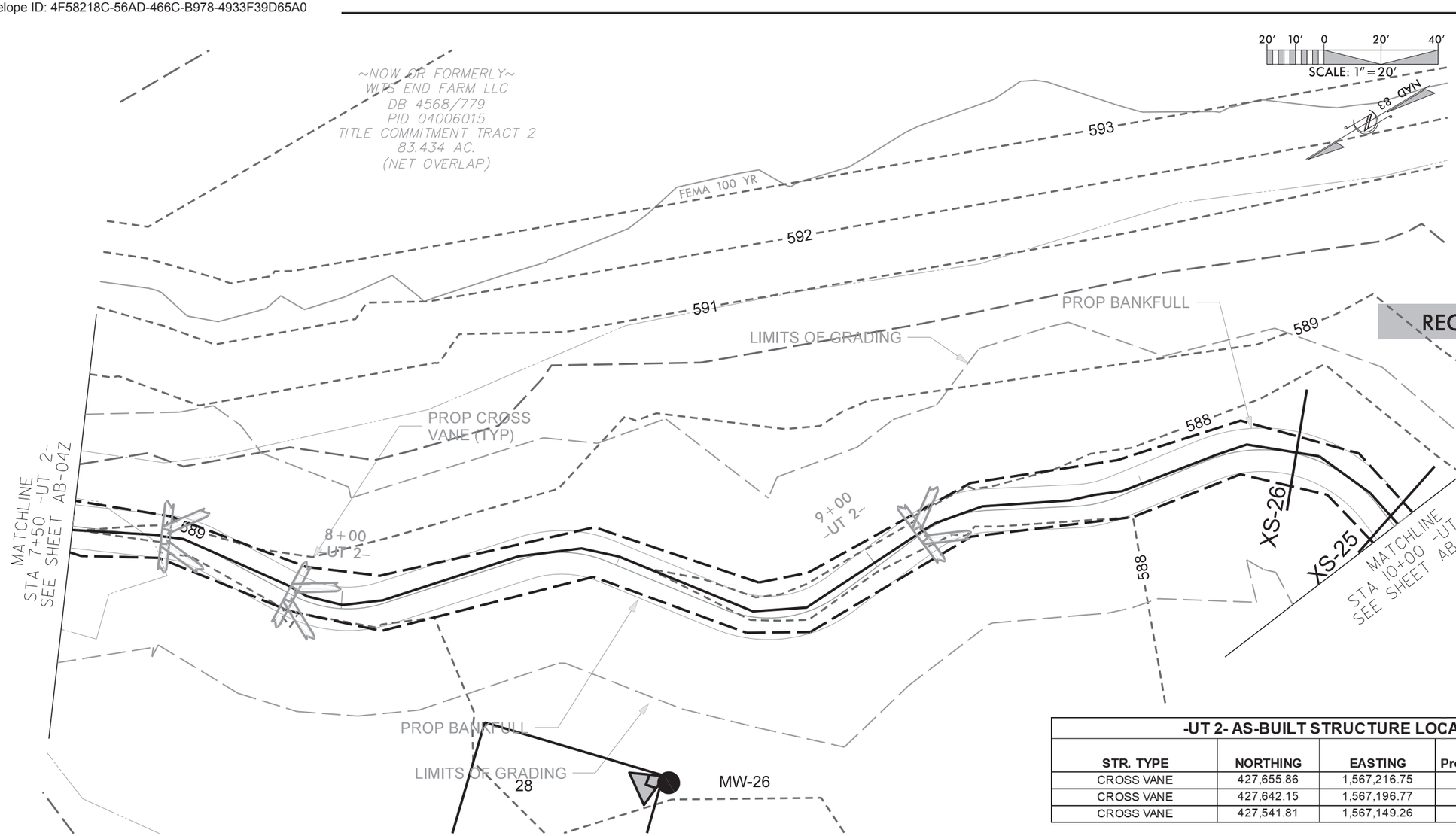


WITS END
UNION COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04Z
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. AB-04Z




20′ 10′ 0 20′ 40′

SCALE: 1″ = 20′

NAD 83

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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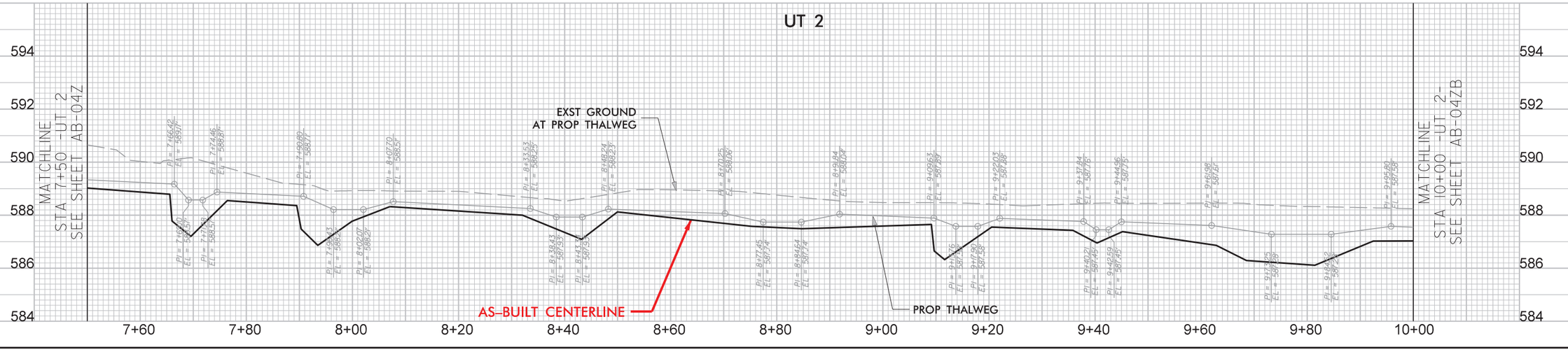
**RECORD DRAWING**

| -UT 2- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 427,655.86 | 1,567,216.75 | 589.17 | 588.79 |
| CROSS VANE | 427,642.15 | 1,567,196.77 | 588.71 | 588.36 |
| CROSS VANE | 427,541.81 | 1,567,149.26 | 587.89 | 587.65 |




SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
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TEL: 919.851.1563
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZA
DATE: 2021
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

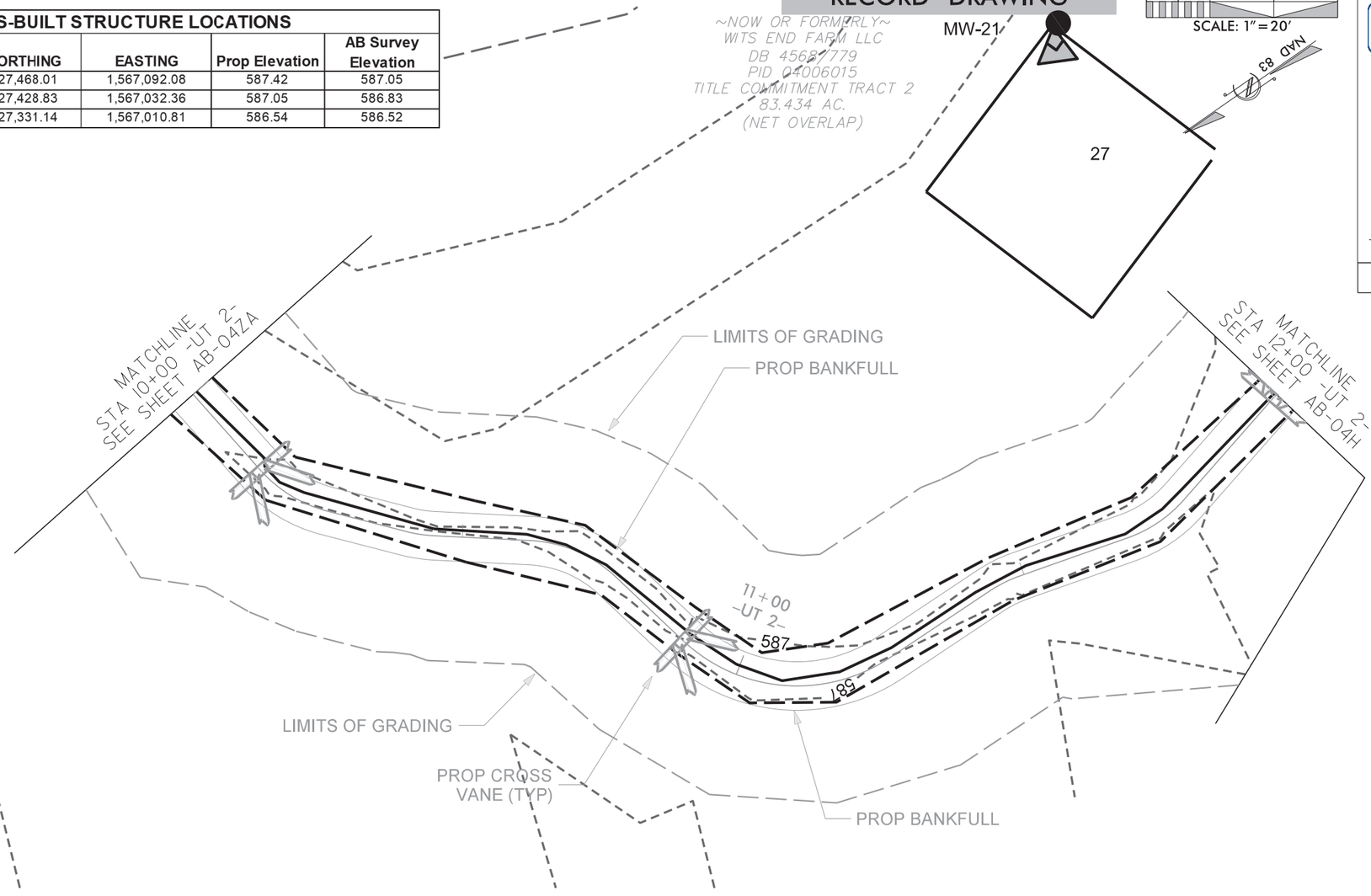
SHEET NO. ***AB–04ZA***

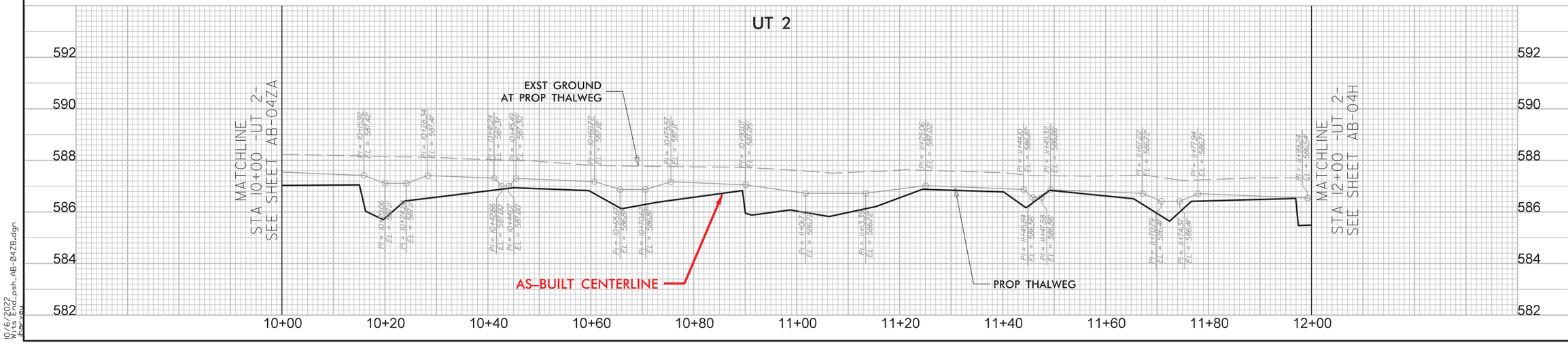


10/6/2022
Wits End_psh_AB-04ZA.dgn
jharvell

RECORD DRAWING

| -UT 2- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 427,468.01 | 1,567,092.08 | 587.42 | 587.05 |
| CROSS VANE | 427,428.83 | 1,567,032.36 | 587.05 | 586.83 |
| CROSS VANE | 427,331.14 | 1,567,010.81 | 586.54 | 586.52 |




DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

*DATE:*

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ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.

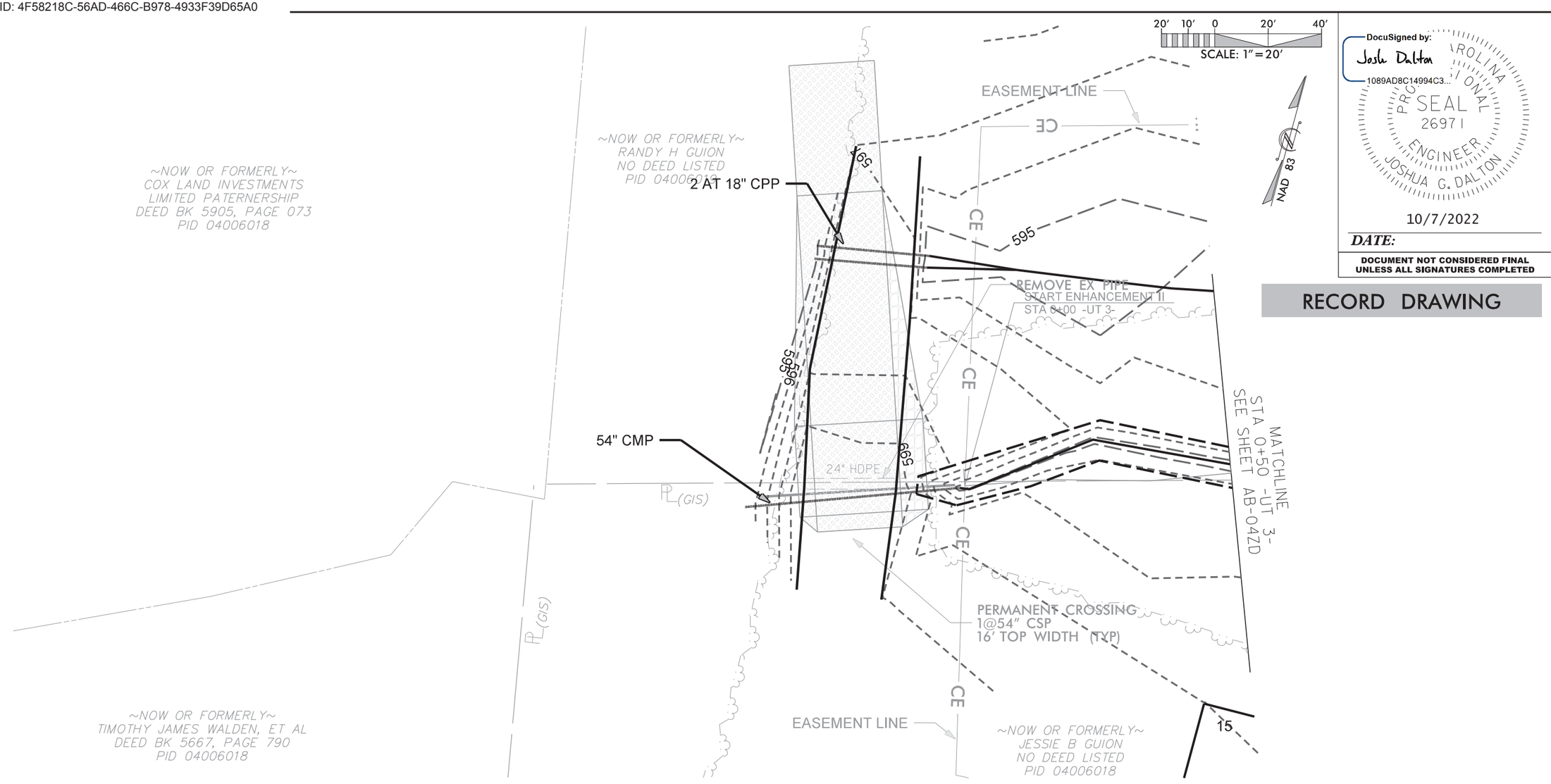


**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZB |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04ZB*** |

10/6/2022
Wits End_psh_AB-04ZB.dgn
jharvey




DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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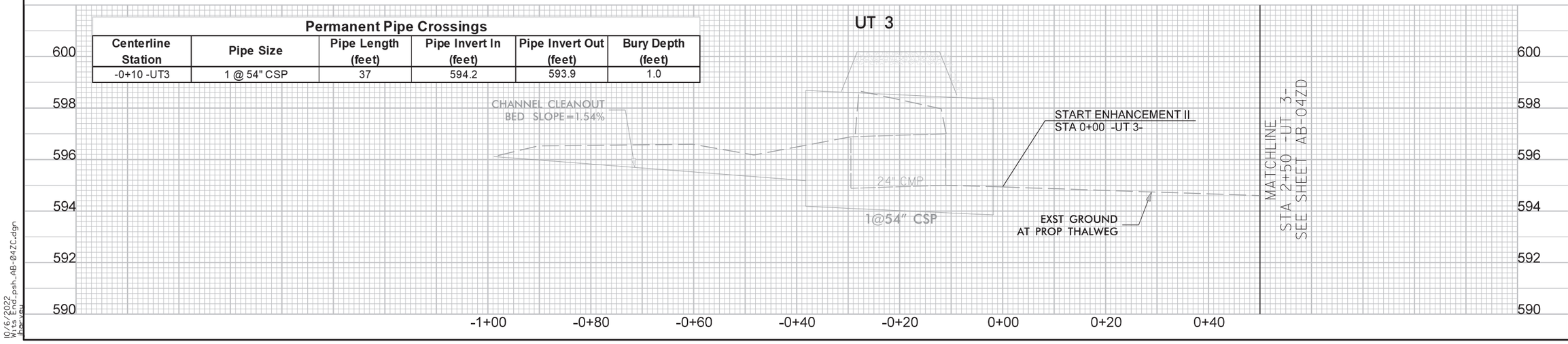
## RECORD DRAWING

**Permanent Pipe Crossings**

| Centerline Station | Pipe Size | Pipe Length (feet) | Pipe Invert In (feet) | Pipe Invert Out (feet) | Bury Depth (feet) |
|---|---|---|---|---|---|
| -0+10 -UT3 | 1 @ 54" CSP | 37 | 594.2 | 593.9 | 1.0 |

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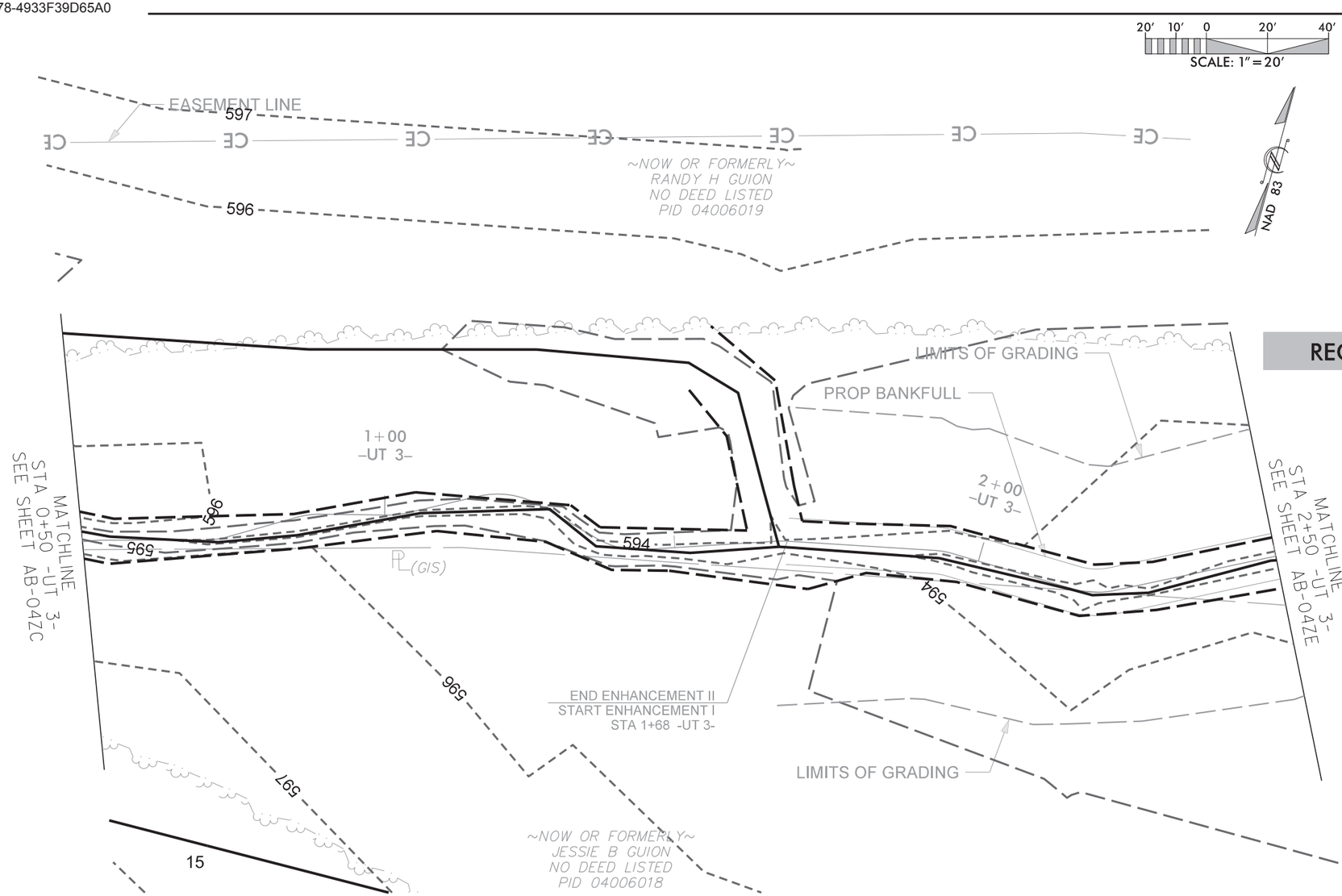
**WITS END**
**UNION COUNTY, NC**

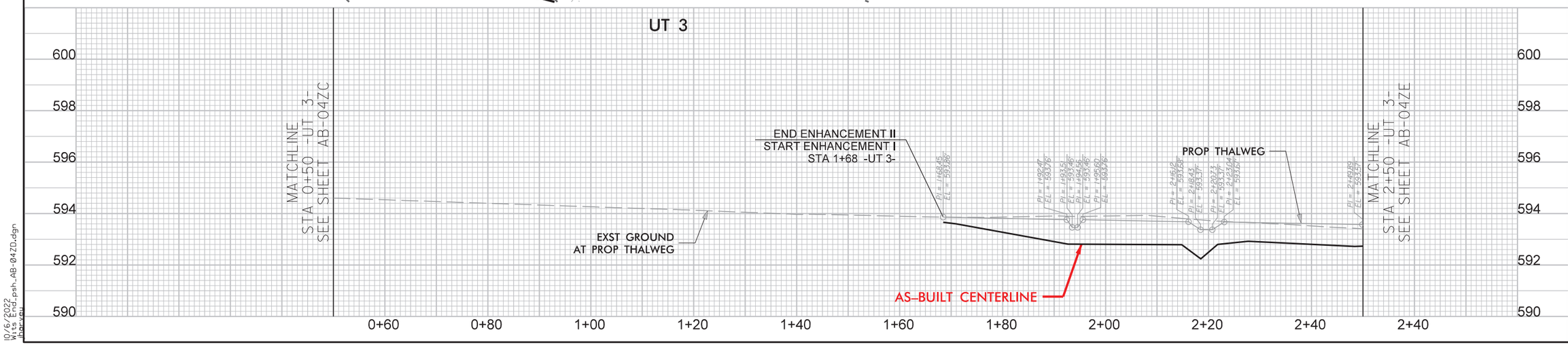
**AS-BUILT STRUCTURES**



| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZC |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04ZC*** |

10/6/2022
Wits End_psh_AB-04ZC.dgn
jharvell

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NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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**RECORD DRAWING**

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Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

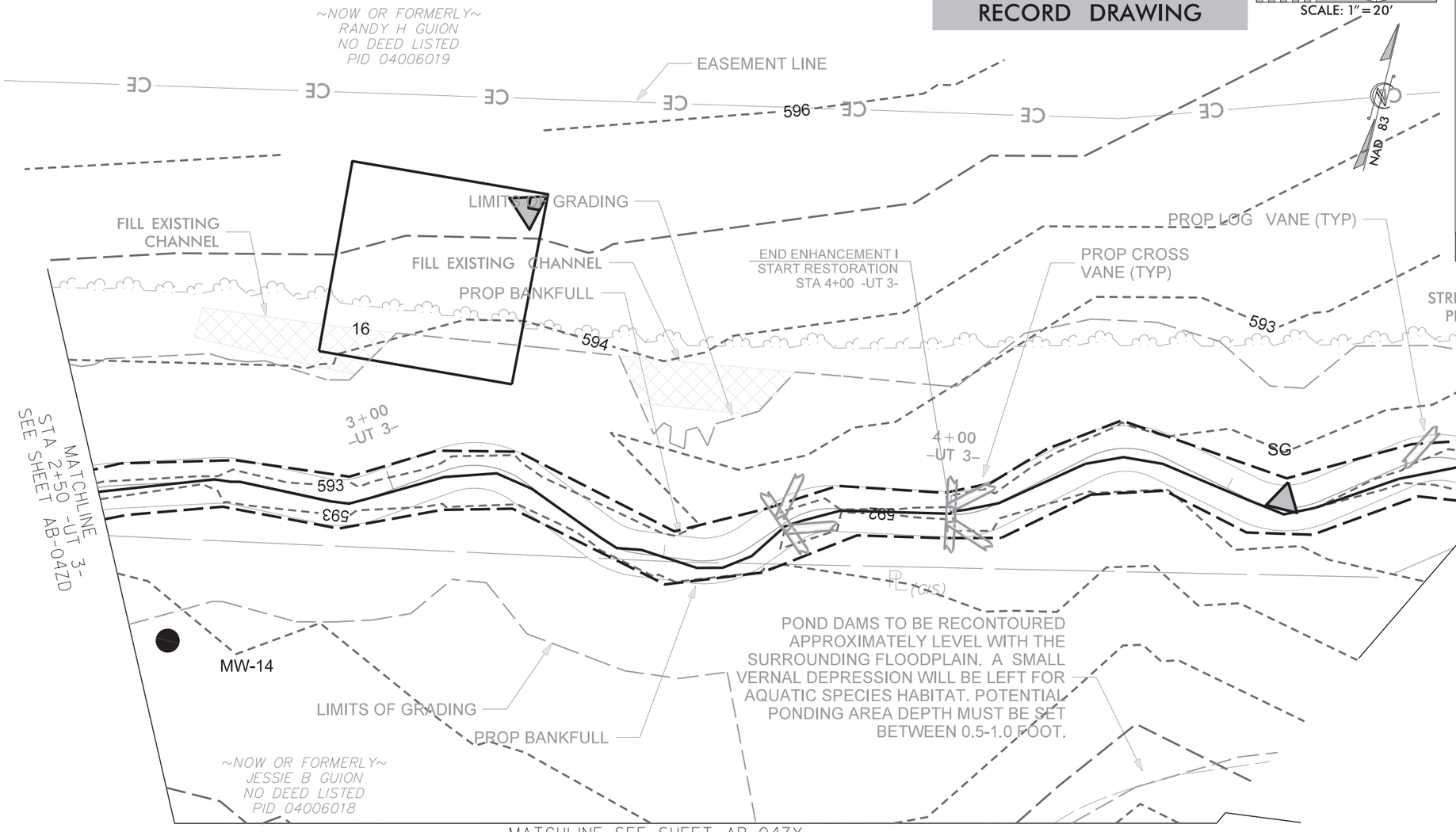
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZD
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04ZD**

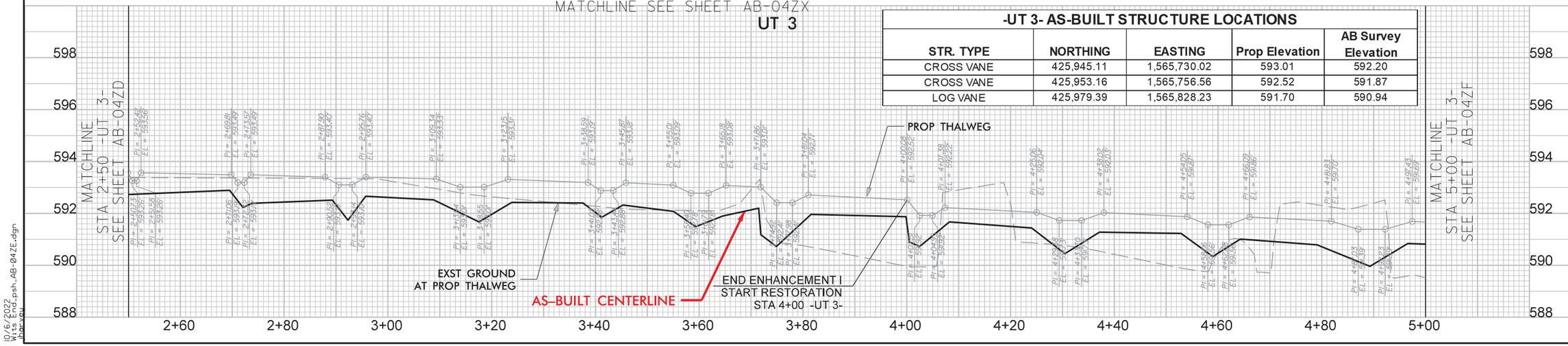
10/6/2022
Wits End_psh_AB-04ZD.dgn
Jarvis

# RECORD DRAWING

SCALE: 1" = 20'




## UT 3




### -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,945.11 | 1,565,730.02 | 593.01 | 592.20 |
| CROSS VANE | 425,953.16 | 1,565,756.56 | 592.52 | 591.87 |
| LOG VANE | 425,979.39 | 1,565,828.23 | 591.70 | 590.94 |

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NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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Axiom Environmental, Inc.

**WITS END**
UNION COUNTY, NC

**AS-BUILT STRUCTURES**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZE
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

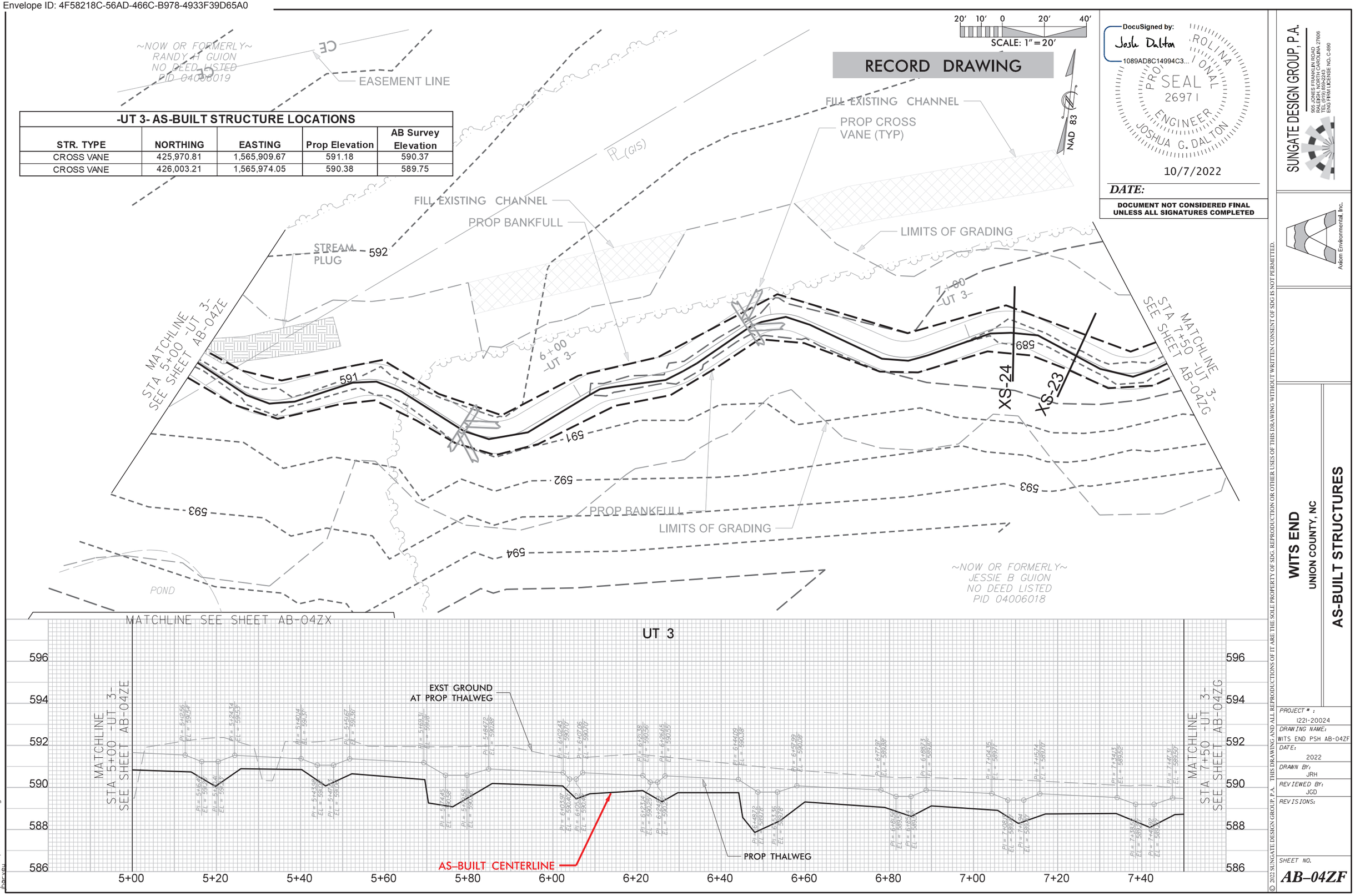
SHEET NO.
**AB–04ZE**



10/6/2022
Wits End_psh_AB-04ZE.dgn
JRH

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,970.81 | 1,565,909.67 | 591.18 | 590.37 |
| CROSS VANE | 426,003.21 | 1,565,974.05 | 590.38 | 589.75 |

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10/7/2022

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(919) 859-0515
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



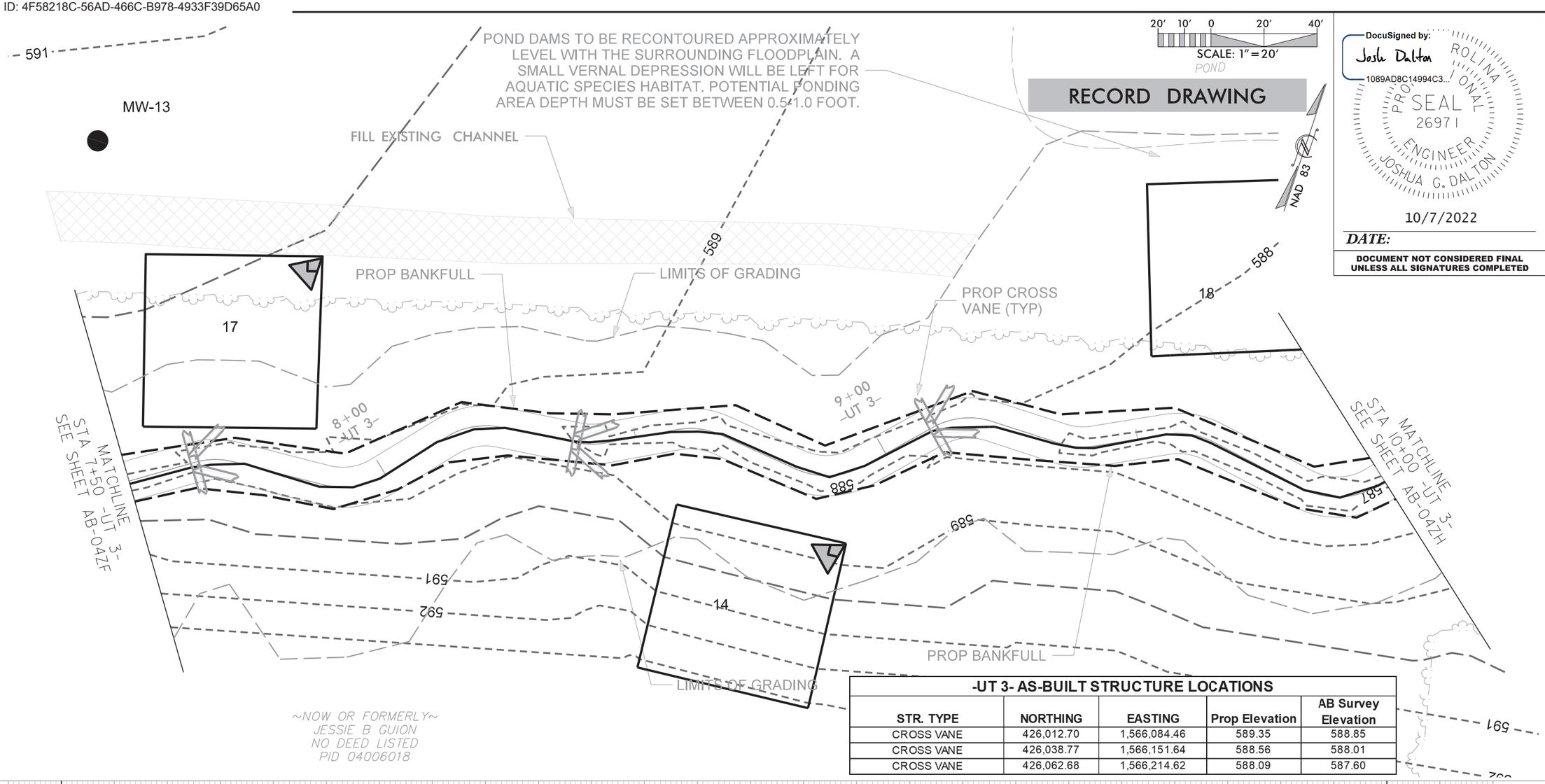
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

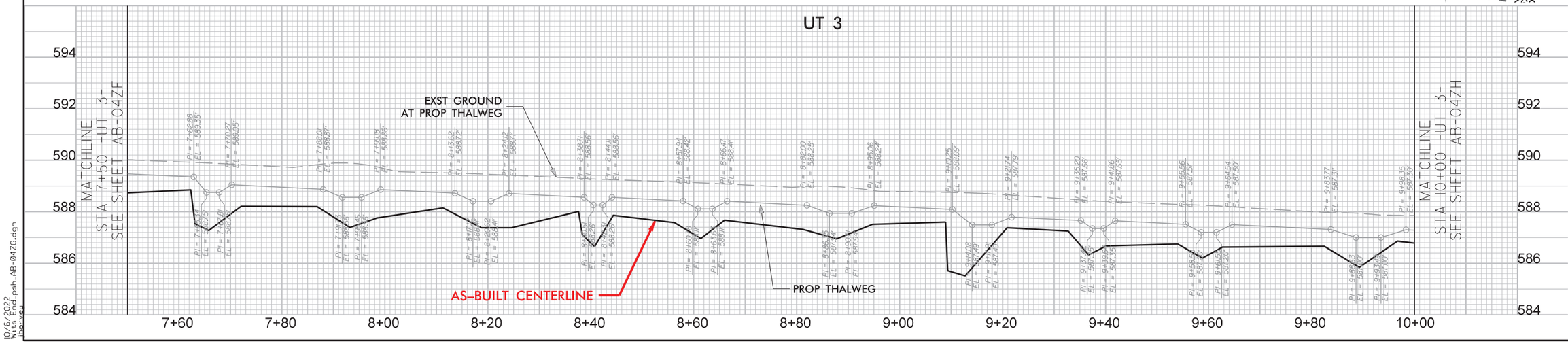
PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZF
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04ZF**

10/6/2022
Wits End_psh_AB-04ZF.dgn
jharvell




| -UT 3- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 426,012.70 | 1,566,084.46 | 589.35 | 588.85 |
| CROSS VANE | 426,038.77 | 1,566,151.64 | 588.56 | 588.01 |
| CROSS VANE | 426,062.68 | 1,566,214.62 | 588.09 | 587.60 |




DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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ENG FIRM LICENSE NO. C-2890

Axiom Environmental, Inc.



**WITS END**
UNION COUNTY, NC

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZG
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04ZG**

10/6/2022
Wits End_psh_AB-04ZG.dgn
jharvell

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,093.05 | 1,566,309.59 | 587.11 | 586.42 |
| ~~CROSS VANE~~ | ~~426,131.33~~ | ~~1,566,414.76~~ | ~~586.29~~ | |
| DROP STRUCTURE | 426,122.52 | 1,566,448.99 | | 585.08 |
| DROP STRUCTURE | 426,110.27 | 1,566,470.21 | | 583.38 |

## -UT 3A- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,131.57 | 1,566,436.77 | | 585.50 |

20' 10' 0 20' 40'
SCALE: 1" = 20'

RECORD DRAWING

NAD 83

SURROUNDING FLOODPLAIN. A SMALL VERNAL DEPRESSION WILL BE LEFT FOR AQUATIC SPECIES HABITAT. POTENTIAL PONDING AREA DEPTH MUST BE SET BETWEEN 0.5-1.0 FOOT.

CROSS VANE NOT CONSTRUCTED

STREAM PLUG NOT CONSTRUCTED

LIMITS OF GRADING

PROP BANKFULL

MATCHLINE STA 7+40 -UT 3A- SEE SHEET AB-04Z

END RESTORATION STA 7+78 -UT 3A- STA 11+63 -UT 3-

MATCHLINE STA 10+00 -UT 3- SEE SHEET AB-04ZG

MATCHLINE STA 12+50 -UT 3- SEE SHEET AB-04ZI

STREAM PLUG

CROSS VANE ADDED

DROP STRUCTURE ADDED

STREAM RE-ALIGNED DUE TO LANDOWNER REQUEST

FILL EXISTING CHANNEL

PROP CROSS VANE (TYP)

18

13

11+00 -UT 3-

12+00 -UT 3-

587

586

588

584

589

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ROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

DATE:

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UT 3

EXST GROUND AT PROP THALWEG

PROP THALWEG

AS-BUILT CENTERLINE

END RESTORATION STA 7+78 -UT 3A- STA 11+63 -UT 3-

UT 3A

EXST GROUND AT PROP THALWEG

PROP THALWEG

END RESTORATION STA 7+78 -UT 3A- ELEV=586.19

AS-BUILT CENTERLINE

592 590 588 586 584 582

10+00 10+20 10+40 10+60 10+80 11+00 11+20 11+40 11+60 11+80 12+00 12+20 12+40

7+40 7+60 7+80

588 586 584 582

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PH: (919) 851-9986
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.

WITS END
UNION COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZH
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. AB–04ZH



10/6/2022
Wits End_psh_AB-04ZH.dgn
jharvell

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| ~~CROSS VANE~~ | ~~426,115.27~~ | ~~1,566,541.40~~ | ~~585.26~~ | |
| ~~CROSS VANE~~ | ~~426,077.24~~ | ~~1,566,687.26~~ | ~~584.22~~ | |
| ~~CROSS VANE~~ | ~~426,061.00~~ | ~~1,566,722.74~~ | ~~583.76~~ | |

RECORD DRAWING

SCALE: 1" = 20'

DocuSigned by: Josh Dalton 1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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LIMITS OF GRADING
PROP BANKFULL
CROSS VANE NOT CONSTRUCTED
13+00 -UT 3-
14+00 -UT 3-
EX SOIL PATH
PROP CROSS VANE (TYP)
MATCHLINE STA 12+50 -UT 3- SEE SHEET AB-04ZH
MATCHLINE STA 15+00 -UT 3- SEE SHEET AB-04ZJ
STREAM RE-ALIGNED DUE TO LANDOWNER REQUEST
~NOW OR FORMERLY~ JESSIE B GUION NO DEED LISTED PID 04006018
FILL EXISTING CHANNEL
13

UT 3

EXST GROUND AT PROP THALWEG
PROP THALWEG
AS-BUILT CENTERLINE

SUNGATE DESIGN GROUP, P.A.
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PH: 919.859.1353
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZI
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

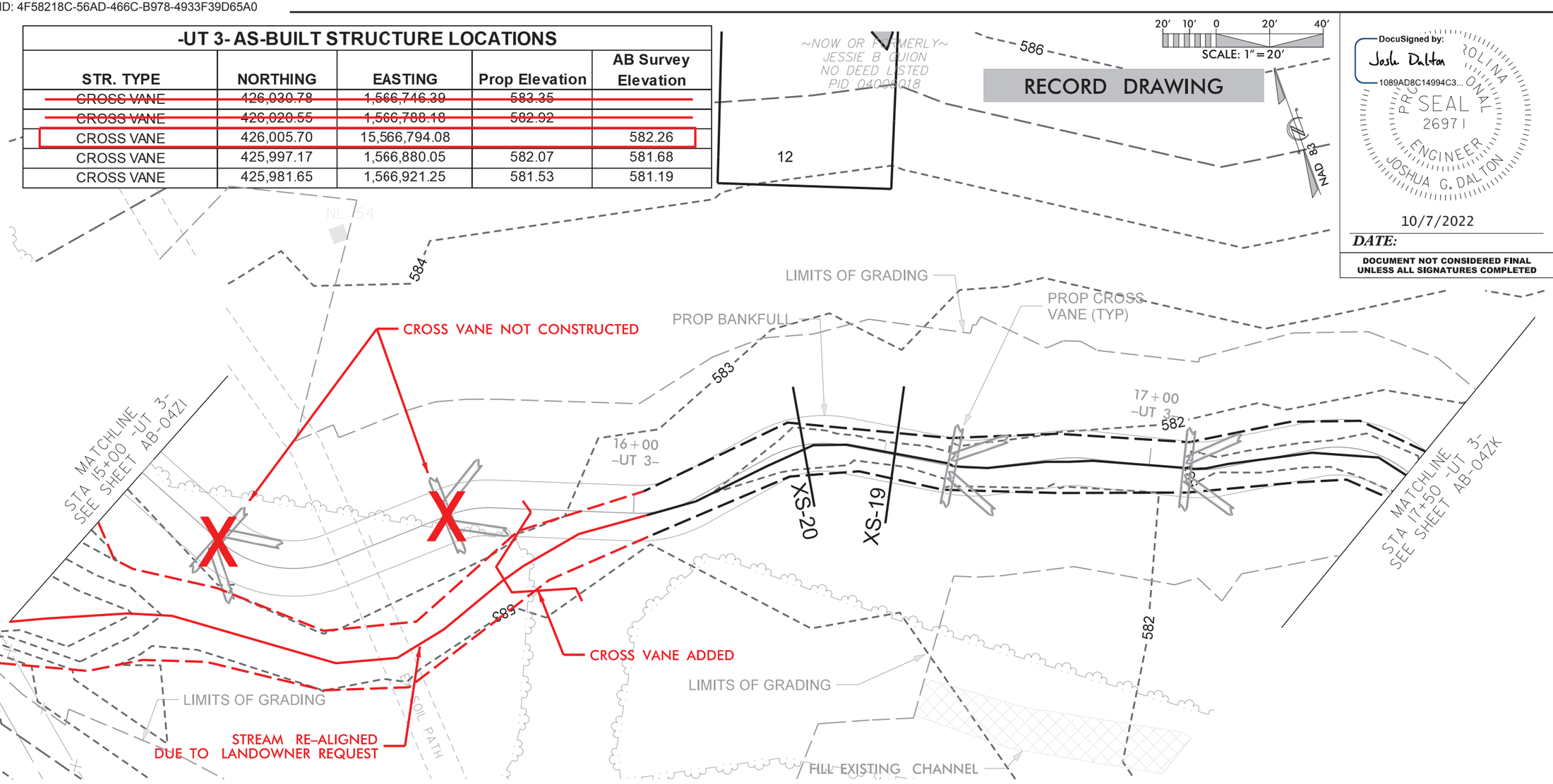
SHEET NO. **AB–04ZI**



10/6/2022
Wits End_psh_AB-04ZI.dgn
Parker

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| ~~CROSS VANE~~ | ~~426,030.78~~ | ~~1,566,746.39~~ | ~~583.35~~ | |
| ~~CROSS VANE~~ | ~~426,020.55~~ | ~~1,566,788.18~~ | ~~582.92~~ | |
| CROSS VANE | 426,005.70 | 15,566,794.08 | | 582.26 |
| CROSS VANE | 425,997.17 | 1,566,880.05 | 582.07 | 581.68 |
| CROSS VANE | 425,981.65 | 1,566,921.25 | 581.53 | 581.19 |




DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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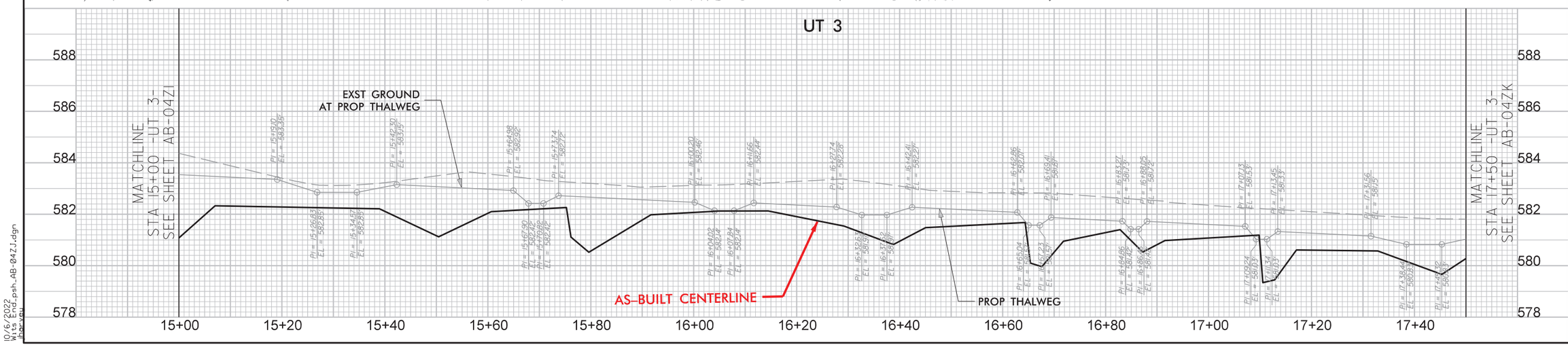


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ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZJ |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04ZJ*** |



10/6/2022
Wits End_psh_AB-04ZJ.dgn
jharvey

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,933.04 | 1,566,997.26 | 580.77 | 580.43 |
| CROSS VANE | 425,887.75 | 1,567,074.26 | 580.15 | 579.61 |
| CROSS VANE | 425,847.30 | 1,567,149.06 | 579.54 | 579.11 |

SCALE: 1" = 20'

RECORD DRAWING

NAD 83

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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~NOW OR FORMERLY~
JESSIE B GUION
NO DEED LISTED
PID 04006018

LIMITS OF GRADING

PROP BANKFULL

MATCHLINE STA 17+50 -UT 3- SEE SHEET AB-04ZJ

MATCHLINE STA 20+00 -UT 3- SEE SHEET AB-04ZL

18+00 -UT 3-

19+00 -UT 3-

SG

FEMA 100 YR

PROP CROSS VANE (TYP)

FILL EXISTING CHANNEL

UT 3

EXST GROUND AT PROP THALWEG

AS-BUILT CENTERLINE

PROP THALWEG

586
584
582
580
578
576

17+60 17+80 18+00 18+20 18+40 18+60 18+80 19+00 19+20 19+40 19+60 19+80 20+00

SUNGATE DESIGN GROUP, P.A.
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Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZK
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04ZK**



10/6/2022
Wits End_psh_AB-04ZK.dgn
jharvell

| -UT 3- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 425,718.00 | 1,567,191.31 | 578.94 | 578.79 |

RECORD DRAWING

SCALE: 1" = 20'

NAD 83

~NOW OR FORMERLY~
JESSIE B GUION
NO DEED LISTED
PID 04006018

FEMA 100 YR

PROP BANKFULL

LIMITS OF GRADING

PROP CROSS VANE (TYP)

EX SOIL PATH

STREAM PLUG

21+00 -UT 3-

22+00 -UT 3-

579

578

10

9

MATCHLINE STA 20+00 -UT 3- SEE SHEET AB-04ZK

MATCHLINE STA 22+50 -UT 3- SEE SHEET AB-04ZM

FILL EXISTING CHANNEL

UT 3

EXST GROUND AT PROP THALWEG

AS-BUILT CENTERLINE

PROP THALWEG

584
582
580
578
576
574

610
600
590
580
570

20+00 20+20 20+40 20+60 20+80 21+00 21+20 21+40 21+60 21+80 22+00 22+20 20+40

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

DATE:

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL 919.859.1353
ENG FIRM LICENSE NO. C-3950

Axiom Environmental, Inc.



WITS END
UNION COUNTY, NC

AS-BUILT STRUCTURES

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZL
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB-04ZL

10/6/2022
Wits End_psh_AB-04ZL.dgn
jharvey

## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,553.32 | 1,567,236.03 | 578.10 | 577.98 |

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

RECORD DRAWING

NAD 83

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022
***DATE:***

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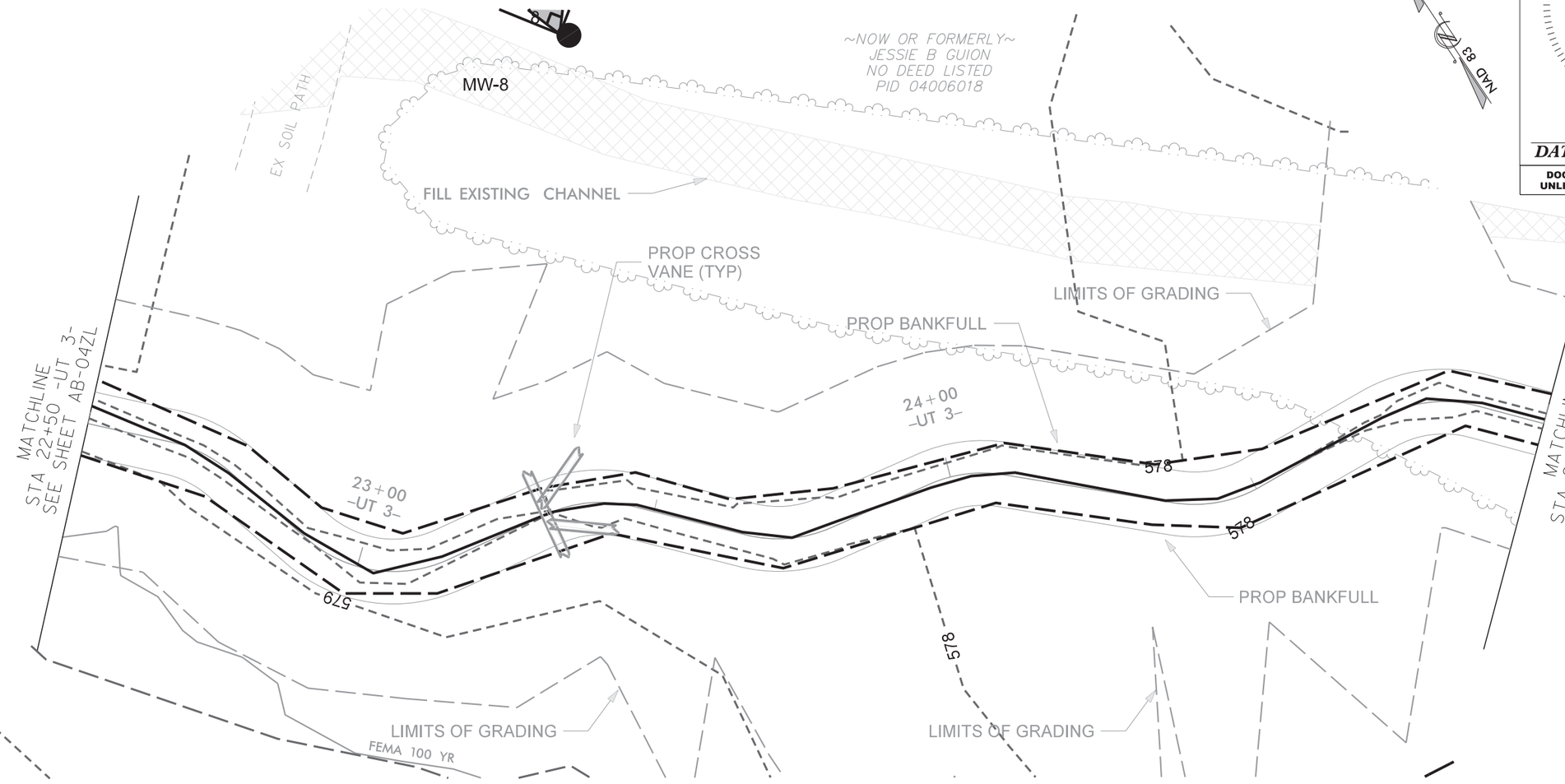


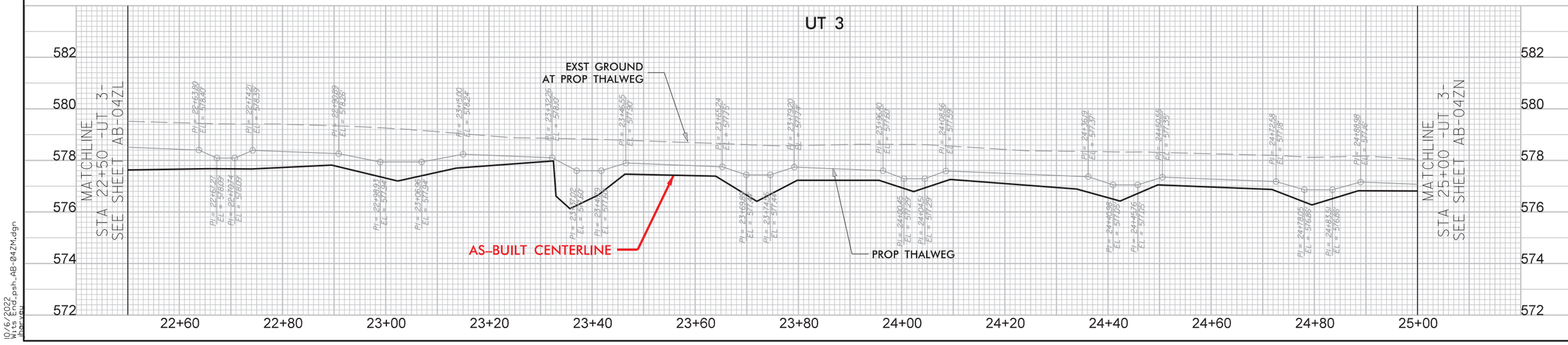


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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: (919) 859-0013
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZM
DATE: 2023
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–04ZM***



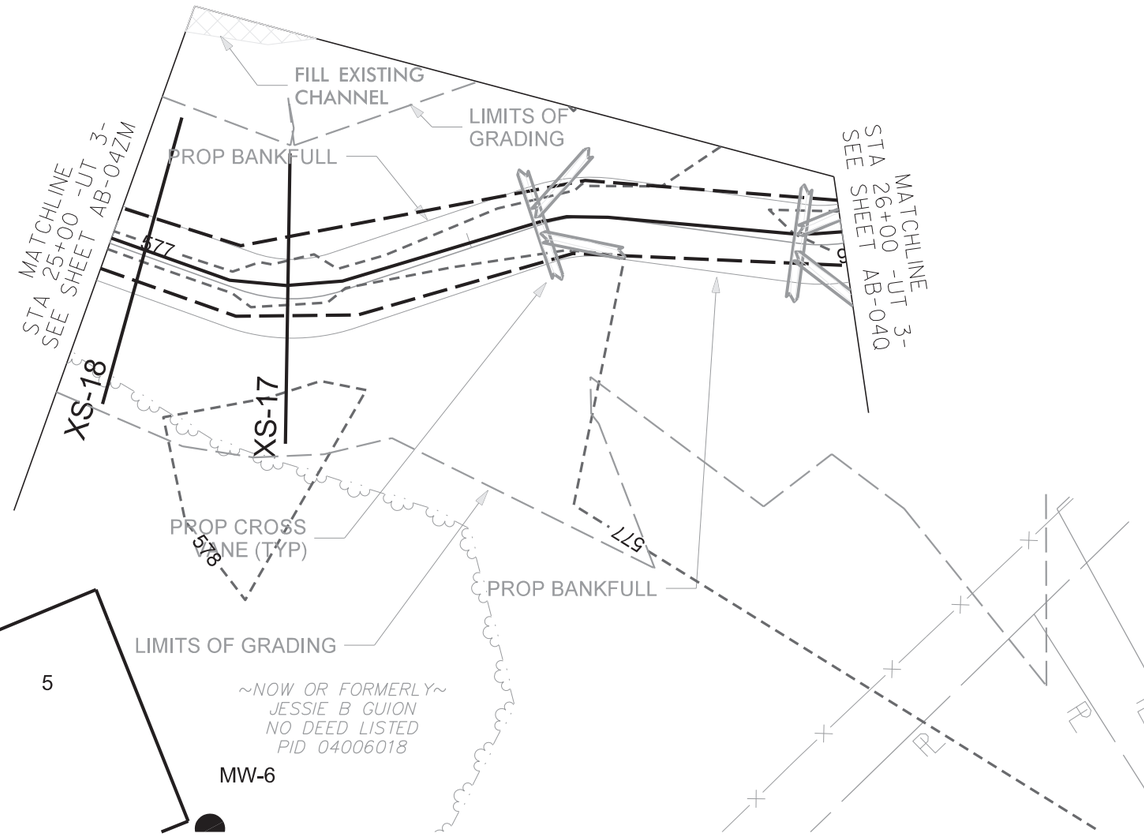
10/6/2022
Wits End_psh_AB-04ZM.dgn
jharvey

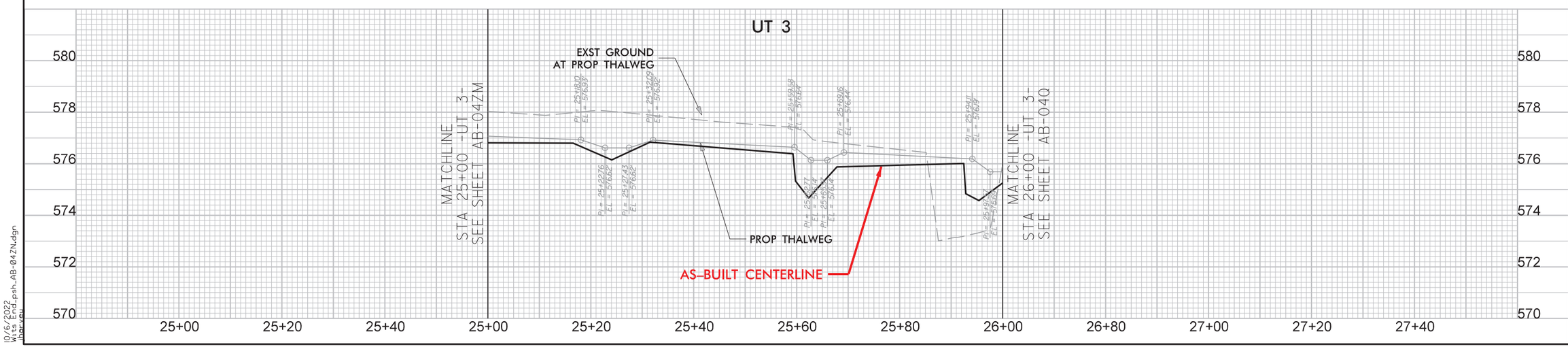
## -UT 3- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 425,451.95 | 1,567,428.59 | 576.64 | 576.39 |
| CROSS VANE | 425,433.38 | 1,567,457.40 | 576.19 | 576.01 |

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83




DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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**RECORD DRAWING**

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.1353
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZN |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–04ZN*** |

10/6/2022
Wits End_psh_AB-04ZN.dgn
Harvell

RECORD DRAWING

SCALE: 1" = 20'

NAD 83

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

DATE:

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~NOW OR FORMERLY~
RANDY H GUION
NO DEED LISTED
PID 04006019

EASEMENT LINE

REMOVE RELIC DAM

LIMITS OF GRADING

PROP CROSS VANE (TYP)

PROP BANKFULL

PROP BANKFULL

START RESTORATION
STA 0+00 -UT 3A-

LIMITS OF GRADING

1+00 -UT 3A-

2+00 -UT 3A-

MATCHLINE STA 2+50 -UT 3A- SEE SHEET AB-04ZP

CE

592

593

594

## -UT 3A- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,528.71 | 1,565,988.44 | 591.45 | 590.79 |
| CROSS VANE | 426,501.03 | 1,566,016.54 | 590.96 | 590.15 |
| CROSS VANE | 426,468.02 | 1,566,048.53 | 590.36 | 589.83 |

## UT 3A

PROP THALWEG

EXST GROUND AT PROP THALWEG

AS-BUILT CENTERLINE

START RESTORATION
STA 0+00 -UT 3A-

MATCHLINE STA 2+50 -UT 3A- SEE SHEET AB-04ZP

596
594
592
590
588
586

0 20 40 60 80 1+00 1+20 1+40 1+60 1+80 2+00 2+20 2+40

10/6/2022
Wits End_psh_AB-04ZO.dgn
jarvis

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TEL: 919.852.1003
ENG FIRM LICENSE NO. C-890

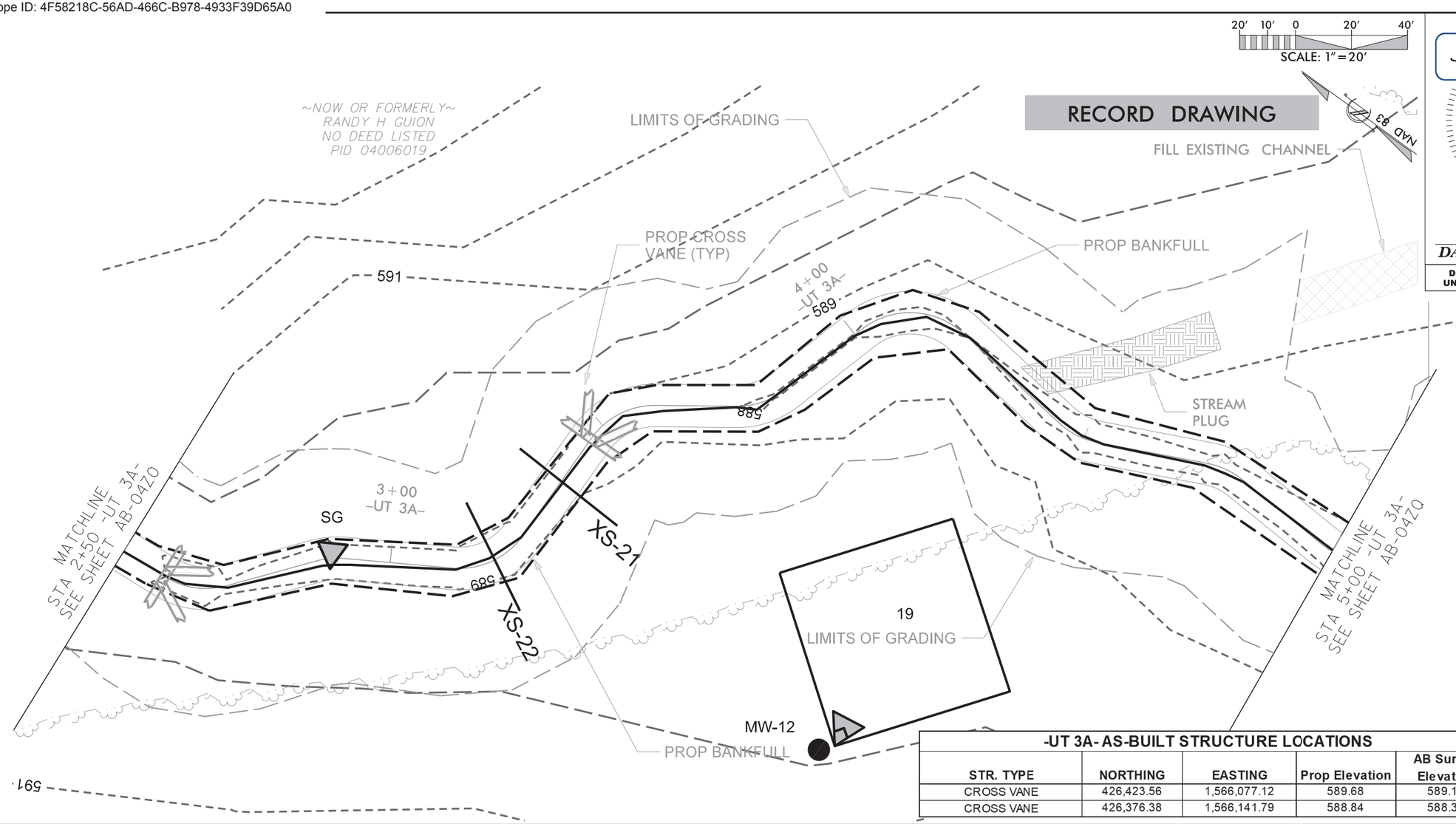
Axiom Environmental, Inc.

WITS END
UNION COUNTY, NC

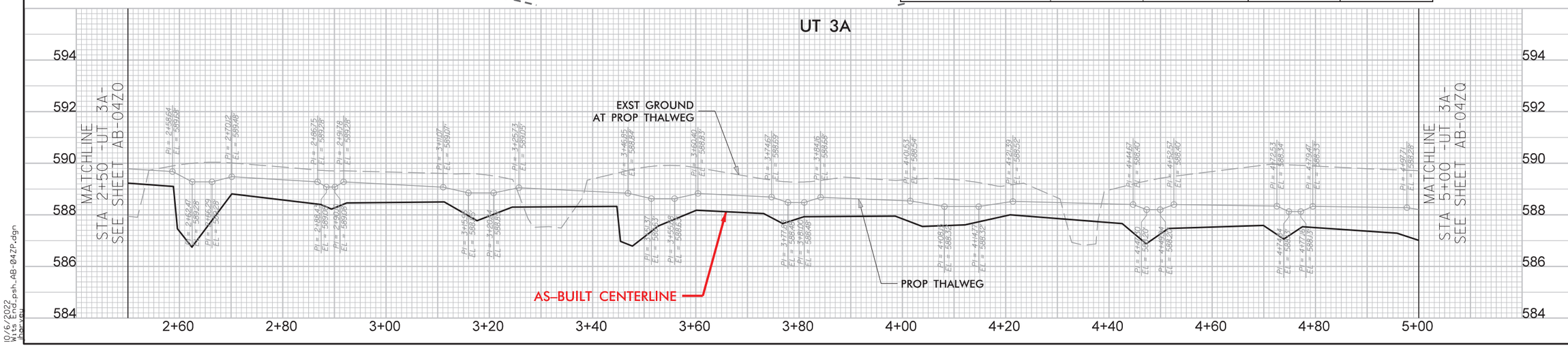
AS-BUILT STRUCTURES

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZO
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. AB–04ZO




| -UT 3A- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 426,423.56 | 1,566,077.12 | 589.68 | 589.10 |
| CROSS VANE | 426,376.38 | 1,566,141.79 | 588.84 | 588.33 |




DocuSigned by: Josh Dalton 1089AD8C14994C3...

ROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1183
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
UNION COUNTY, NC

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZP
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB–04ZP**

10/6/2022
Wits End_psh_AB-04ZP.dgn
jharvey

## -UT 3A- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 426,224.68 | 1,566,278.15 | 587.98 | |
| CROSS VANE | 426,208.24 | 1,566,329.44 | 587.38 | |
| CROSS VANE | 426,184.00 | 1,566,396.66 | 586.57 | |

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

**RECORD DRAWING**

NAD 83

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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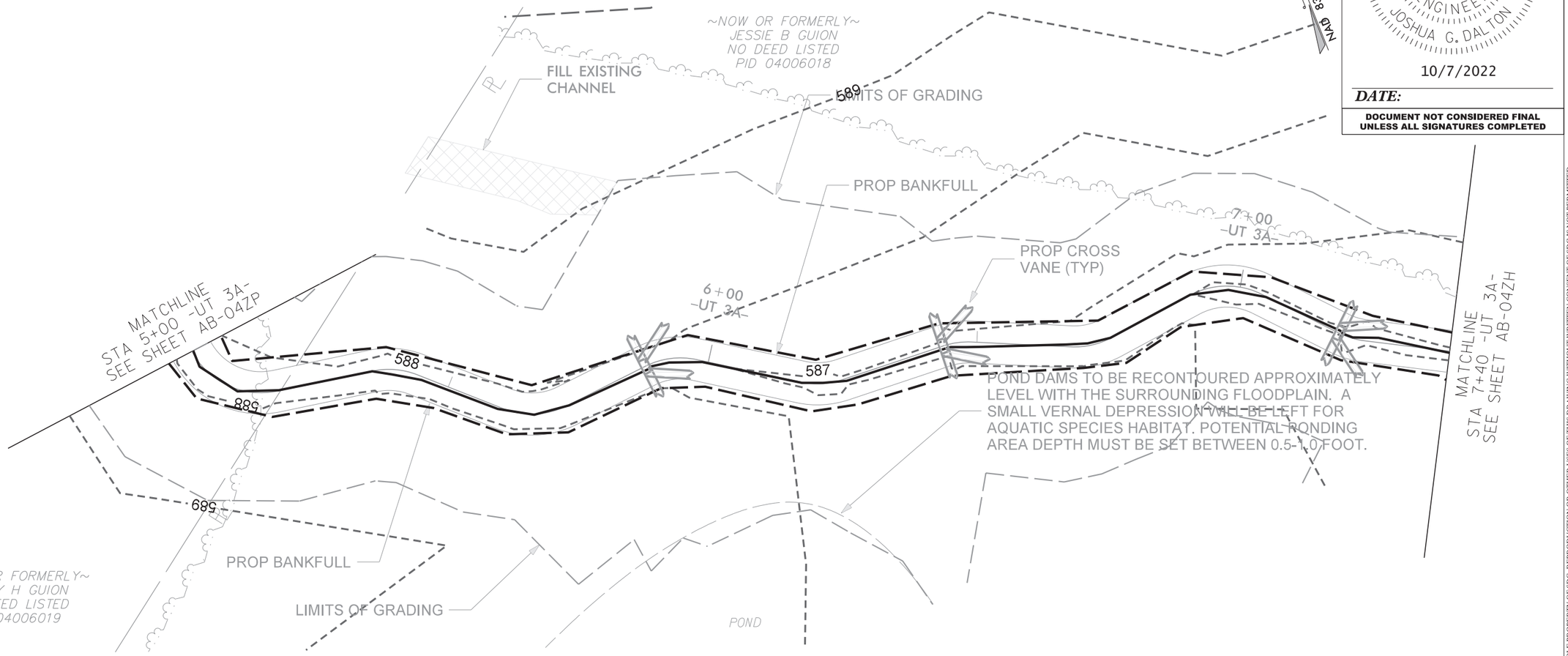


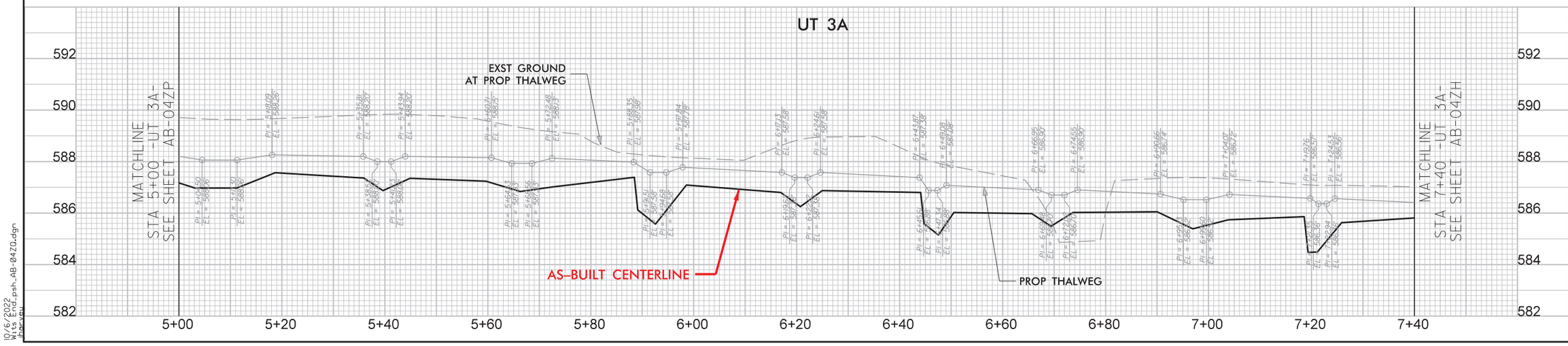


SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.9545
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZQ
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–04ZQ***



10/6/2022
Wits End_psh_AB-04ZQ.dgn
jharvey

SCALE: 1" = 20'

RECORD DRAWING

NAD 83

DocuSigned by: Josh Dalton 1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

**DATE:**

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EASEMENT LINE

START RESTORATION
STA 0+00 -UT 4-

LIMITS OF GRADING

PROP BANKFULL

4

1+00 -UT 4-

2+00 -UT 4-

SG

MATCHLINE STA 2+50 -UT 4- SEE SHEET AB-04ZS

~NOW OR FORMERLY~
JESSIE BRICE GUION
VIRGINIA L GUION
NO DEED LISTED
PID 04006013

~NOW OR FORMERLY~
WITS END FARM LLC
DB 4568/786
PID 04006014A
TITLE COMMITMENT TRACT 3
16.571 AC.
(NET GAPS AND OVERLAPS)

583 582 581 580 579 578 577 576 575 574 573 572

UT 4

EXST GROUND AT PROP THALWEG

PROP THALWEG

AS-BUILT CENTERLINE

0 20 40 60 80 1+00 1+20 1+40 1+60 1+80 2+00 2+20 2+40

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.859.9013
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AB-BUILT STRUCTURES**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZR
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. **AB-04ZR**



10/6/2022
Wits End_psh_AB-04ZR.dgn
JRH

## -UT 4- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 424,902.42 | 1,567,165.98 | 576.56 | 576.33 |
| CROSS VANE | 424,868.14 | 1,567,271.60 | 575.65 | 575.31 |

~NOW OR FORMERLY~
WITS END FARM LLC
DB 4568/786
PID 04006014A
TITLE COMMITMENT TRACT 3
16.571 AC.
(NET GAPS AND OVERLAPS)

20' 10' 0 20' 40'
SCALE: 1" = 20'

**RECORD DRAWING**

NAD 83

DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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LIMITS OF GRADING
PROP BANKFULL
FEMA 100 YR
578
577
576
575
579
3+00 -UT 4-
4+00 -UT 4-
MATCHLINE STA 2+50 -UT 4- SEE SHEET AB-04ZR
MATCHLINE STA 5+00 -UT 4- SEE SHEET AB-04ZT
XS-14
XS-13
PROP CROSS VANE (TYP)
PROP BANKFULL
FEMA 100 YR
LIMITS OF GRADING
3

UT 4

EXST GROUND AT PROP THALWEG
AS-BUILT CENTERLINE
PROP THALWEG
582
580
578
576
574
572
2+60 2+80 3+00 3+20 3+40 3+60 3+80 4+00 4+20 4+40 4+60 4+80 5+00

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: 919.851.9545
ENG FIRM LICENSE NO. C-990

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZS
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–04ZS***



10/6/2022
Wits End_psh_AB-04ZS.dgn
jharvell

## -UT 4- AS-BUILT STRUCTURE LOCATIONS

| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
|---|---|---|---|---|
| CROSS VANE | 424,835.97 | 1,567,353.84 | 574.84 | 574.53 |
| CROSS VANE | 424,831.26 | 1,567,431.61 | 574.29 | 573.96 |
| CROSS VANE | 424,787.58 | 1,567,506.58 | 573.70 | 573.22 |

RECORD DRAWING

20′ 10′ 0 20′ 40′
SCALE: 1" = 20′

NAD 83

DocuSigned by: Josh Dalton
1089AD8C14994C3...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON
NORTH CAROLINA

10/7/2022
*DATE:*

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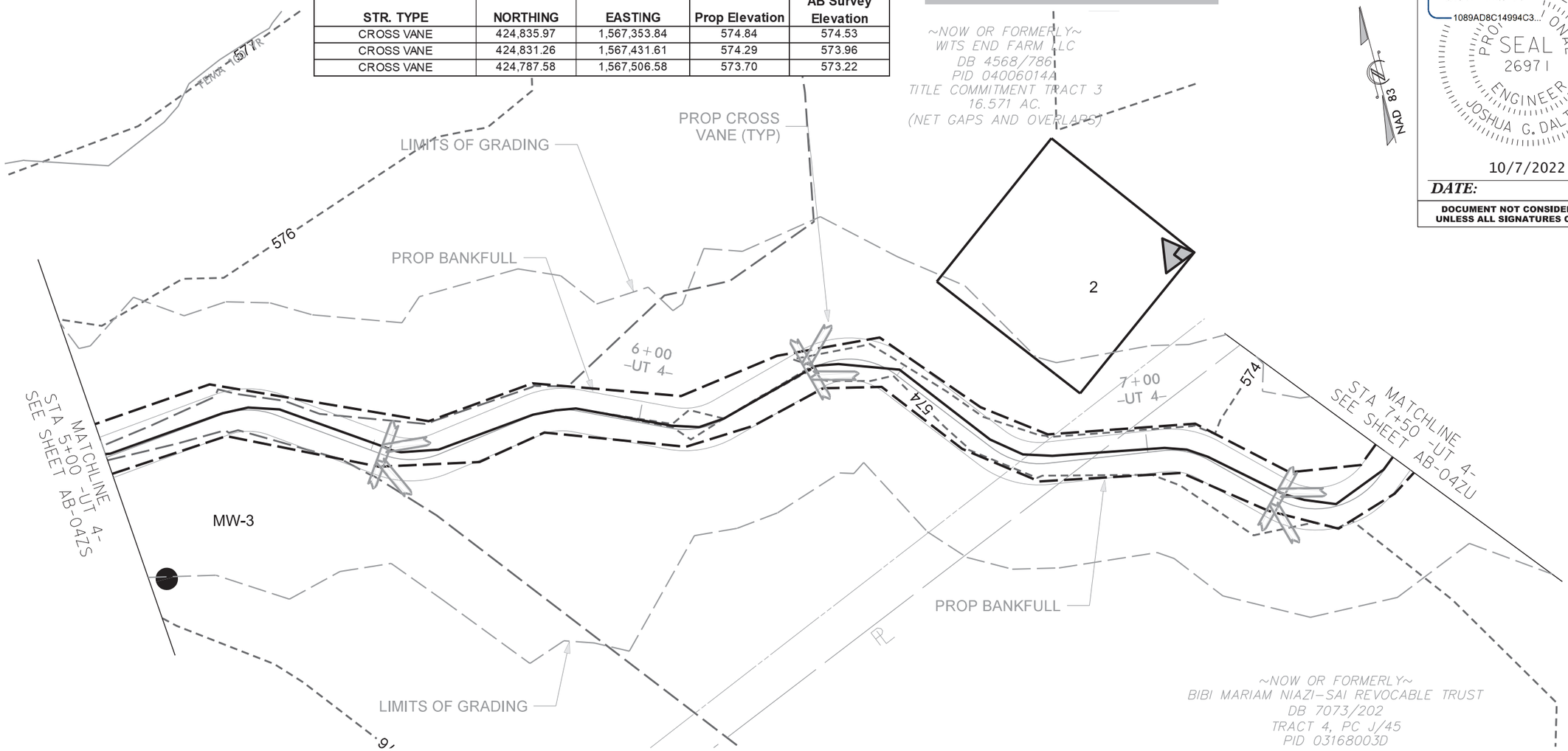


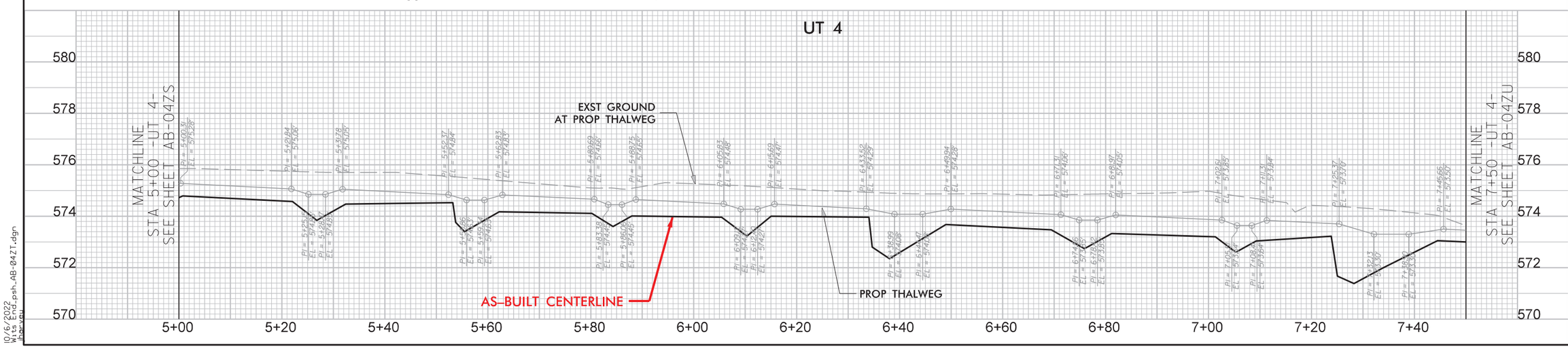


10/6/2022
Wits End_psh_AB-04ZT.dgn
jharvey

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.851.9986
ENG FIRM LICENSE NO. C-990

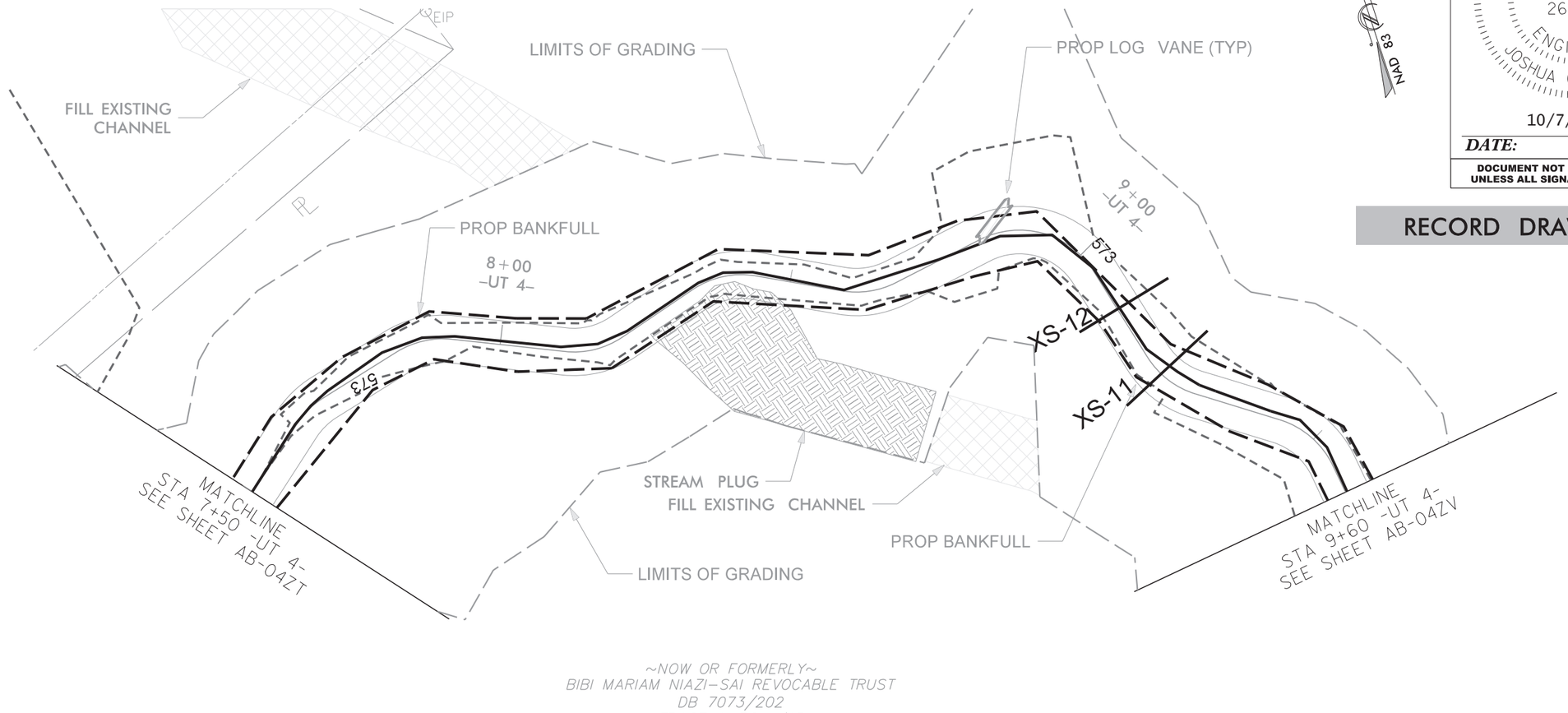
Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZT |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | AB–04ZT |

| -UT 4- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| LOG VANE | 424,791.43 | 1,567,652.04 | 572.87 | 572.47 |




20' 10' 0 20' 40'
SCALE: 1" = 20'

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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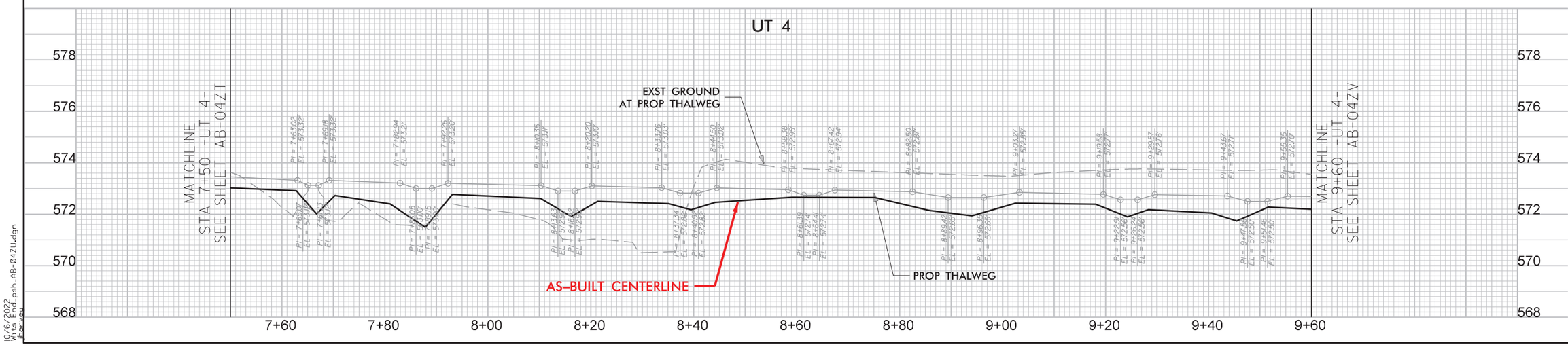
**RECORD DRAWING**

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RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1253
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : I22I-20024
DRAWING NAME: WITS END PSH AB-04ZU
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB-04ZU***

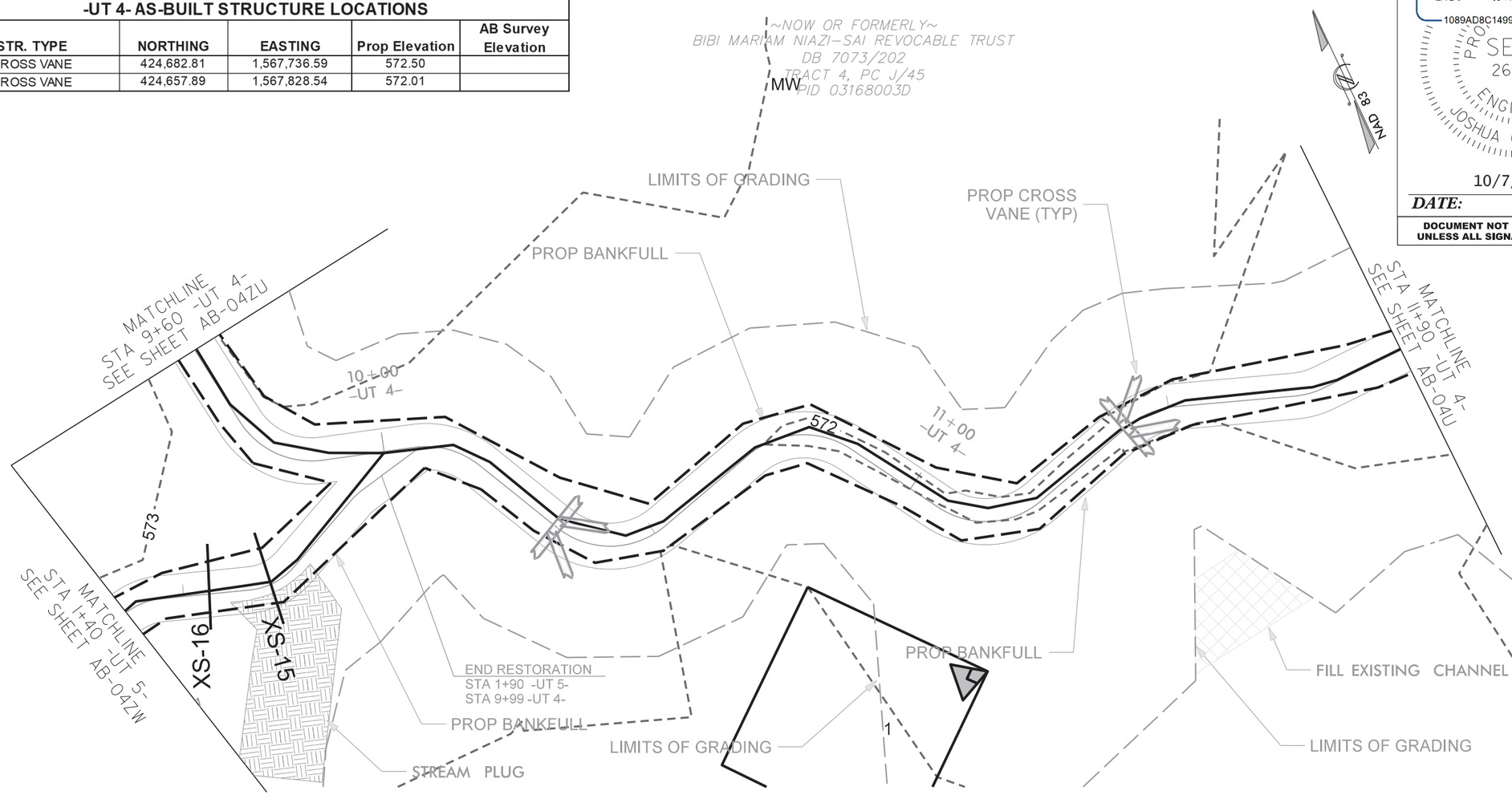


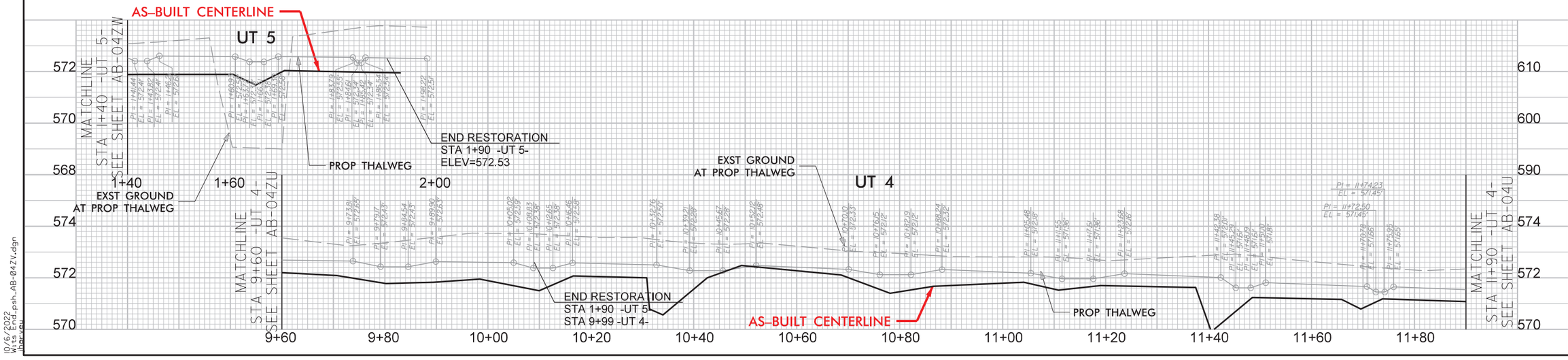
10/6/2022
Wits End_psh_AB-04ZU.dgn
jharvell

# RECORD DRAWING

SCALE: 1" = 20'

| -UT 4- AS-BUILT STRUCTURE LOCATIONS | | | | |
|---|---|---|---|---|
| STR. TYPE | NORTHING | EASTING | Prop Elevation | AB Survey Elevation |
| CROSS VANE | 424,682.81 | 1,567,736.59 | 572.50 | |
| CROSS VANE | 424,657.89 | 1,567,828.54 | 572.01 | |




DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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RALEIGH, NORTH CAROLINA 27606
PH: (919) 859-2243
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

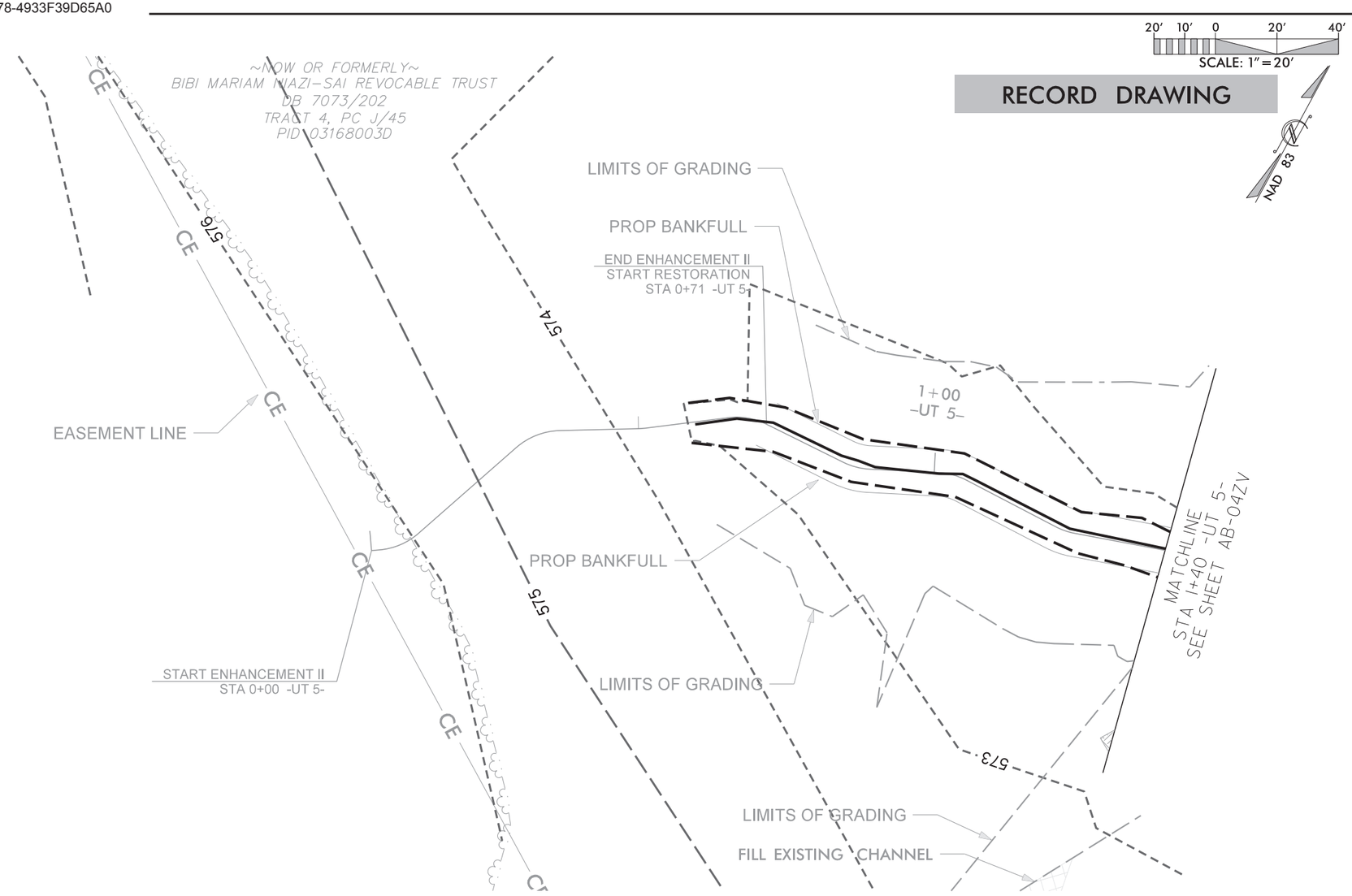


**WITS END**
**UNION COUNTY, NC**

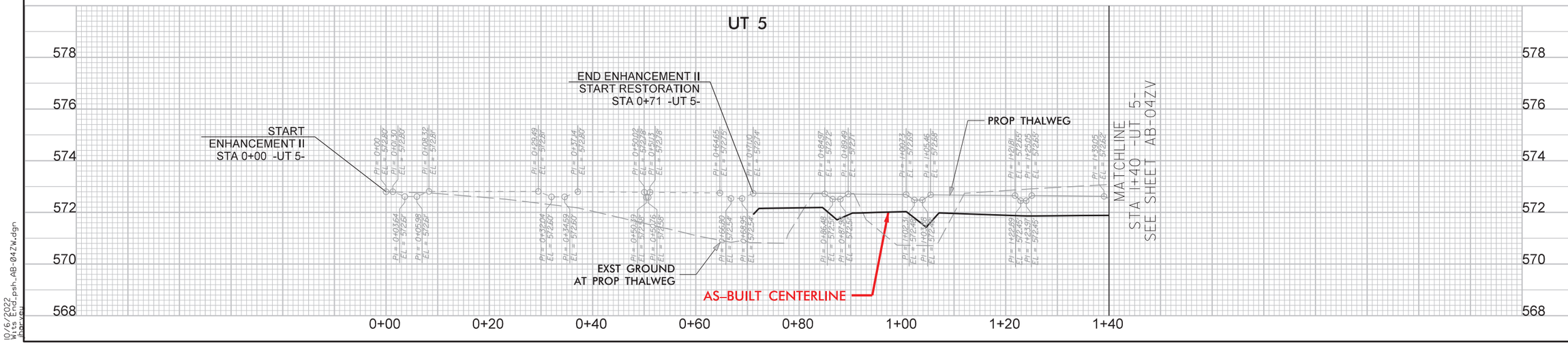
**AS-BUILT STRUCTURES**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-04ZV |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB-04ZV*** |

10/6/2022
Wits End_psh_AB-04ZV.dgn
Jarvis




RECORD DRAWING




DocuSigned by: Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

***DATE:***

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TEL (919) 859-0013
ENG FIRM LICENSE NO. C-3890

Axiom Environmental, Inc.

**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-04ZW
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB-04ZW***



10/6/2022
Wits End_psh_AB-04ZW.dgn
Jarvis

RECORD DRAWING

20' 10' 0 20' 40'
SCALE: 1" = 20'

NAD 83

DocuSigned by:
Josh Dalton
1089AD8C14994C3...

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

10/7/2022

*DATE:*

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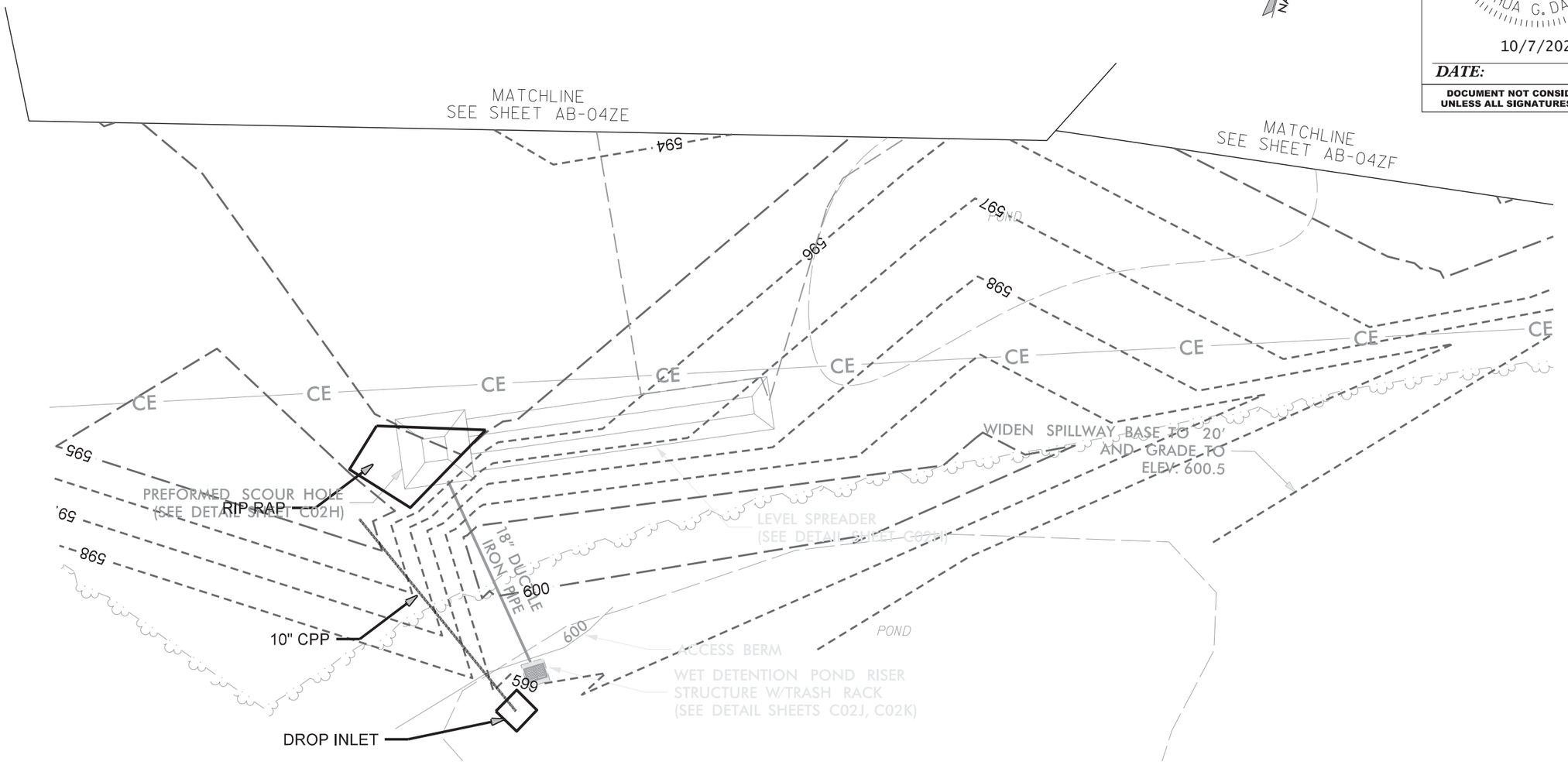



SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: 919.852.1003
ENG FIRM LICENSE NO. C-3890

Axiom Environmental, Inc.



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT STRUCTURES**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-04ZX |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–04ZX*** |

10/6/2022
Wits End_psh_AB-04ZX.dgn
jharvey

# DESIGN PLANT LIST

| Vegetation Association | Piedmont/Mountain Bottomland Forest* | | Dry-Mesic Oak-Hickory Forest* | | Stream-side Assemblage** | | TOTAL |
|---|---|---|---|---|---|---|---|
| Area (acres) | 7.2 | | 5 | | 3.8 | | 16 |
| Species | # planted* | % of total | # planted* | % of total | # planted** | % of total | # planted |
| River birch (*Betula nigra*) | 245 | 5 | -- | -- | 1550 | 15 | 1795 |
| Bitternut hickory (*Carya cordiformis*) | 490 | 10 | -- | -- | -- | -- | 490 |
| American elm (*Ulmus americana*) | 245 | 5 | 170 | 5 | -- | -- | 415 |
| Red bud (*Cercis canadensis*) | -- | -- | 510 | 15 | -- | -- | 510 |
| Silky dogwood (*Cornus amomum*) | 245 | 5 | -- | -- | 2067 | 20 | 2312 |
| Persimmon (*Diospyros virginiana*) | -- | -- | 510 | 15 | -- | -- | 510 |
| Hackberry (*Celtis occidentalis*) | 490 | 10 | -- | -- | 517 | 5 | 1006 |
| Green ash (*Fraxinus pennsylvanica*) | 245 | 5 | -- | -- | 517 | 5 | 762 |
| Tulip poplar (*Liriodendron tulipifera*) | 245 | 5 | 170 | 5 | 517 | 5 | 932 |
| Sycamore (*Platanus occidentalis*) | 245 | 5 | 170 | 5 | 1550 | 15 | 1965 |
| Red mulberry (*Morus rubra*) | -- | -- | 170 | 5 | 517 | 5 | 687 |
| Water oak (*Quercus nigra*) | 734 | 15 | 680 | 20 | -- | -- | 1414 |
| White oak (*Quercus alba*)) | 490 | 10 | 680 | 20 | 1034 | 10 | 2203 |
| Red oak (*Quercus rubra*) | -- | -- | 340 | 10 | -- | -- | 340 |
| Black gum (*Nyssa sylvatica*) | 490 | 10 | -- | -- | 1034 | 10 | 1523 |
| Willow oak (*Quercus phellos*) | 245 | 5 | -- | -- | 1034 | 10 | 1278 |
| Shumard oak (*Quercus shumardii*) | 490 | 10 | -- | -- | -- | -- | 490 |
| **TOTAL** | **4896** | **100** | **3400** | **100** | **10336** | **100** | **18632** |

* Planted at a density of 680 stems/acre.

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

# AS–BUILT PLANT LIST

**Table 6A. Planted Woody Vegetation**
**Wits End Stream and Wetland Mitigation Site**

| Bare-Root Planting | | |
|---|---|---|
| **Species** | **Total** | **Percent** |
| **Acres** | **58** | **%** |
| American Elm (*Ulmus americana*) | 3,000 | 4.0 |
| American Holly (*Ilex opaca*) | 2,220 | 2.9 |
| Birch River (*Betula nigra*) | 6,300 | 8.3 |
| Black Gum (*Nyssa sylvatica*) | 5,049 | 6.7 |
| Hackberry (*Celtis occidentalis*) | 2,900 | 3.8 |
| Hickory Mockernut (*Carya tomentosa*) | 1,500 | 2.0 |
| Hickory Shagbark (*Carya ovata*) | 3,500 | 4.6 |
| Oak Red (*Quercus rubra*) | 4,000 | 5.3 |
| Oak Swamp Chestnut (*Quercus michauxii*) | 1,700 | 2.2 |
| Oak Water (*Quercus nigra*) | 12,200 | 16.1 |
| Oak White (*Quercus alba*) | 4,850 | 6.4 |
| Oak Willow (*Quercus phellos*) | 1,400 | 1.8 |
| Persimmon (*Diospyros virginiana*) | 4,250 | 5.6 |
| Red Bud (*Cercis canadensis*) | 1,900 | 2.5 |
| Silky Dogwood (*Cornus amomum*) | 7,550 | 10.0 |
| Sycamore (*Platanus occidentalis*) | 7,900 | 10.4 |
| Tulip Poplar (*Liriodendron tulipifera*) | 5,050 | 6.7 |
| Tupelo Gum (*Nyssa aquatica*) | 500 | 0.7 |
| **TOTALS** | **75,769** | **100** |
| **Average Stems/Acre** | **1306** | |
| **1-Gallon Containerized Planting** | | |
| **Species** | **Total** | **Percent** |
| **Acres** | **1.5** | **%** |
| American Elm (*Ulmus americana*) | 40 | 7.7 |
| Birch River (*Betula nigra*) | 40 | 7.7 |
| Black Gum (*Nyssa sylvatica*) | 70 | 13.5 |
| Oak Red (*Quercus rubra*) | 60 | 11.5 |
| Oak Water (*Quercus nigra*) | 90 | 17.3 |
| Oak White (*Quercus alba*) | 90 | 17.3 |
| Red Bud (*Cercis canadensis*) | 60 | 11.5 |
| Sycamore (*Platanus occidentalis*) | 30 | 5.8 |
| Tulip Poplar (*Liriodendron tulipifera*) | 40 | 7.7 |
| **TOTALS** | **520** | **100** |
| **Average Stems/Acre** | **347** | |

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PH: (919) 859-0123
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



**WITS END**
UNION COUNTY, NC

**AS-BUILT PLANTING LIST**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-04ZY
DATE: 2021
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–04ZY***

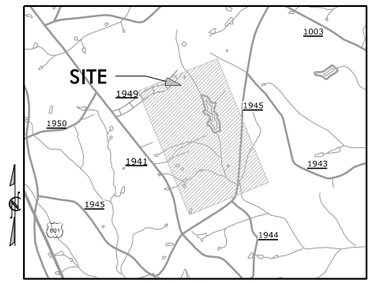
10/6/2022
Wits End_psh_AB-04ZY.dgn
Jarvis

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | WITS END SITE | 1 | |

# AS–BUILT SURVEY DRAWINGS FOR: RESTORATION SYSTEMS, LLC WITS END SITE

***LOCATION: UNION COUNTY, NORTH CAROLINA***

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

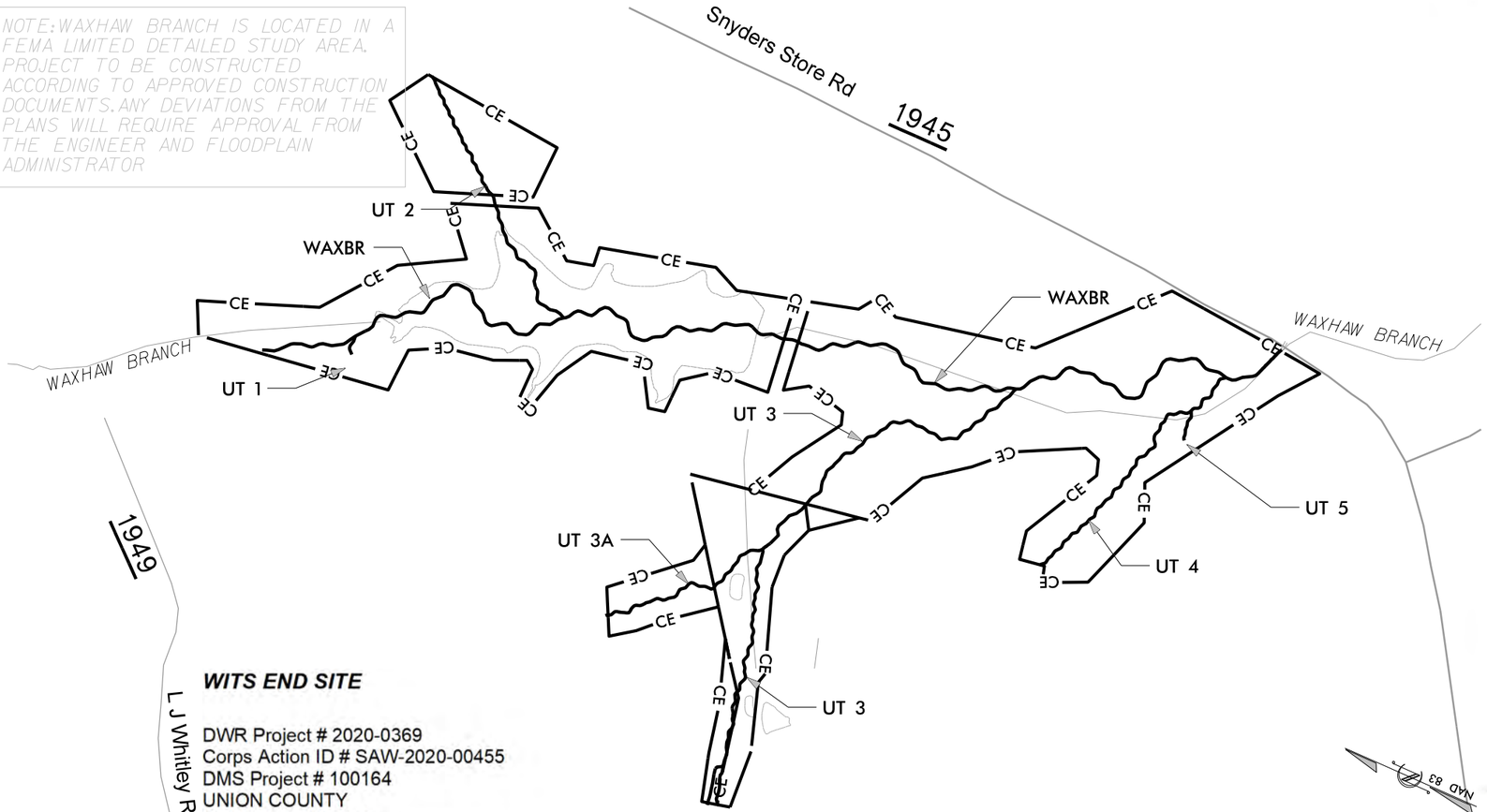



VICINITY MAP
Not to Scale

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

INDEX OF SHEETS

| SHEET NUMBER | SHEET |
|---|---|
| AB-01 | Title Sheet |
| AB-02 | As-Built Symbology |
| AB-03 | As-Built Easement |
| AB-03A | Control Points |
| AB-03B | As-Built Site Overview |
| AB-C04 THRU AB-C53 | As-Built Survey |
| AB-C54 THRU AB-C61 | As-Built Cross Sections |




***WITS END SITE***

DWR Project # 2020-0369
Corp Action ID # SAW-2020-00455
DMS Project # 100164
UNION COUNTY
LATITUDE: 34.9130
LONGITUDE: -80.4438 (WGS84)

**SURVEYORS CERTIFICATION(S)**

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground utilities or any other features above, or below ground other than those shown. However, no visible evidence of cemeteries or utilities, aboveground or otherwise, was observed by the undersigned (other than those shown).

I certify that the survey is of an existing parcel or parcels of land or one or more existing easements and does not create a new street or change an existing street.

I JOHN A. RUDOLPH , certify that this plat was prepared under my supervision from an actual field survey made under my supervision, of as-built conditions.

That the boundaries not surveyed are clearly indicated as such and were plotted from information as referenced hereon; That the ratio of precision as calculated was 1:7,500+ and that the global navigational satellite system (GNSS) was used to perform this survey and the following information was used:
Class of Survey: CLASS B (HORIZONTAL) CLASS B (VERTICAL)
Positional Accuracy: 0.12 feet (HORIZONTAL)
Type of GPS field procedure: RTK
Dates of survey: May and June 2022
Datum/Epoch: NAD 1983(2011)
Published/Fixed Control Use: OPUS
Geoid Model: 2012B CONUS
Combined Grid Factor: 0.99995565 GROUND TO GRID
Units: US SURVEY FEET

That this plat meets the requirements of the standards of practice for land surveying in North Carolina. Witness my hand and seal this 29th day of July , 2022.

SEAL OR STAMP

DocuSigned by:
A24BB30246D54EC...

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022
Professional Land Surveyor

L-4194
License Number

k2 design group

***GRAPHIC SCALES***

20 10 0 20 40
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

4 2 0 4 8
PROFILE (VERTICAL)

Axiom Environmental, Inc.
*Axiom Environmental*
*218 Snow Ave*
*Raleigh, NC 27603*
GRANT LEWIS
***PROJECT DESIGNER***

RESTORATION SYSTEMS LLC
*Restoration Systems*
*1101 Haynes St.*
*Suite 211*
*Raleigh, NC 27604*
WORTH CREECH
***SITE CONSTRUCTION MANAGER***

***DATE:***

***CONTRACT: WITS END SITE***

09/08/56

11/9/2022
Wits End_psh_AB-C01.dgn
jharvey

DocuSigned by:
A71BB3224D54EC...

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

***AS–BUILT:***

- Stream Centerline
- Stream Top of Bank
- Stream Gauge
- Groundwater Gauge
- Benthic & Water Quality Station
- Origin Point on CVS Plots
- CVS Plots
- Cross Section — XS-10R
- Adjusted Stream Structure

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Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SYMBOLOGY**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-C02
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C02***

11/9/2022
Wits End_PSH_AB-C02.dgn
Jonathan

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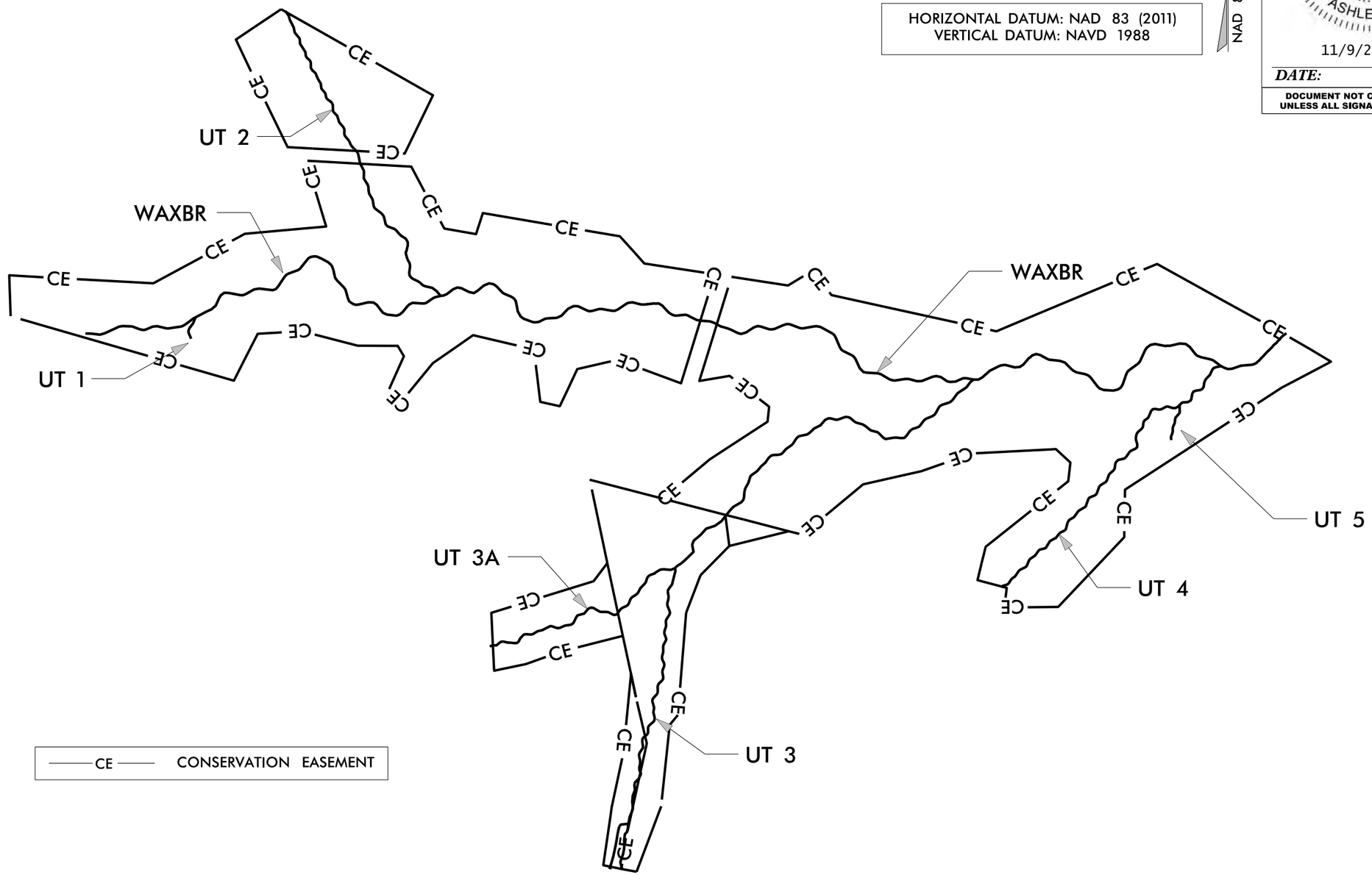
SCALE: 1″ = 400′

NAD 83

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022
*DATE:*

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Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT EASEMENT**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C03 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |

*SHEET NO.*
***AB–C03***

11/9/2022
Wits End_psh_AB-C03.dgn
Jarvis

SURVEY INFORMATION PROPERTY/
EASEMENT PROVIDED BY:
CAROLINA SURVEYORS, INC.
P.O. BOX 267
PINEVILLE, NC 28134

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988

200′ 100′ 0 200′ 400′
SCALE: 1″ = 400′

NAD 83

Snyders Store Rd
1945

L J Whitley Rd
1949

WAXHAW BRANCH

WAXHAW BRANCH

UT 1

UT 2

UT 3

UT 3A

UT 4

UT 5

NL OI CNTRL–TR–T

NL RT–TR2

NL 66

NL 68

NL 63

WAXBR

NL 60

NL 57

NL 70

NL 72

NL 74

NL 56

NL 54

NL 31

NL HUB AN TAC

NL 26

NL 37

OI NL CNTRL–GPS

NL40–RT–TR1

NL 39

NL 41

NL 42

OI NL CNTRL TR–T

CE

BENCHMARK
REBAR SET
N.C.S.P.C.
N: 427,091.64
E: 1,566,907.24
CF: 0.99986609

ELV: 595.05
(NAVD88)

| Wits End Control Points | | | | |
|---|---|---|---|---|
| Pt ## | Northing | Easting | Elevation | Type |
| NL OI CNTRL-RT-T | 428481.86 | 1566962.93 | 618.39 | |
| NL 66 | 428310.45 | 1566630.59 | 604.58 | |
| NL RT-TR2 | 427930.80 | 1566459.30 | 596.35 | |
| NL 63 | 427963.50 | 1566810.88 | 593.93 | |
| NL 68 | 428027.03 | 1567082.61 | 608.51 | |
| NL 60 | 427572.42 | 1566501.17 | 601.93 | |
| NL 70 | 427481.14 | 1567349.89 | 604.03 | |
| NL 72 | 427247.03 | 1567486.57 | 601.97 | |
| NL 57 | 427056.72 | 1566589.75 | 605.03 | |
| NL OI CNTRL (BENCHMARK) | 427091.64 | 1566907.24 | 595.05 | |
| NL 74 | 426987.24 | 1567597.71 | 607.38 | |
| NL 31 | 426683.30 | 1567708.92 | 604.90 | |
| NL 56 | 426479.84 | 1566731.70 | 602.25 | |
| NL 26 | 426407.32 | 1567589.08 | 600.82 | |
| NL HUB AN TAC | 426142.12 | 1567836.12 | 598.06 | |
| NL 54 | 426077.01 | 1566786.96 | 584.05 | |
| NL 42 | 425657.10 | 1566831.98 | 594.52 | |
| NL 39 | 425679.88 | 1567275.35 | 579.53 | |
| NL 37 | 425590.84 | 1567694.14 | 588.43 | |
| OI NL CNTRL-GPS | 425764.55 | 1568013.05 | 597.88 | |
| NL 40-TR-TR1 | 425442.55 | 1567494.97 | 577.39 | |
| OI NL CNTRL TR-T | 425251.88 | 1566886.40 | 595.88 | |
| NL 41 | 425375.02 | 1567052.63 | 593.65 | |

Axiom Environmental, Inc.

WITS END
UNION COUNTY, NC

CONTROL POINTS

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-C03A
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
AB–C03A



11/9/2022
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Harvey

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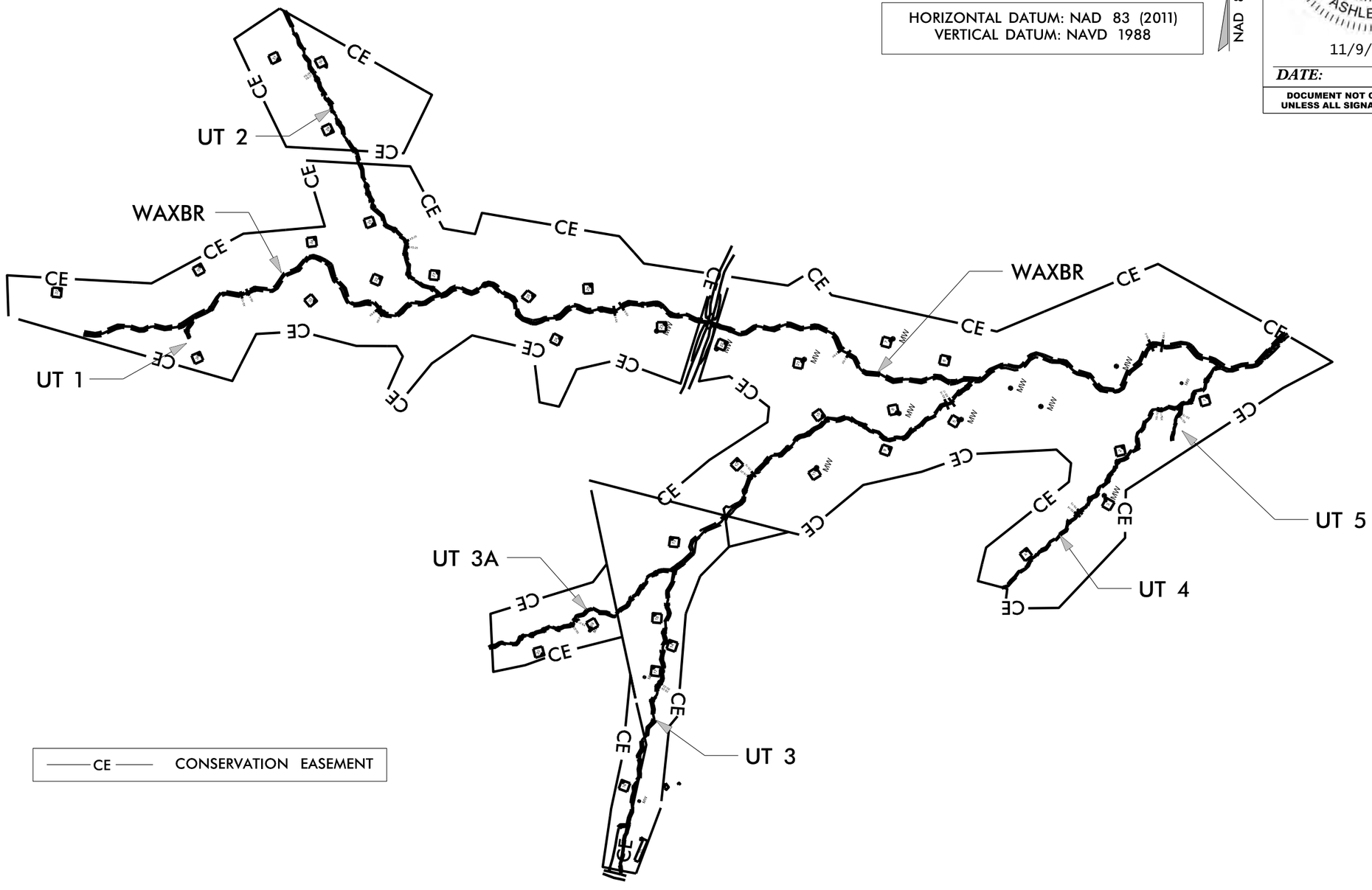
SCALE: 1″ = 400′

NAD 83

HORIZONTAL DATUM: NAD 83 (2011)
VERTICAL DATUM: NAVD 1988




CE CONSERVATION EASEMENT

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

*DATE:*

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k2 design group

Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC

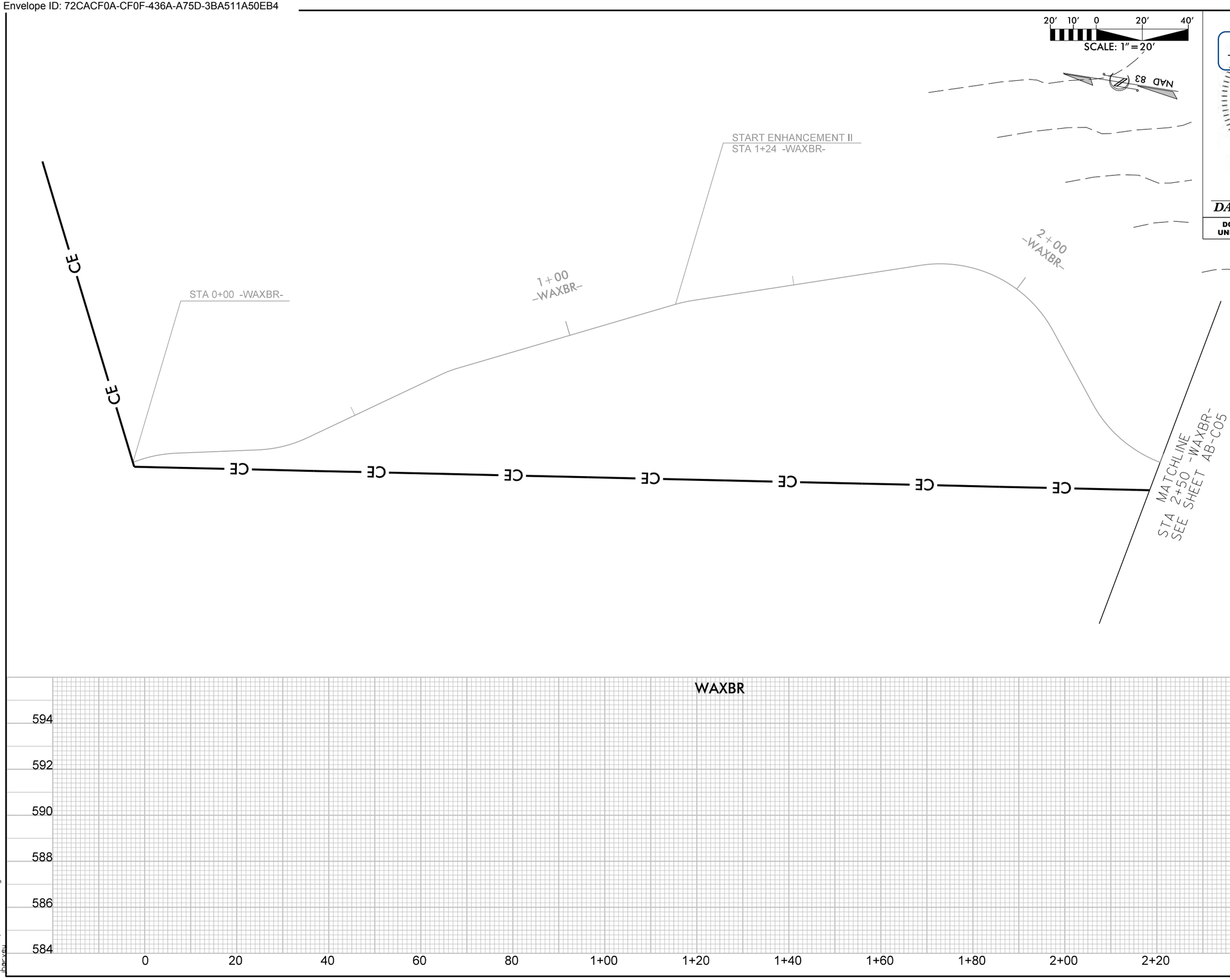
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SITE OVERVIEW**



| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C03B |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C03B*** |

11/9/2022
Wits End_psh_AB-C03B.dgn
Darren

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NORTH CAROLINA
PROFESSIONAL
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH
A2HBB30246D54EC...

11/9/2022
*DATE:*

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RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C04 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB-C04*** |

11/9/2022
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Jarvis

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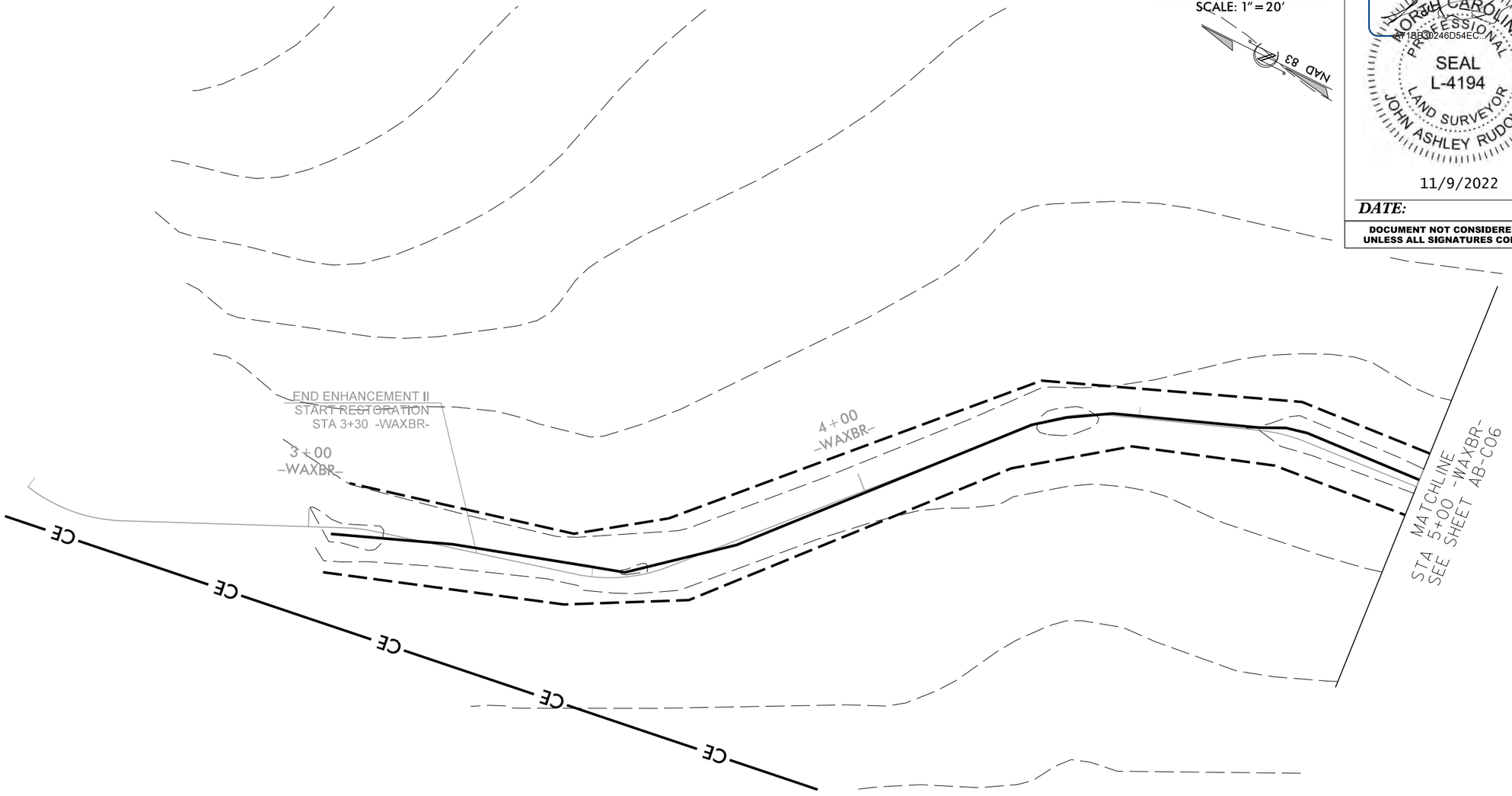
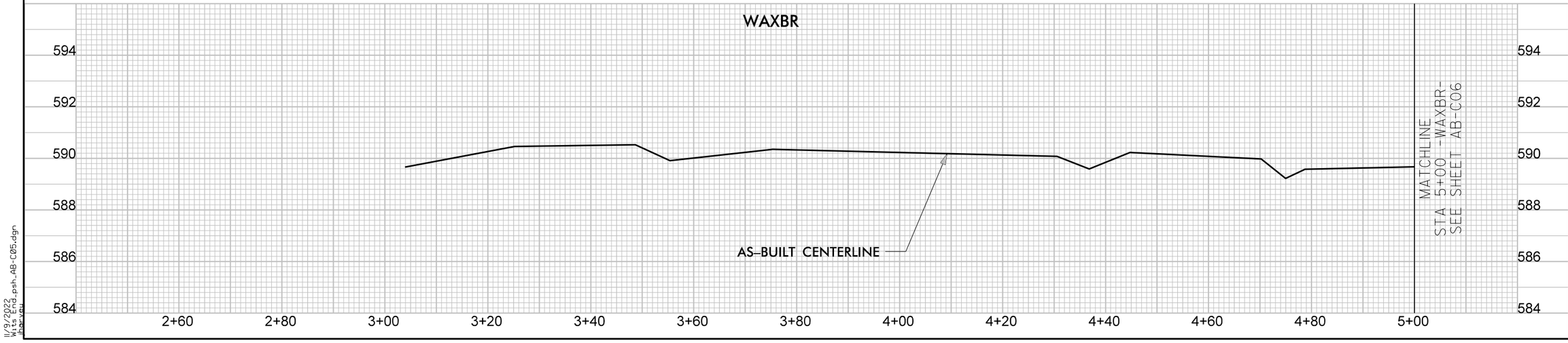
SCALE: 1″ = 20′

NAD 83

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NORTH CAROLINA
PROFESSIONAL
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC

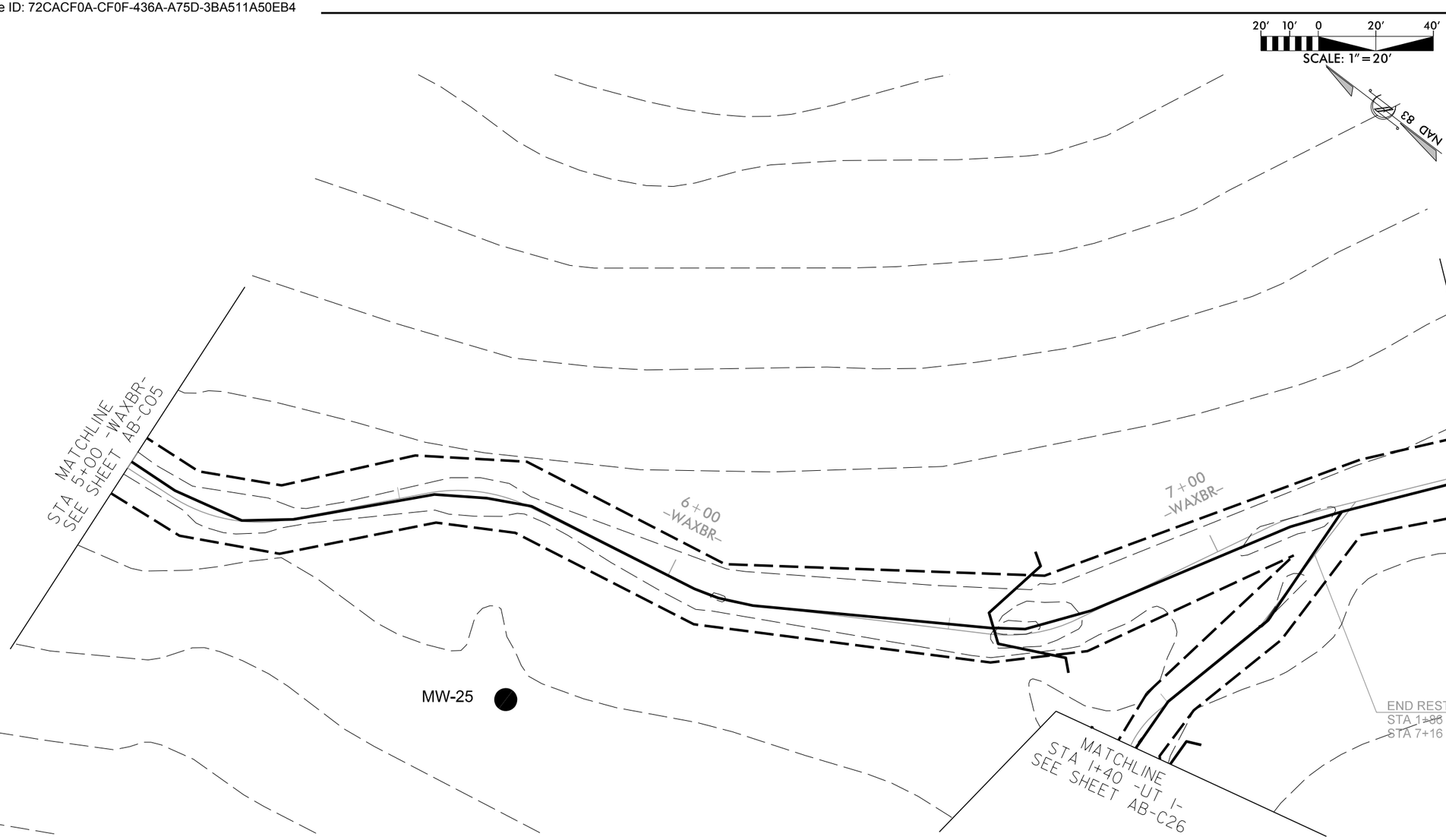
**WITS END**
**UNION COUNTY, NC**

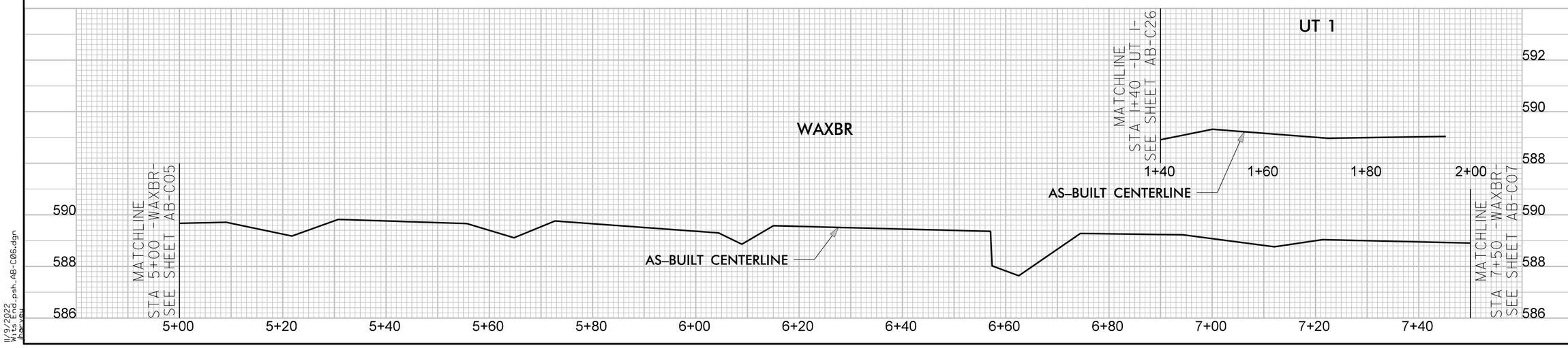
**AS-BUILT SURVEY**



| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C05 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C05*** |

11/9/2022
Wits End_psh_AB-C05.dgn
Jonathan Hall

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C06 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C06*** |

11/9/2022
Wits End_psh_AB-C06.dgn
Default

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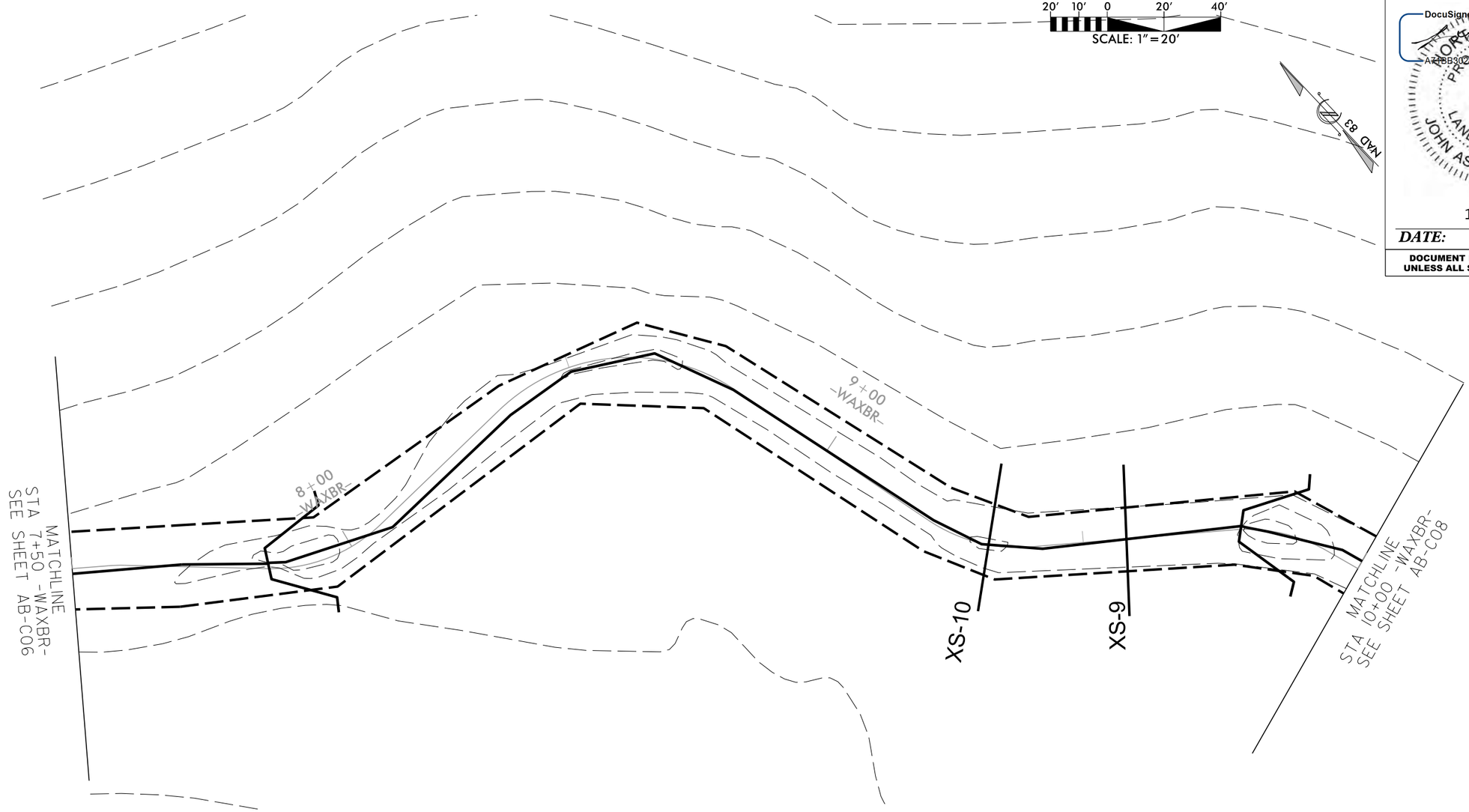
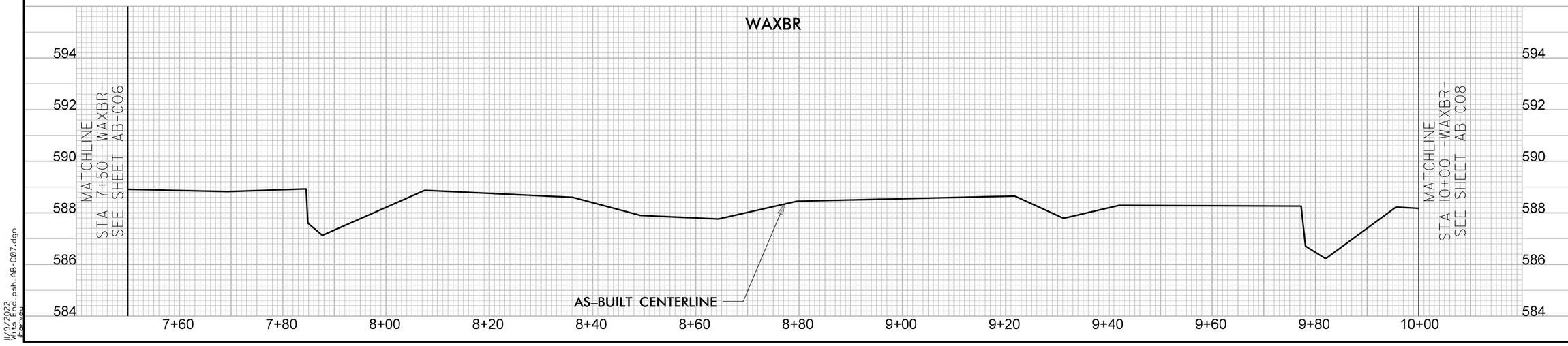
SCALE: 1″ = 20′

NAD 83

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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k2 design group

Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**

**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C07 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C07*** |

11/9/2022
Wits End_psh_AB-C07.dgn
Default

20′ 10′ 0 20′ 40′

SCALE: 1″ = 20′

NAD 83

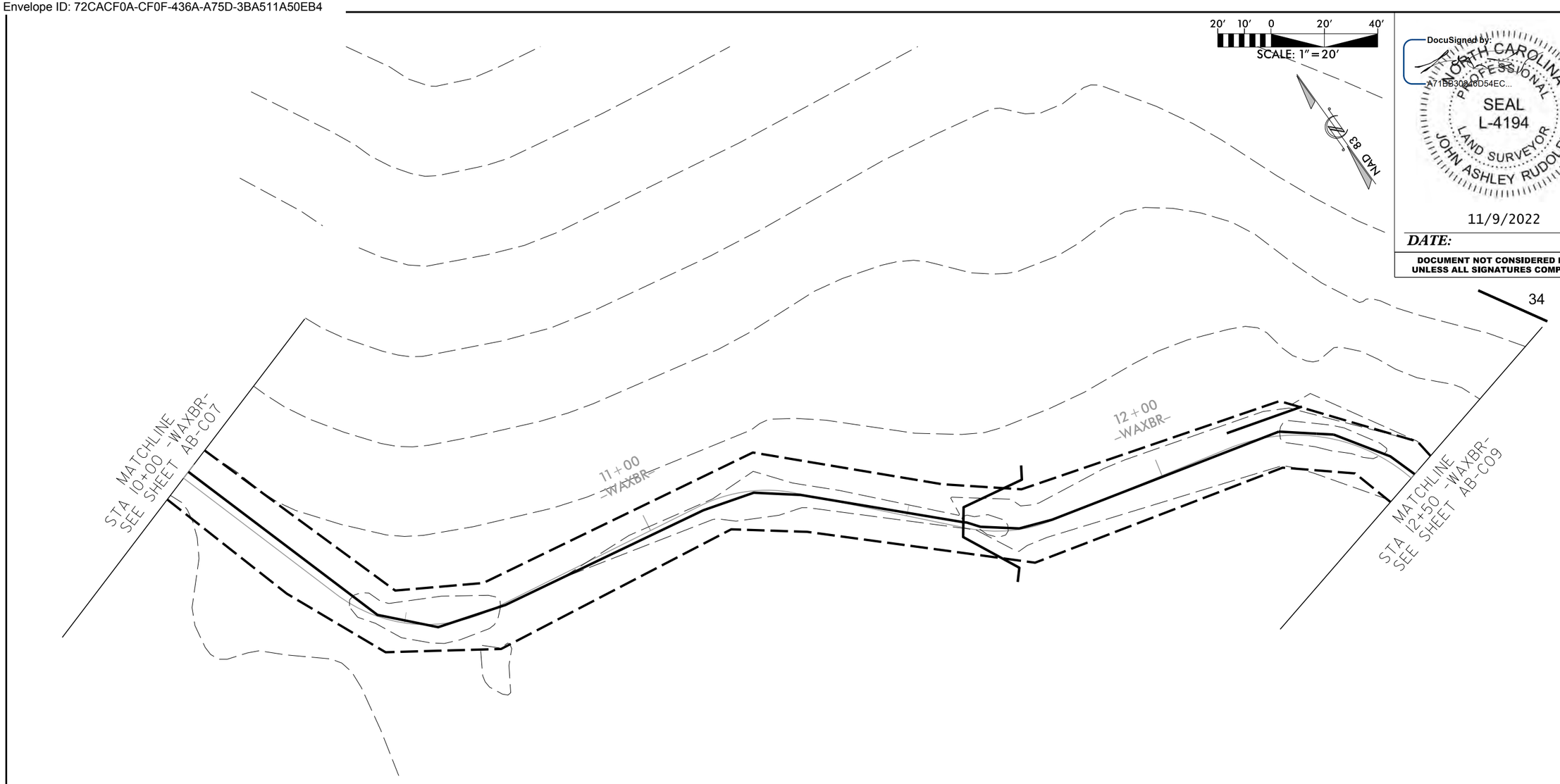
DocuSigned by:
A71BB30846D54EC...

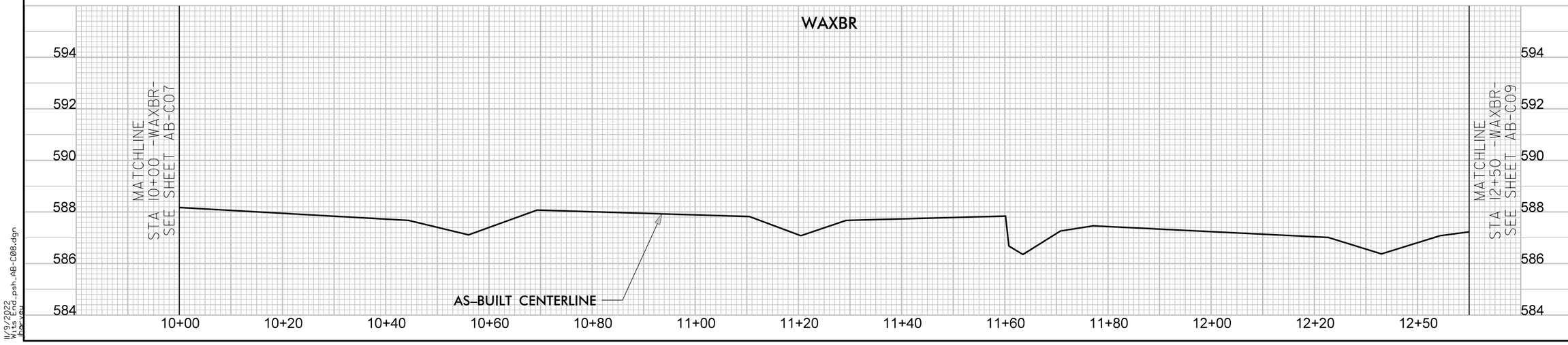
NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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RESTORATION SYSTEMS LLC

# WITS END
UNION COUNTY, NC

# AS-BUILT SURVEY

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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C08 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C08*** |



11/9/2022
Wits End_psh_AB-C08.dgn
jharvell

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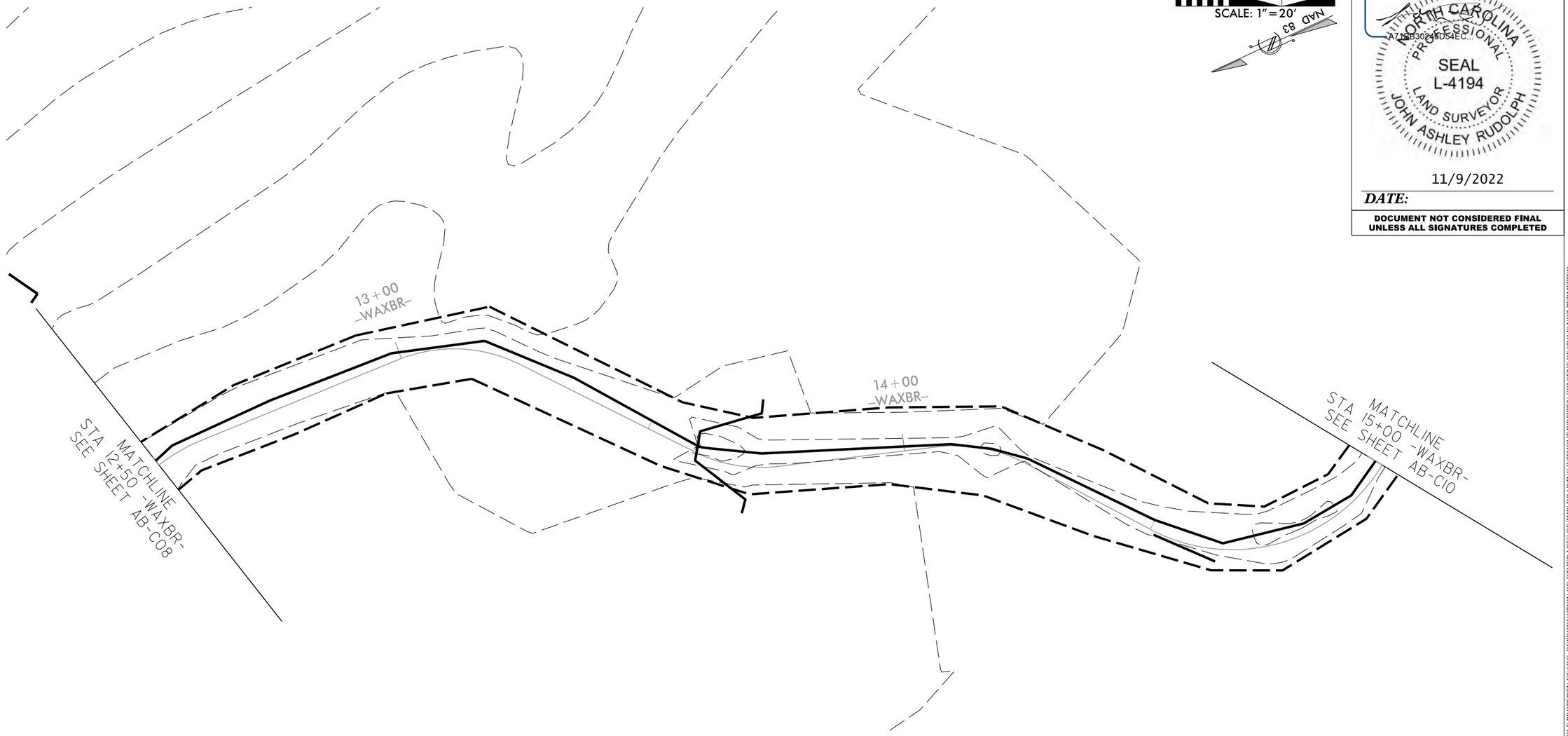
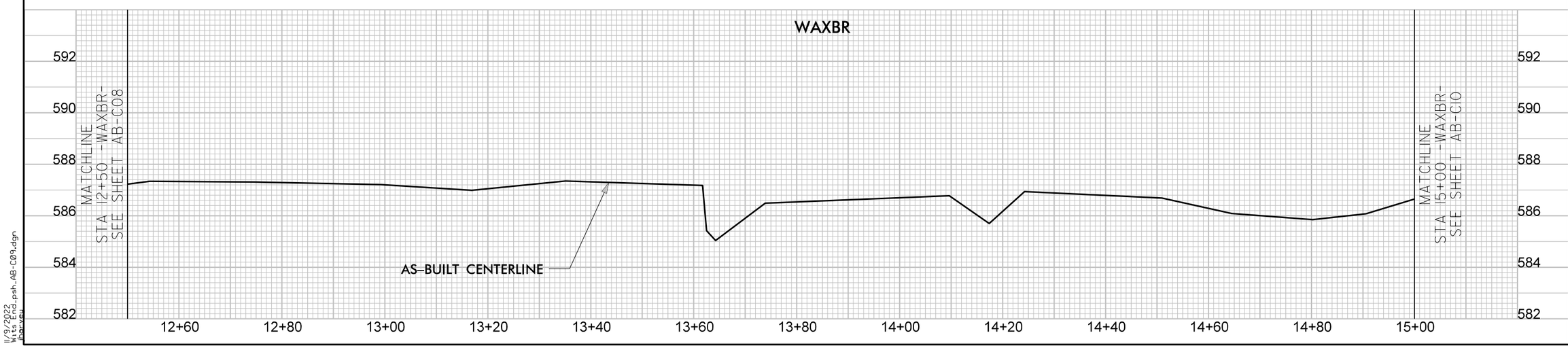
SCALE: 1″ = 20′

NAD 83

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

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# WITS END

UNION COUNTY, NC

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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C09 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C09*** |

11/9/2022
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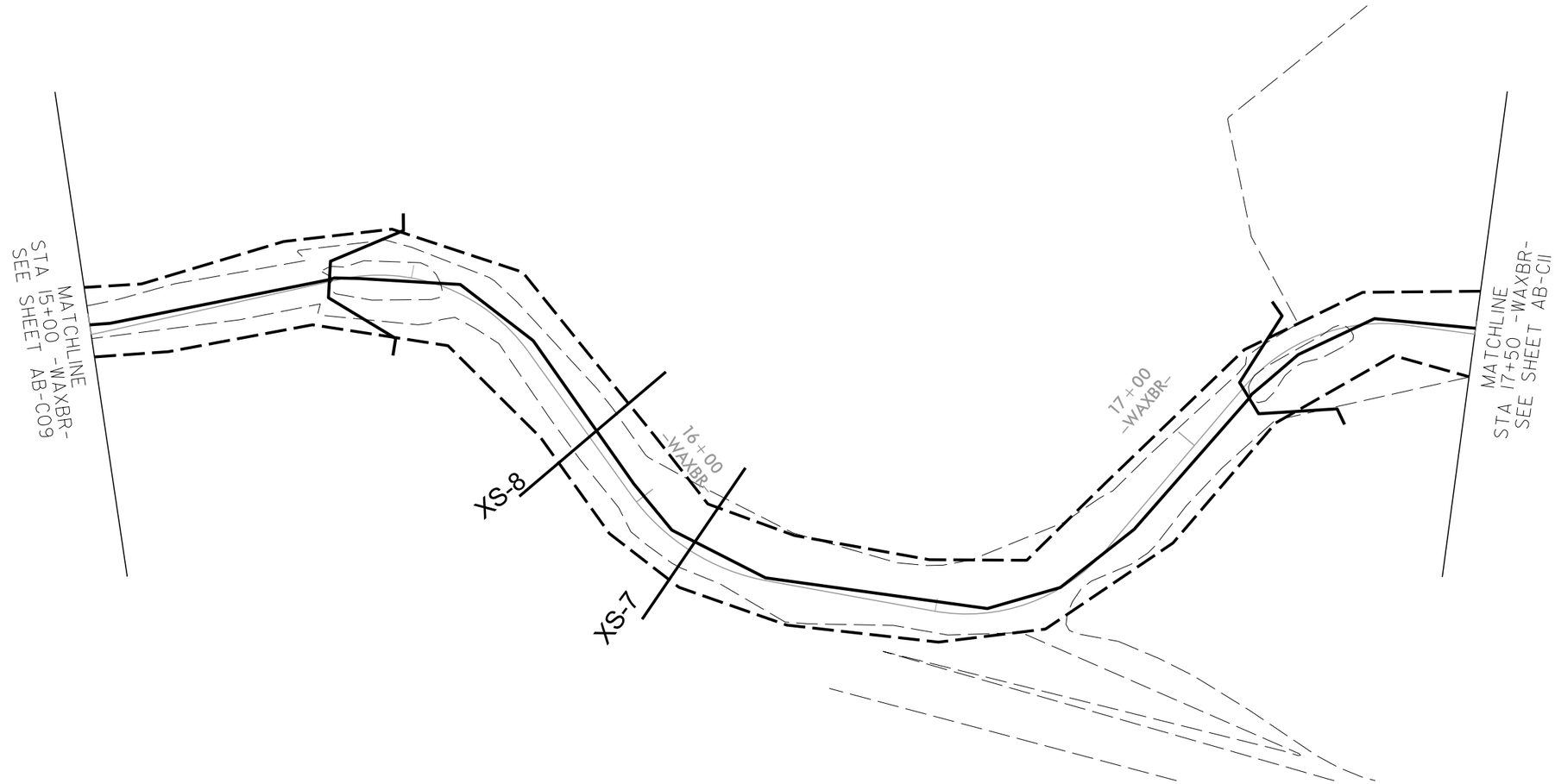


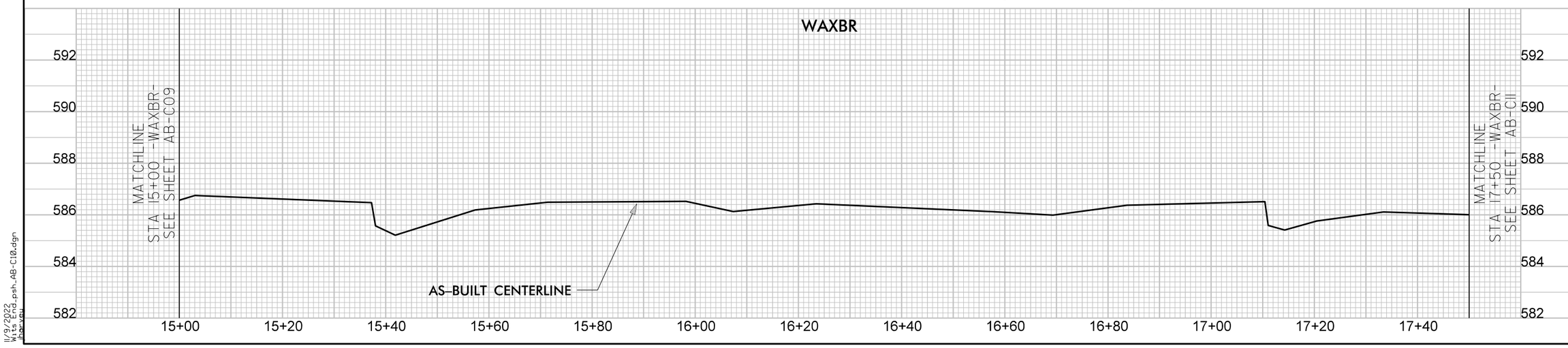


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**AS-BUILT SURVEY**

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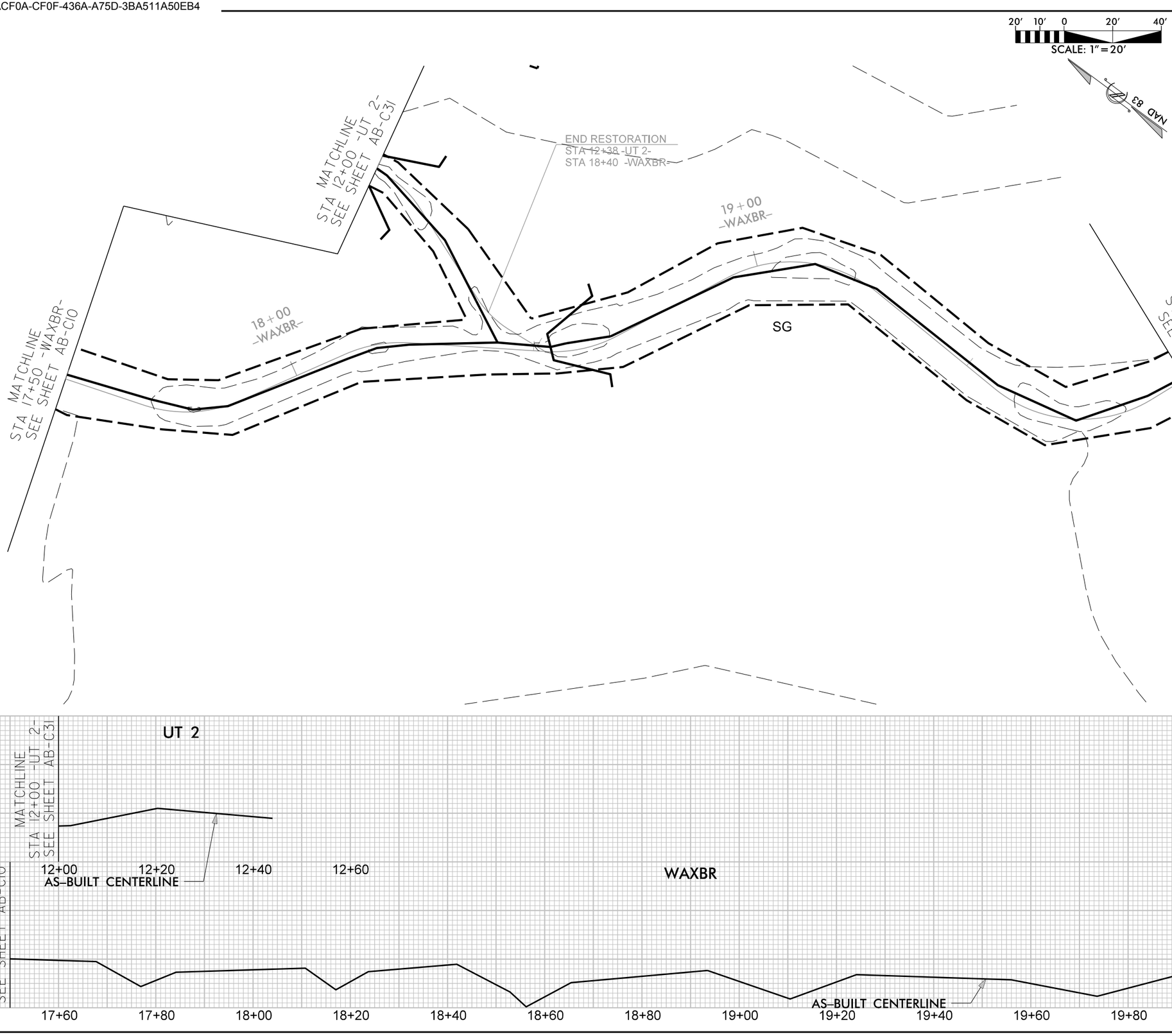
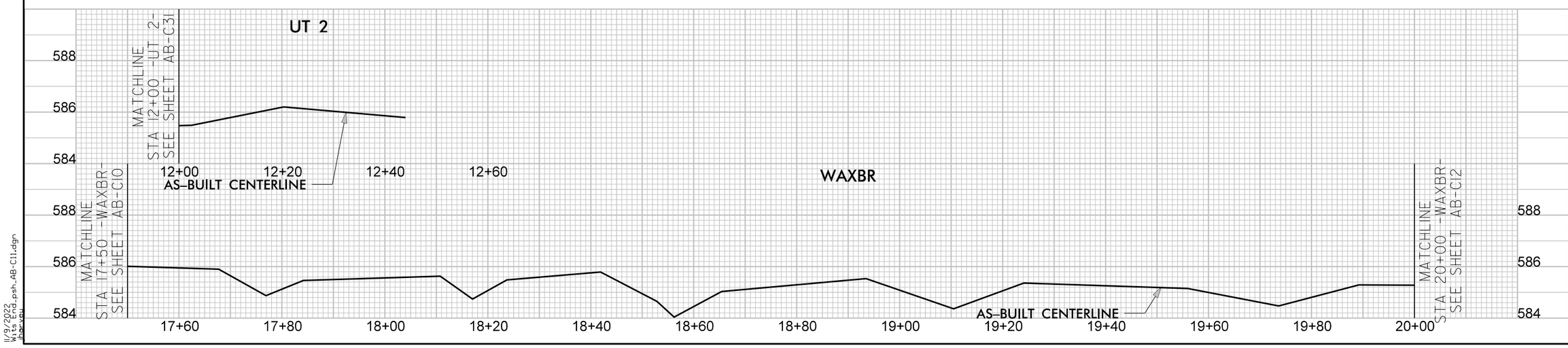
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-04G |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C10*** |

11/9/2022
Wits End_psh_AB-C10.dgn
jharvey

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| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-CII |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
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| *SHEET NO.* | ***AB-CII*** |

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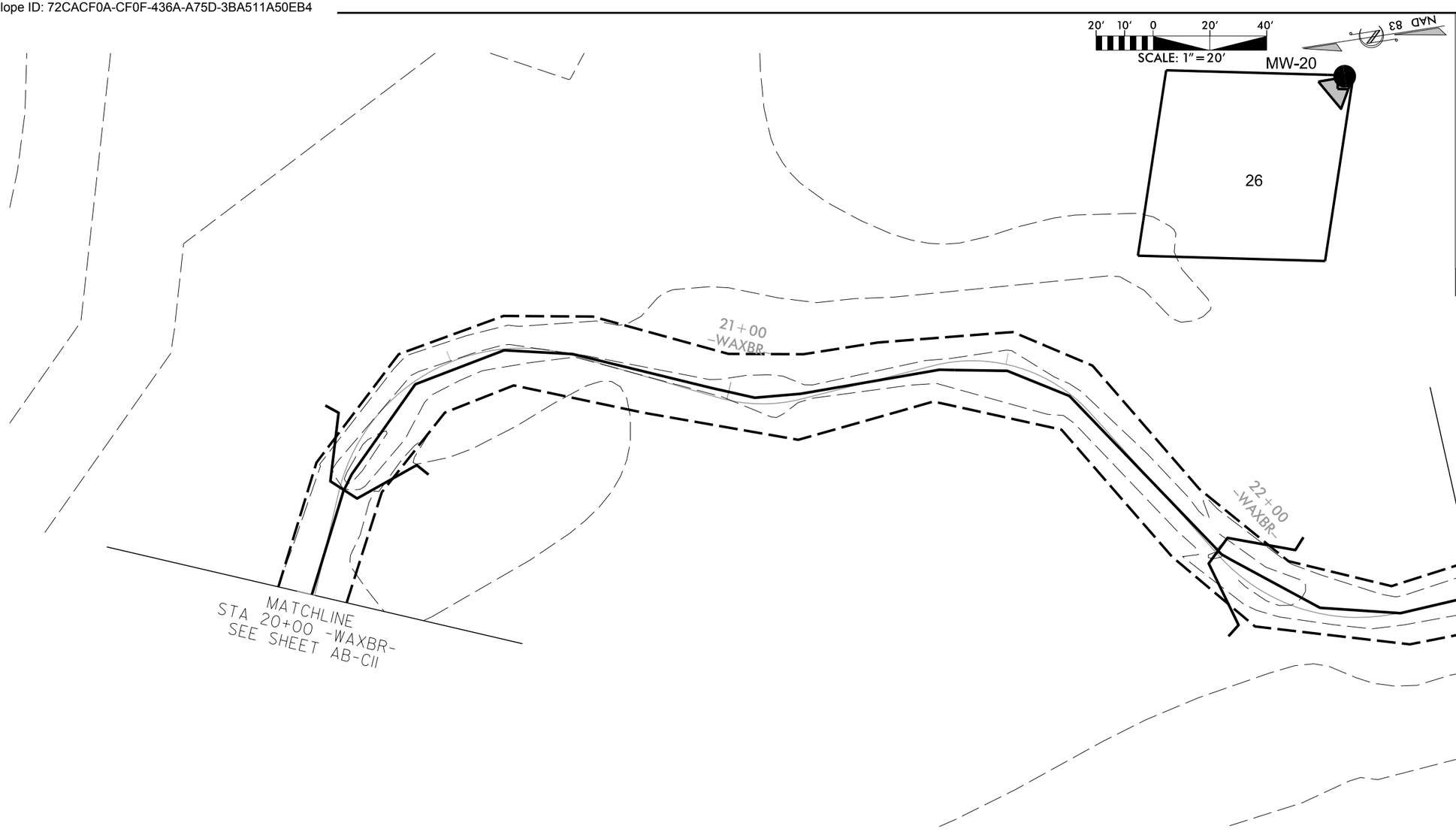
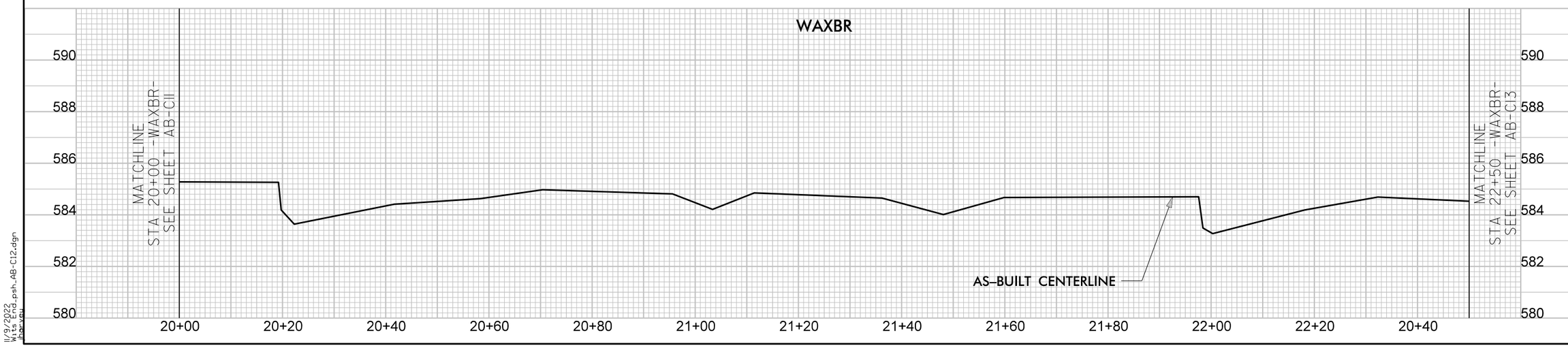
Jarvis

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UNION COUNTY, NC

# AS-BUILT SURVEY

PROJECT # :
1221-20024

DRAWING NAME:
WITS END PSH AB-CI2

DATE:
2022

DRAWN BY:
JRH

REVIEWED BY:
JGD

REVISIONS:

SHEET NO.
***AB–CI2***

11/9/2022
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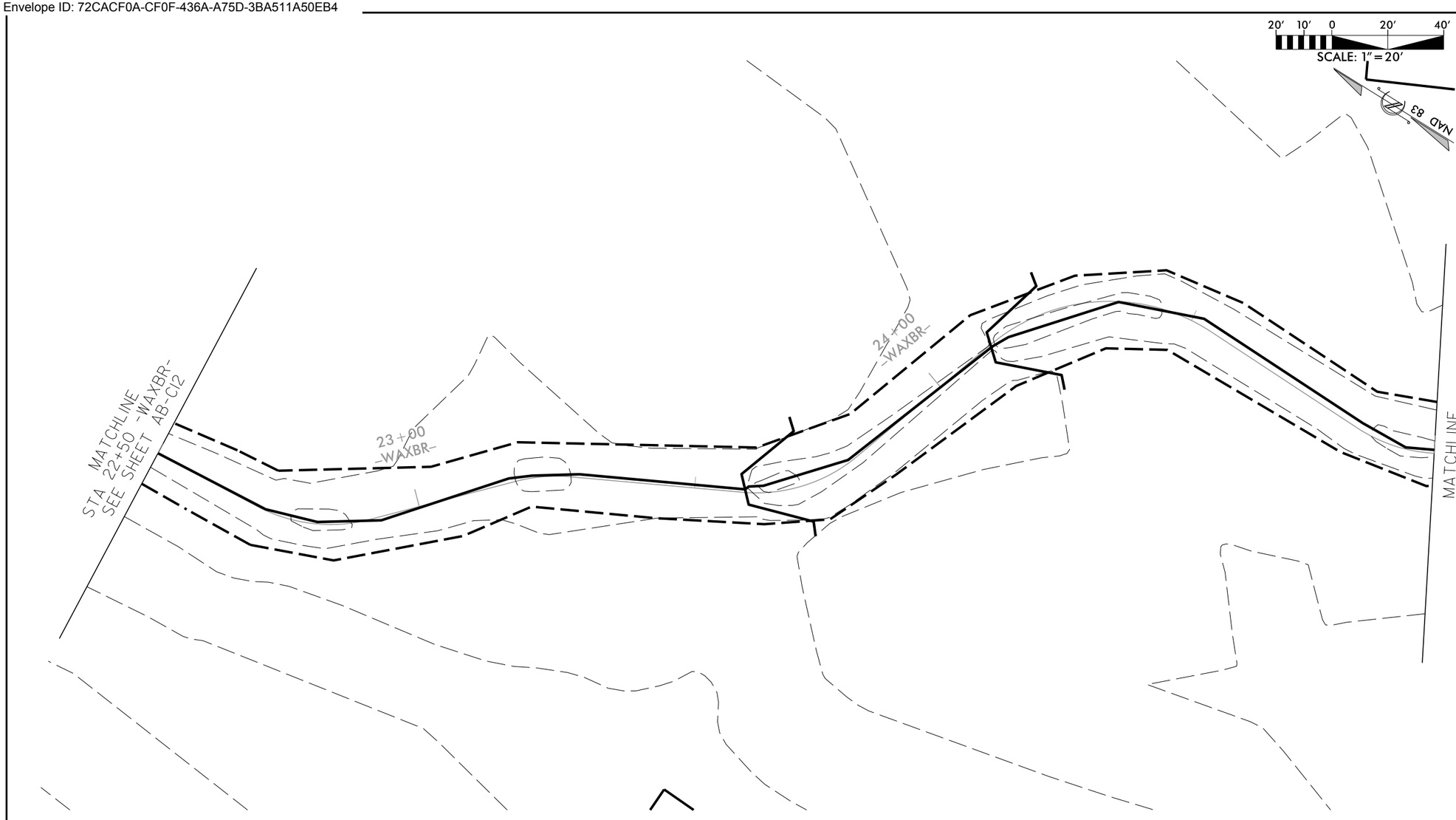
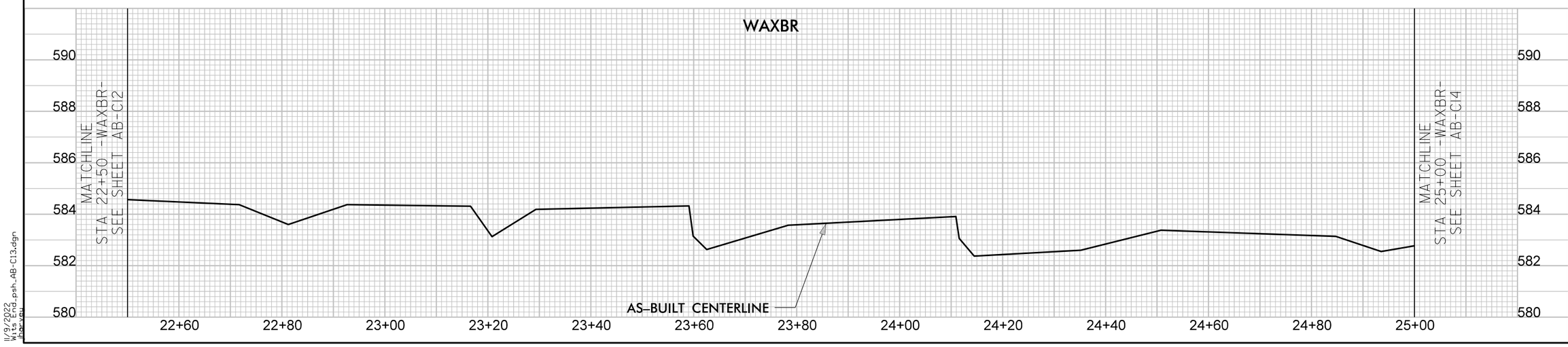
jharvell

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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**



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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C13 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C13*** |

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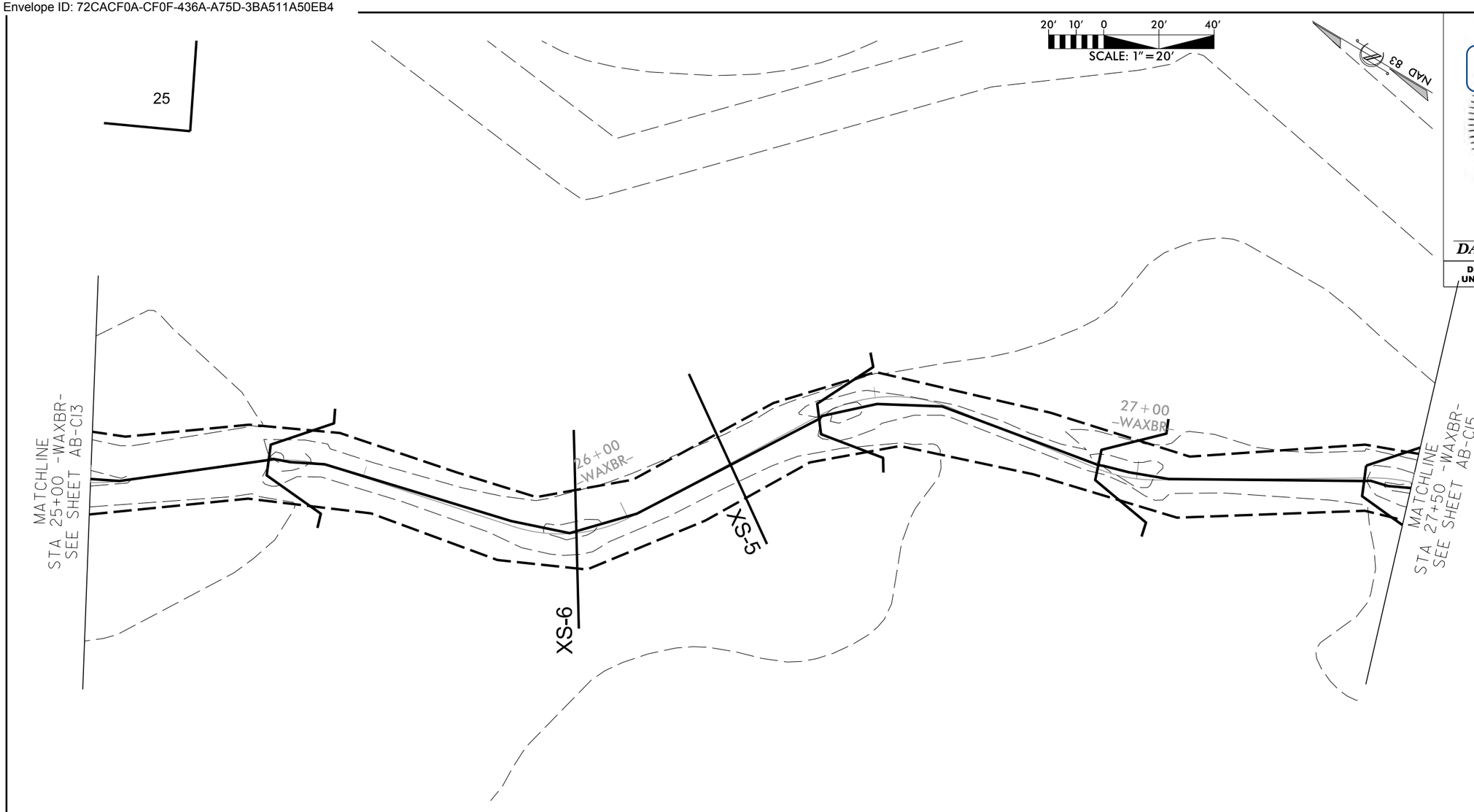
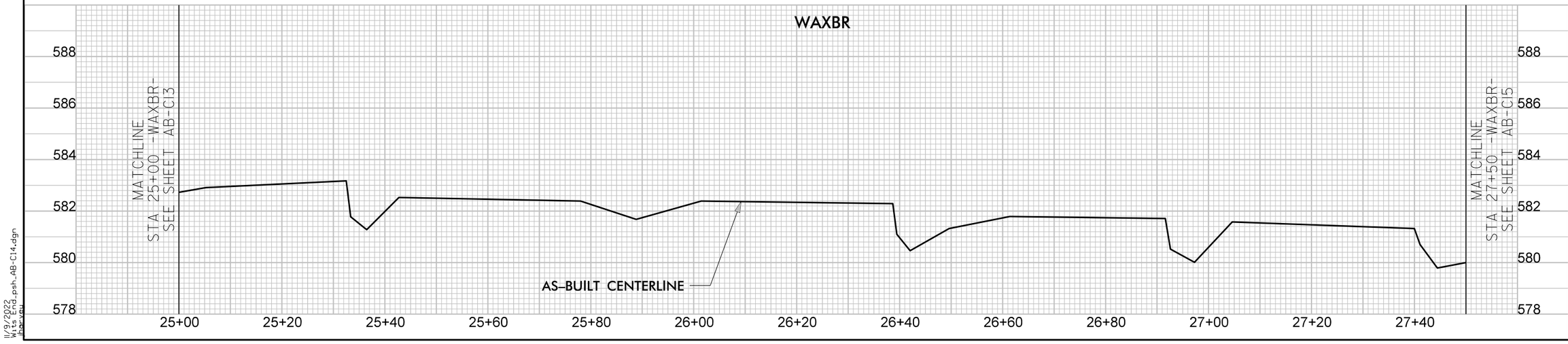
Jarvis

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11/9/2022

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**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C14 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |

*SHEET NO.*

***AB–C14***

11/9/2022
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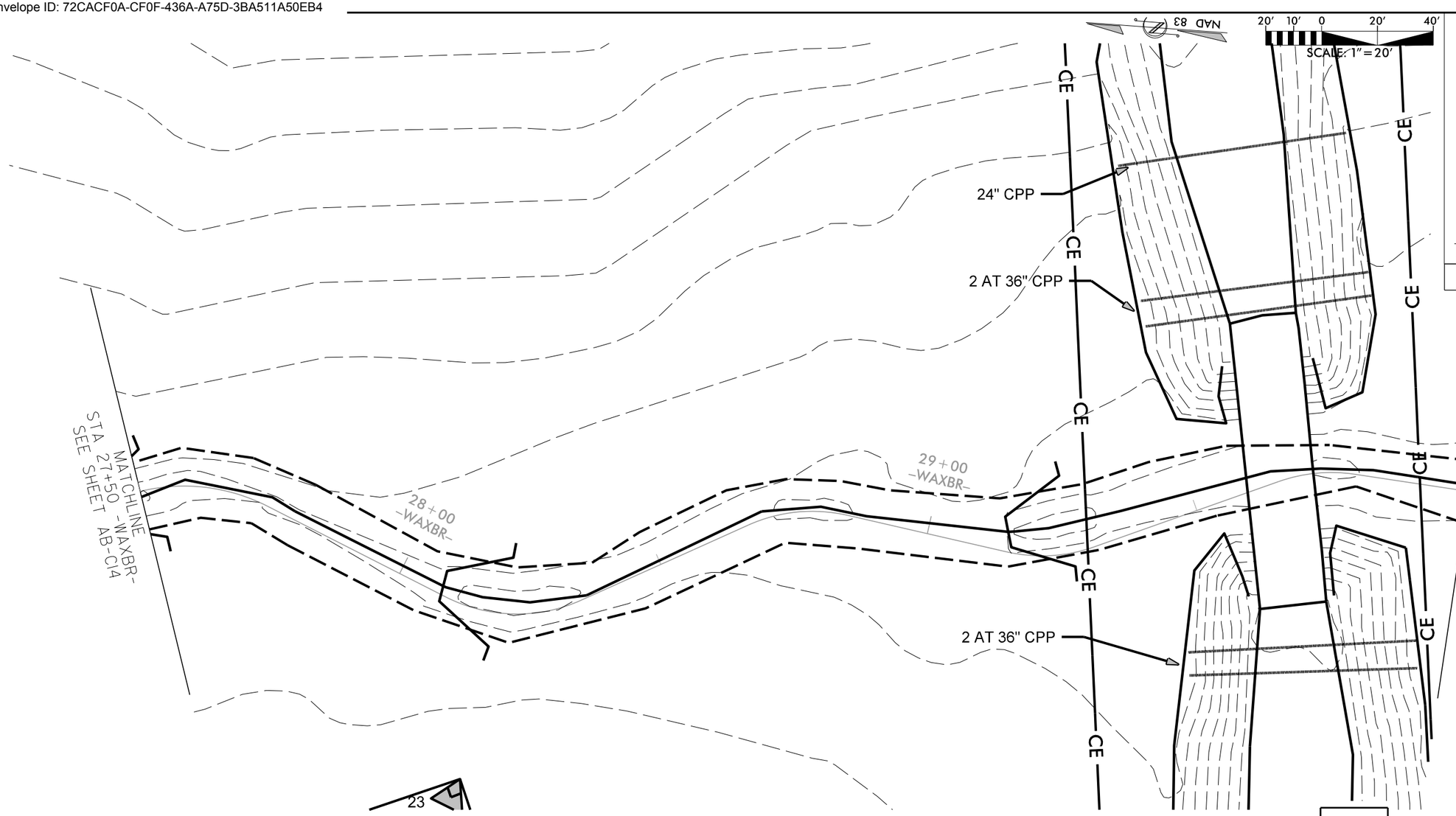
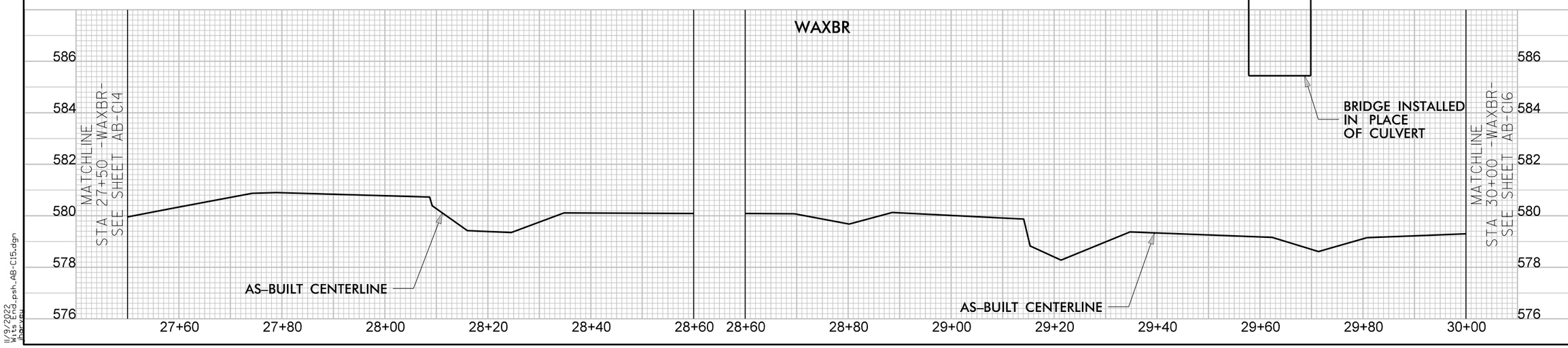
jharvey

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**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C15 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |

SHEET NO.
***AB–C15***

11/9/2022
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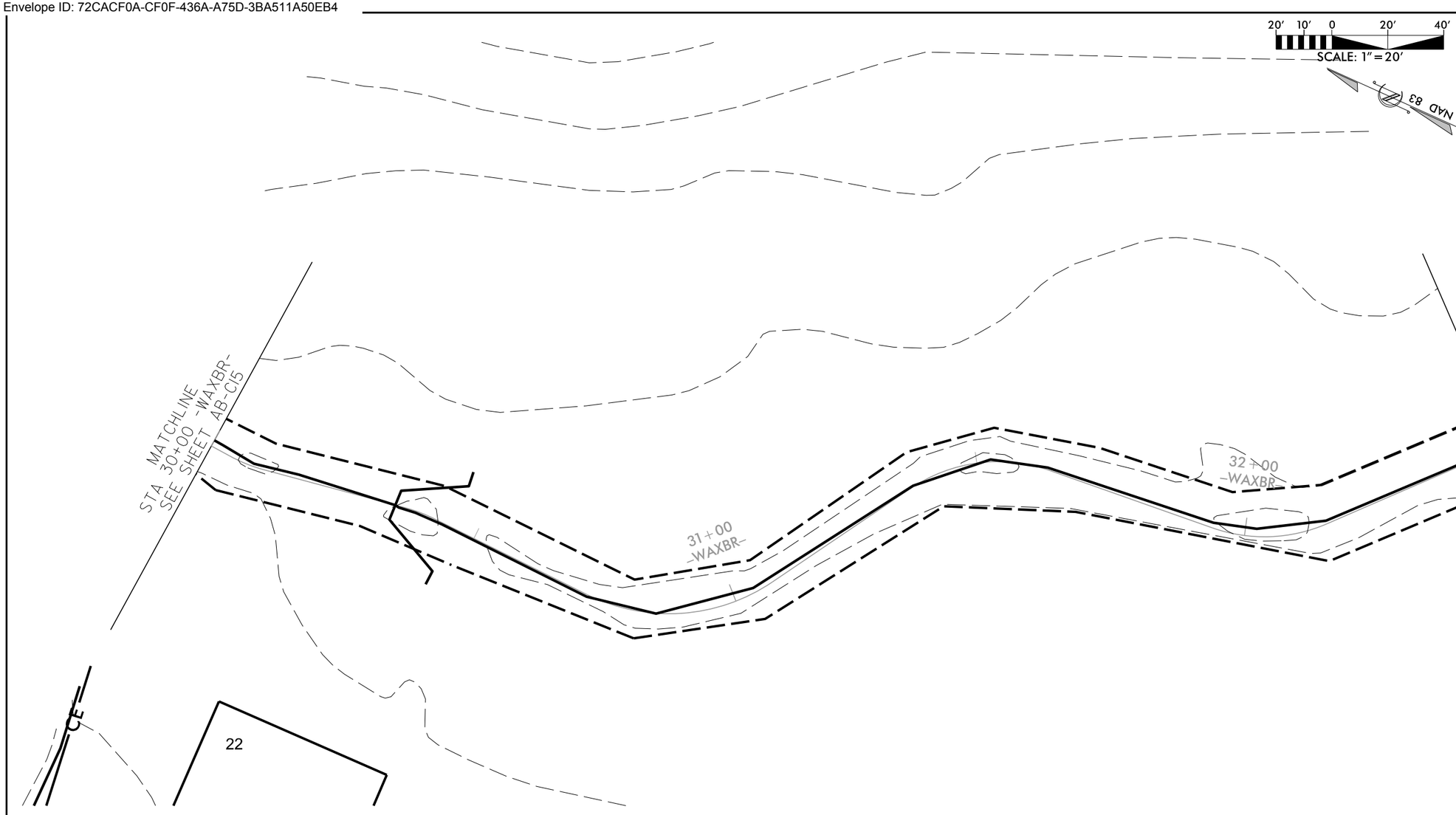
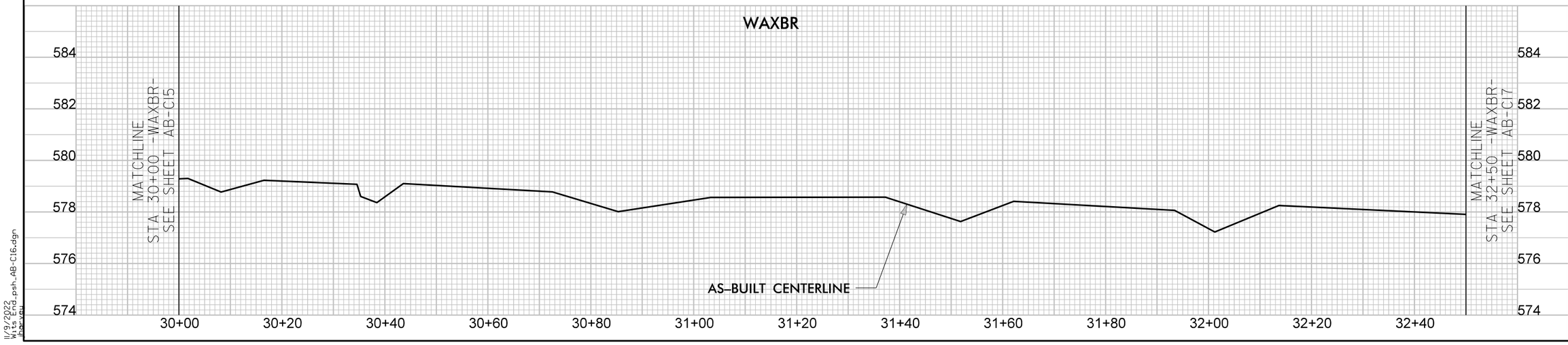
jharvell

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# WITS END
UNION COUNTY, NC

# AS-BUILT SURVEY

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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C16 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C16*** |

11/9/2022
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jharvell

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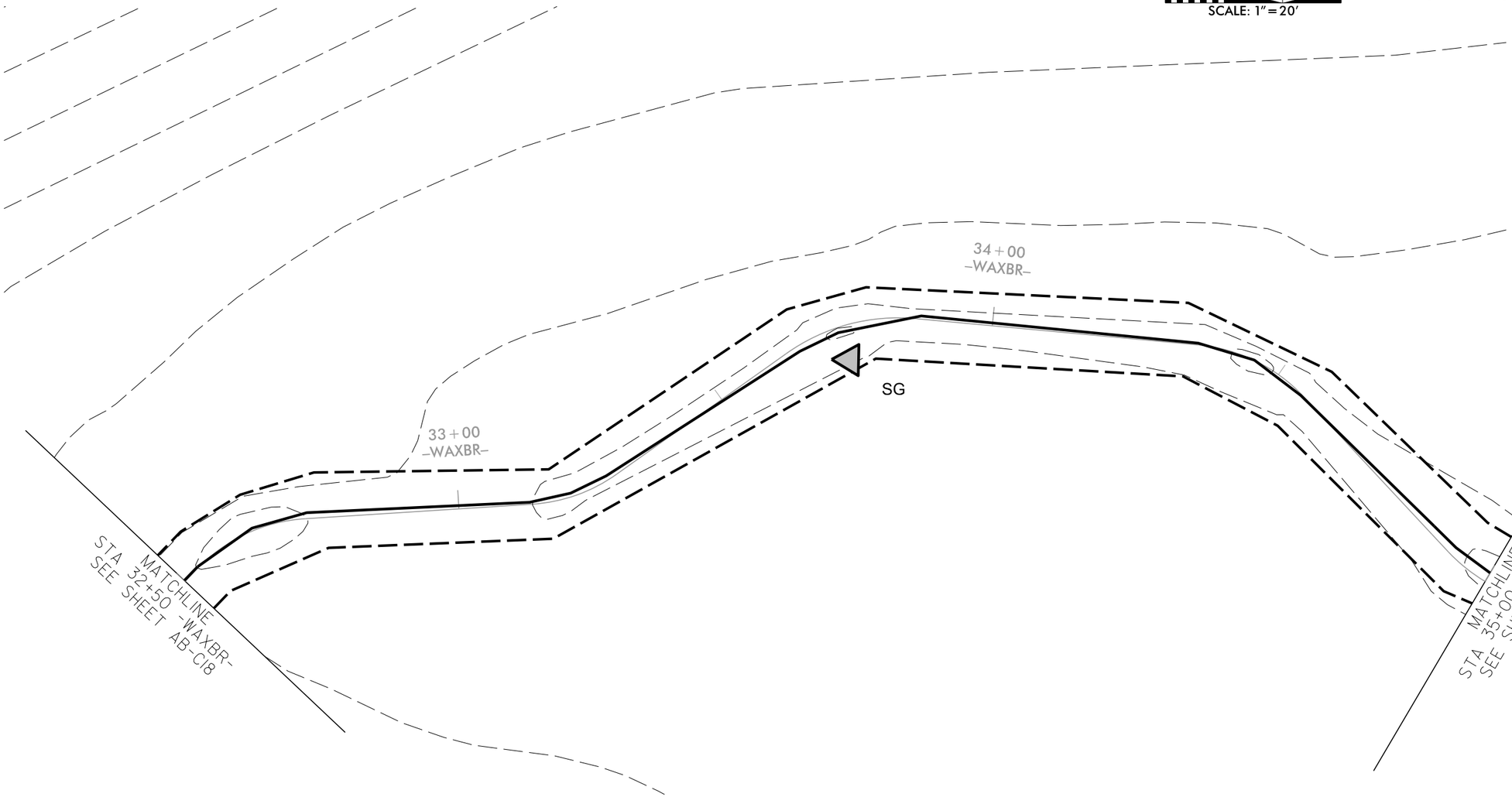
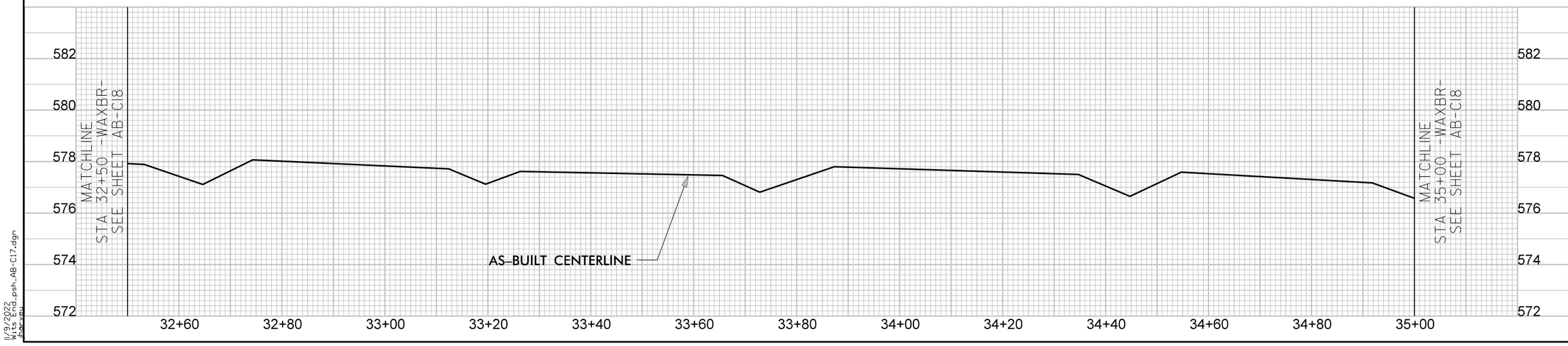
SCALE: 1″ = 20′

NAD 83

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11/9/2022

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RESTORATION SYSTEMS LLC

# WITS END

**UNION COUNTY, NC**

# AS-BUILT SURVEY

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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C17 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
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| SHEET NO. | ***AB–C17*** |



11/9/2022
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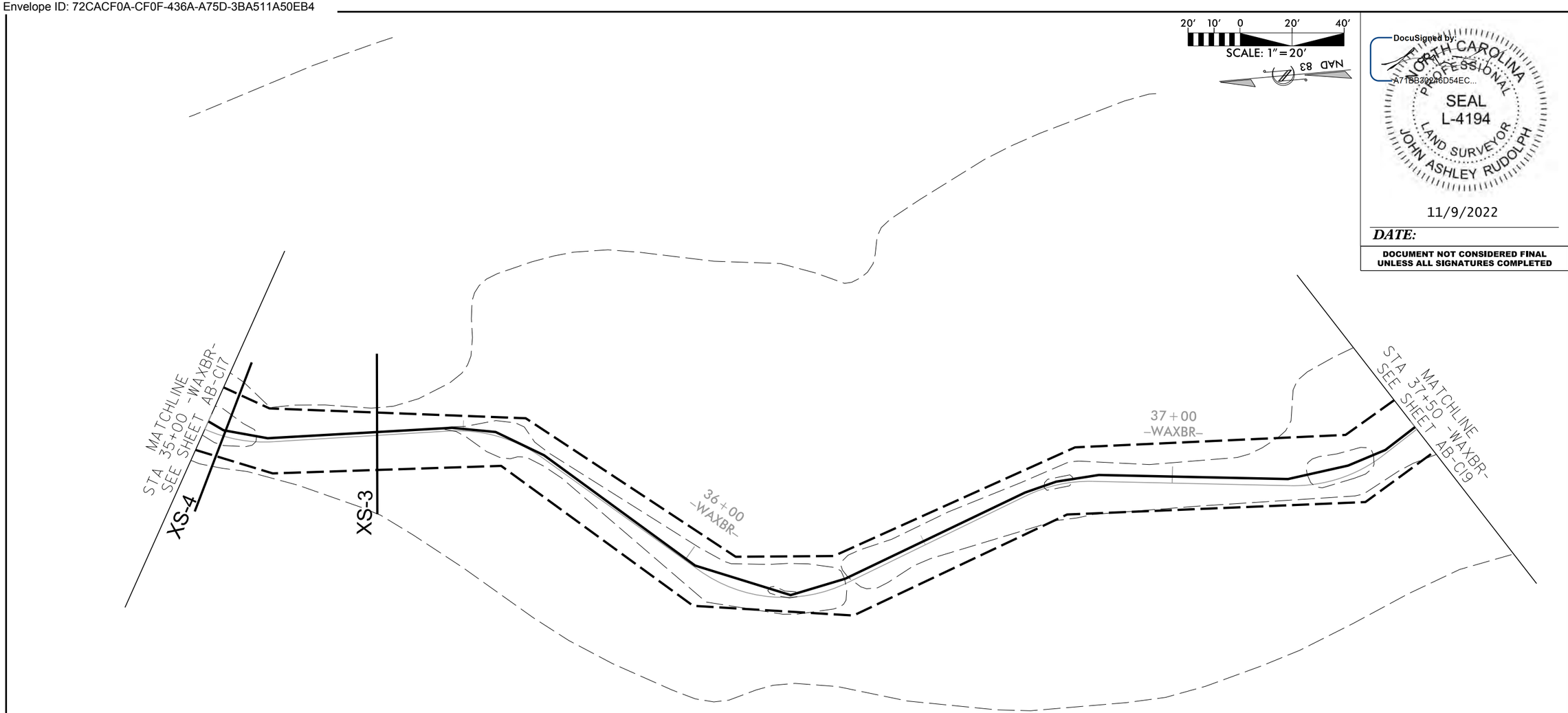


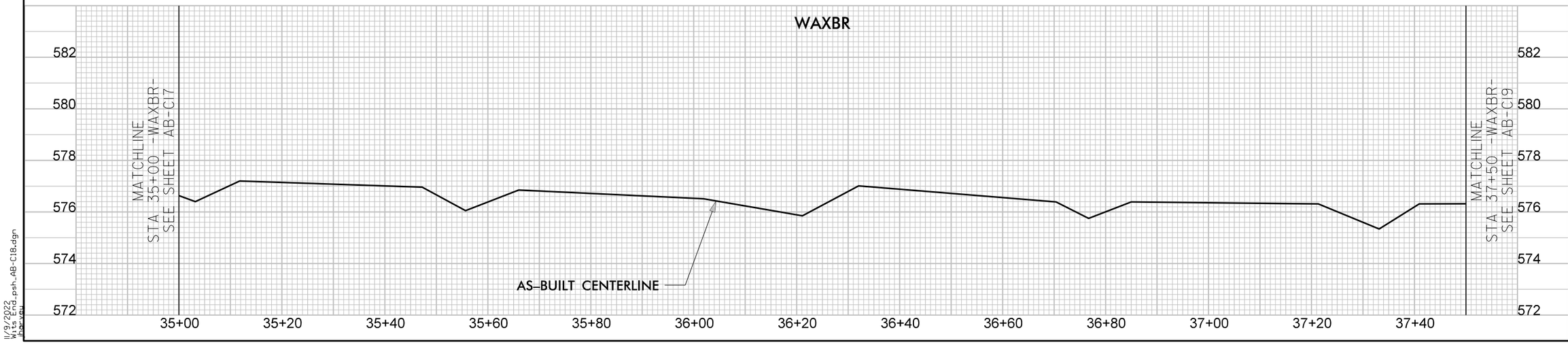


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# WITS END
UNION COUNTY, NC

# AS-BUILT SURVEY



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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C18 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C18*** |

11/9/2022
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jarvis

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SCALE: 1″ = 20′

NAD 83

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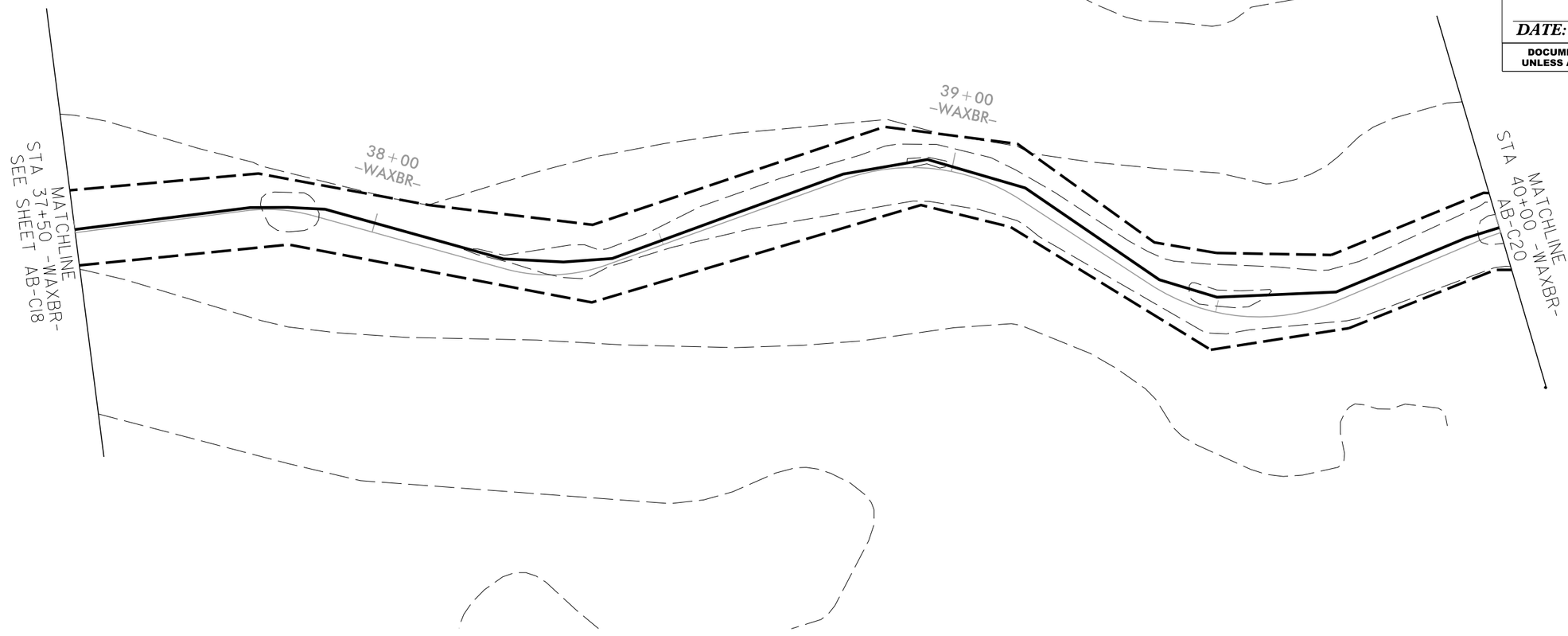


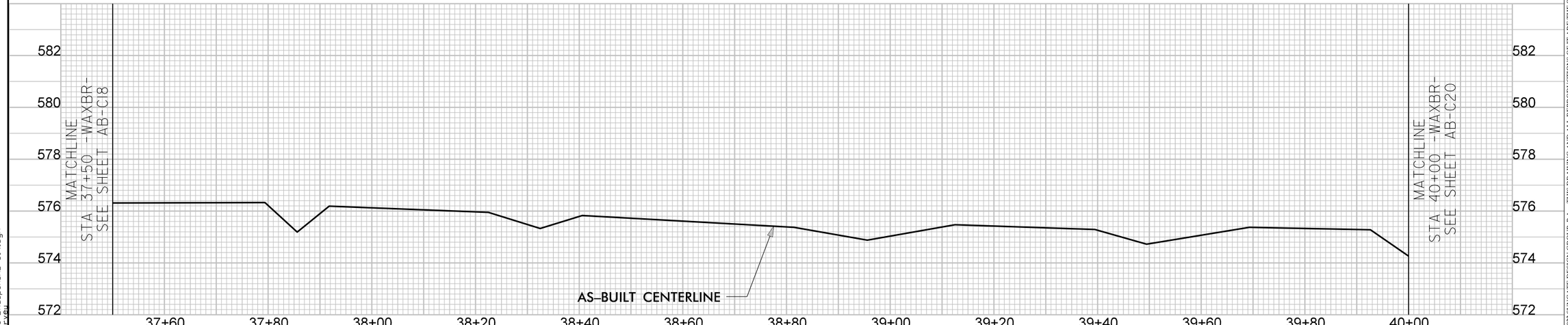


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UNION COUNTY, NC

## AS-BUILT SURVEY

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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C19 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |

SHEET NO.

***AB–C19***

11/9/2022
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jharvey

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SCALE: 1″ = 20′

NAD 83



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11/9/2022
***DATE:***

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MATCHLINE STA 40+00 -WAXBR- SEE SHEET AB-C19

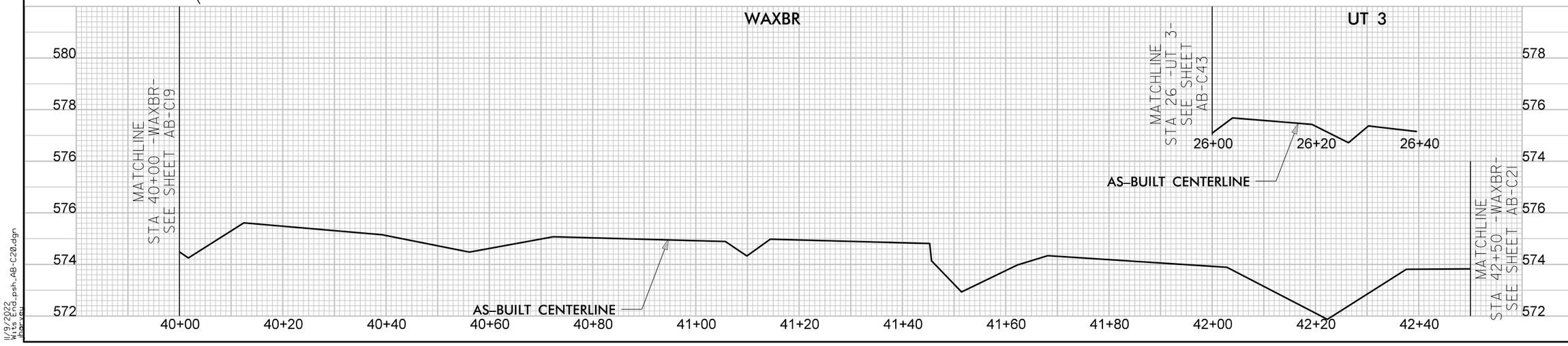
41+00 -WAXBR-

42+00 -WAXBR-

MATCHLINE STA 42+50 -WAXBR- SEE SHEET AB-C21

MATCHLINE STA 26+00 -UT 3- SEE SHEET AB-C43

END RESTORATION
STA 26+28 -UT3-
STA 40+30 -WAXBR-

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jharvey

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C20 |
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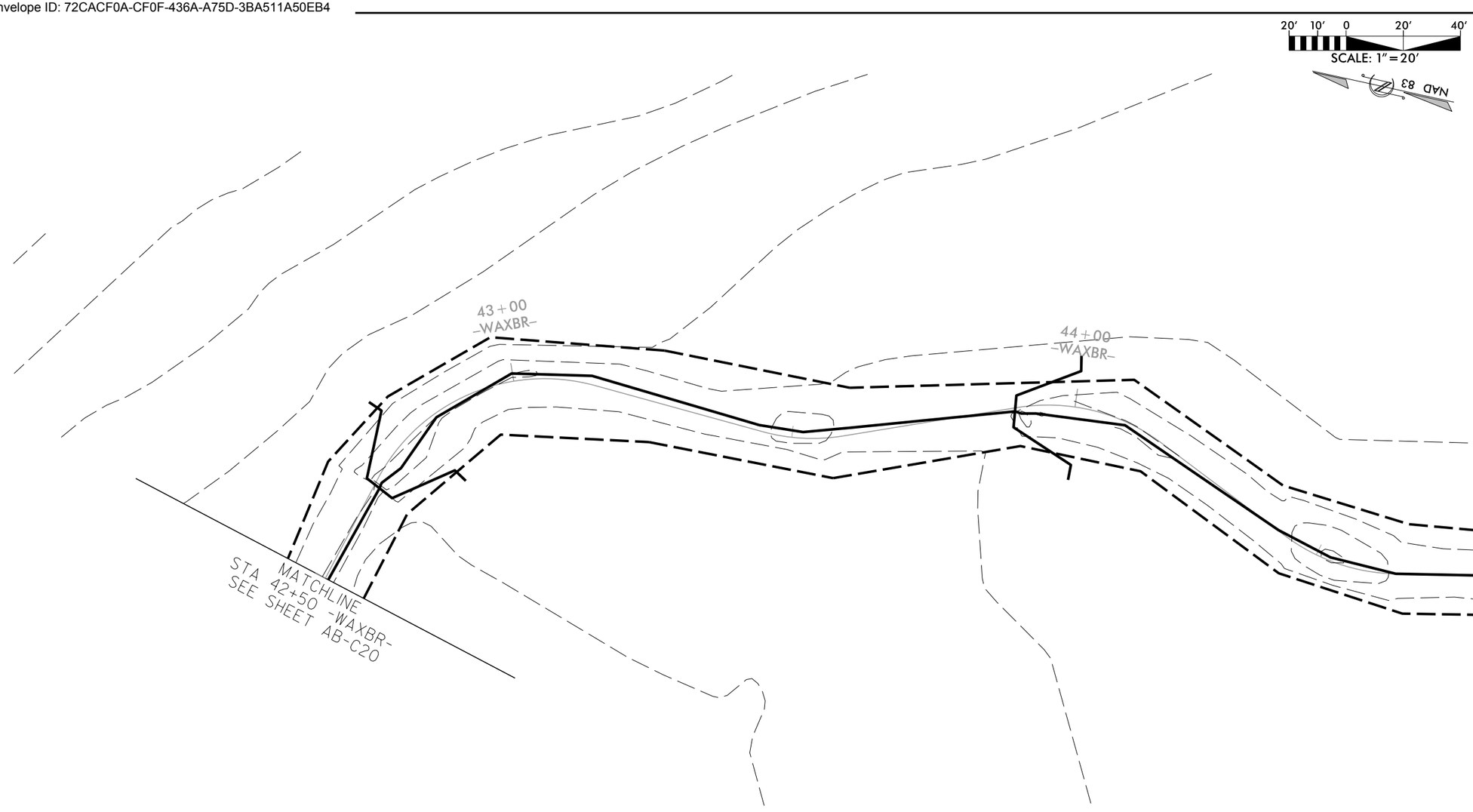


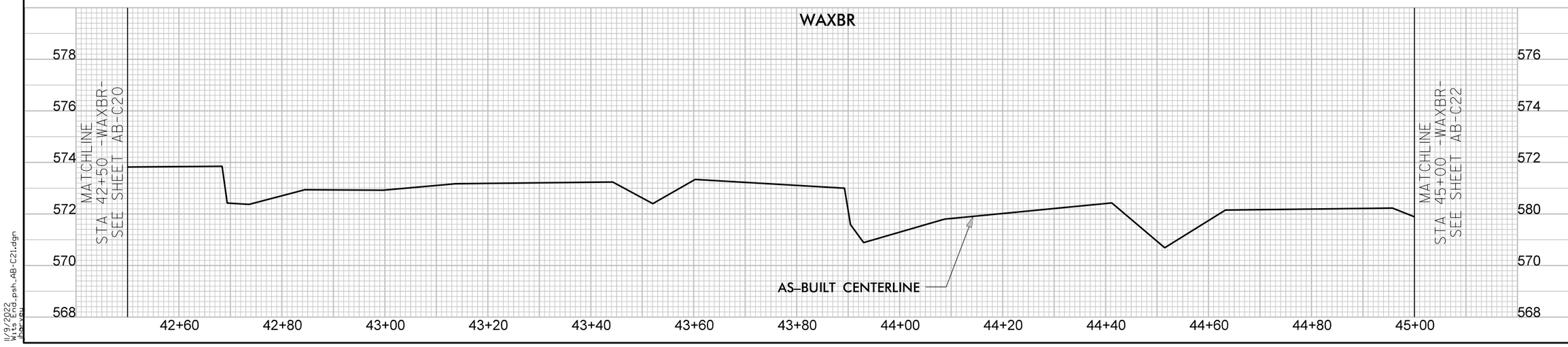


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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C21 |
| DATE: | 2022 |
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| SHEET NO. | ***AB–C21*** |

11/9/2022
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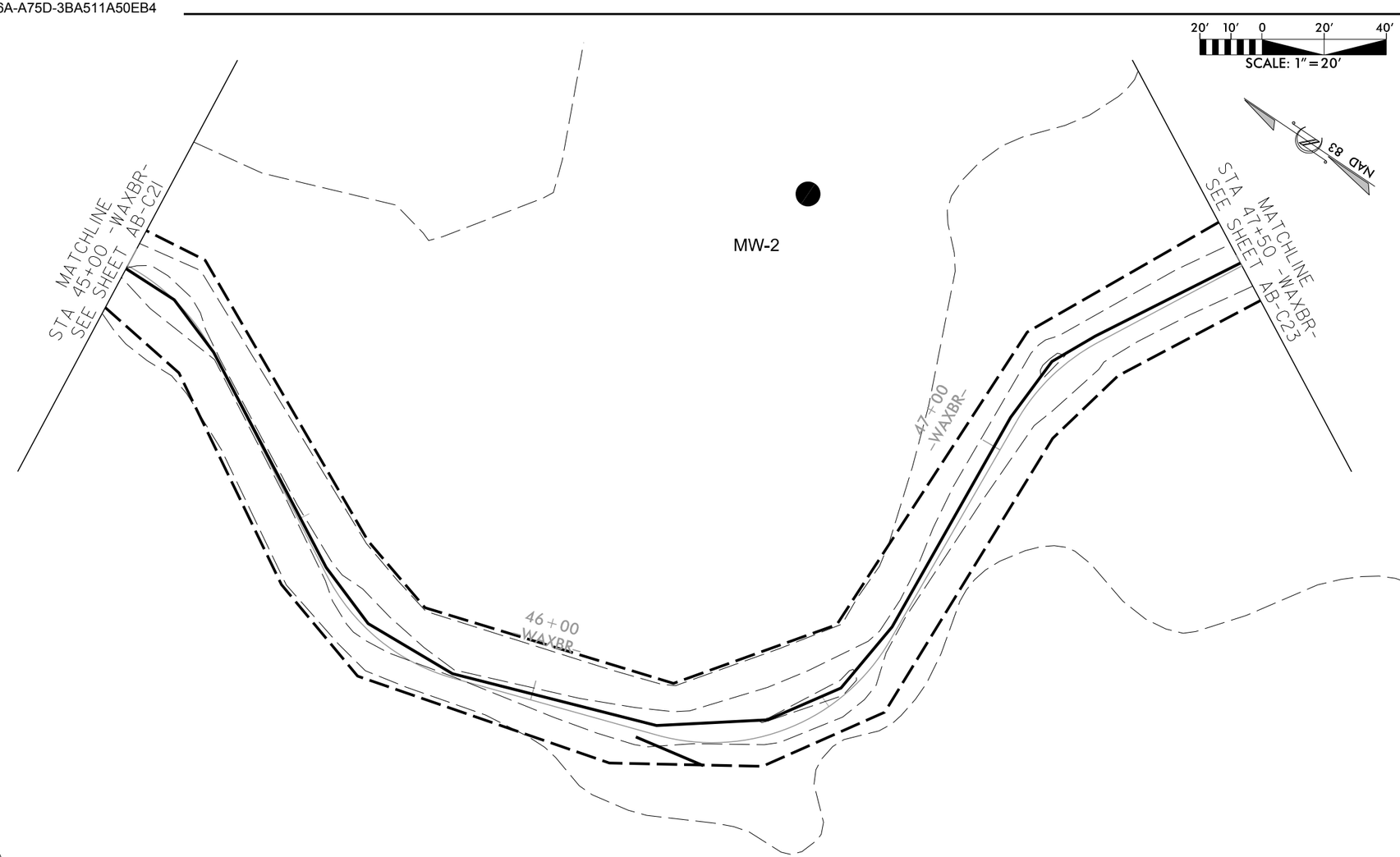
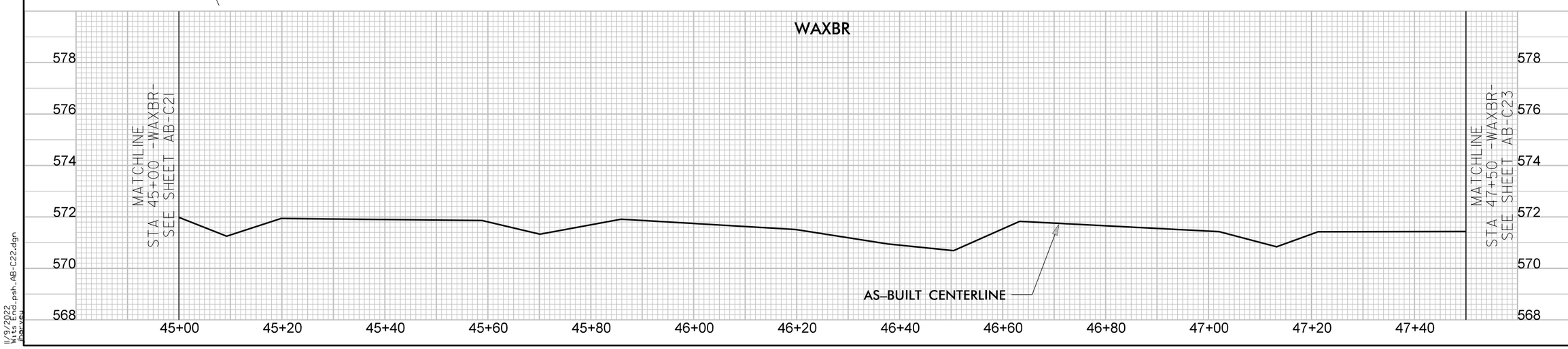
Darren

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**WITS END**

**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C22 |
| *DATE:* | 2022 |
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11/9/2022
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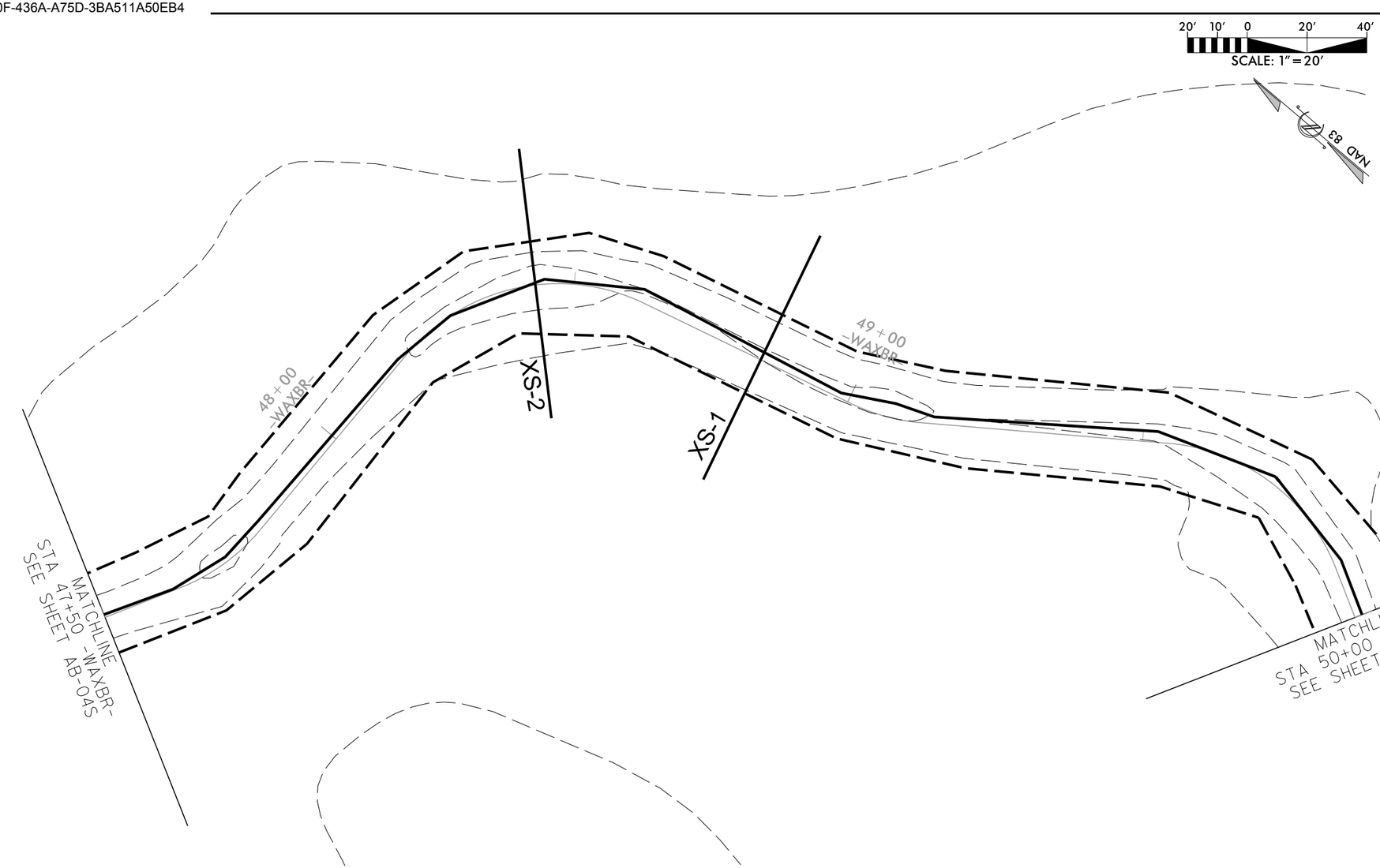


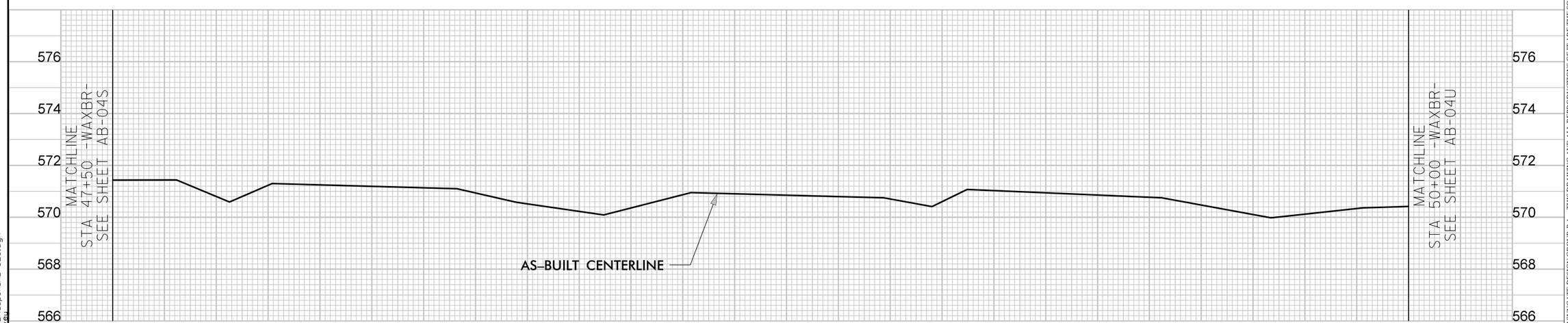


NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

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RESTORATION SYSTEMS LLC



# WITS END

UNION COUNTY, NC

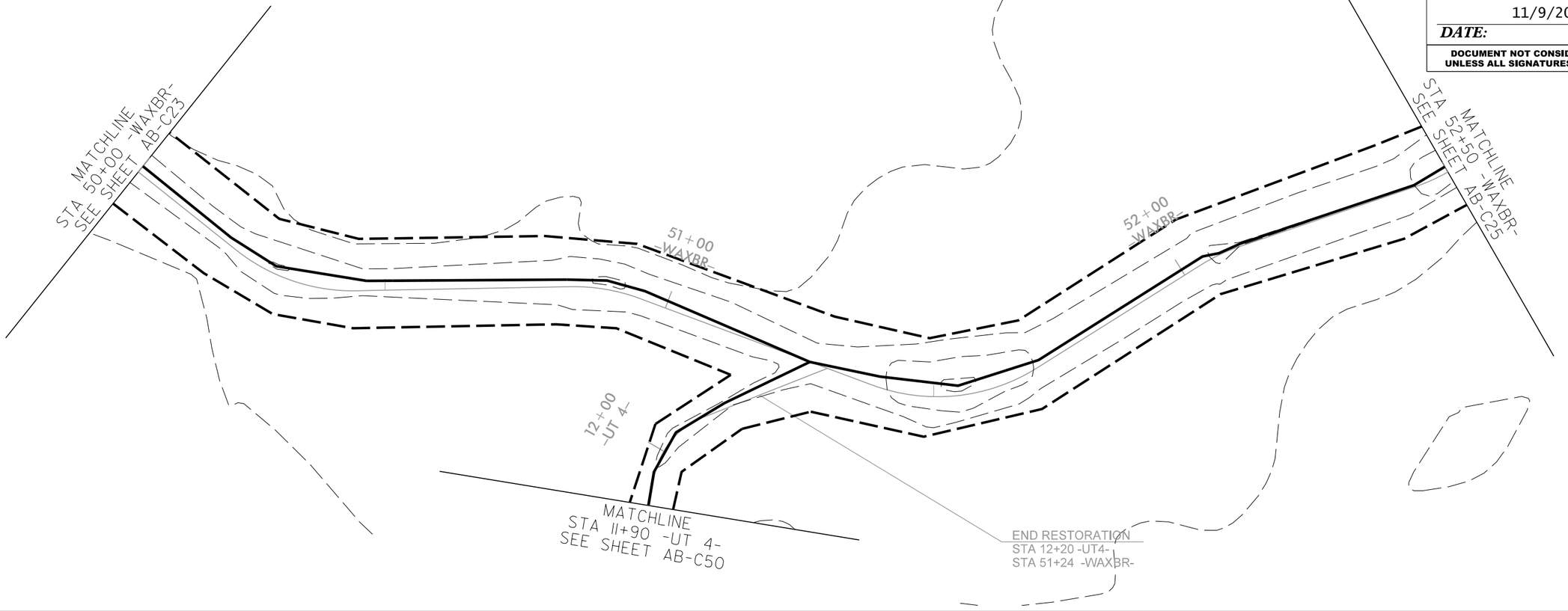
## AS-BUILT SURVEY

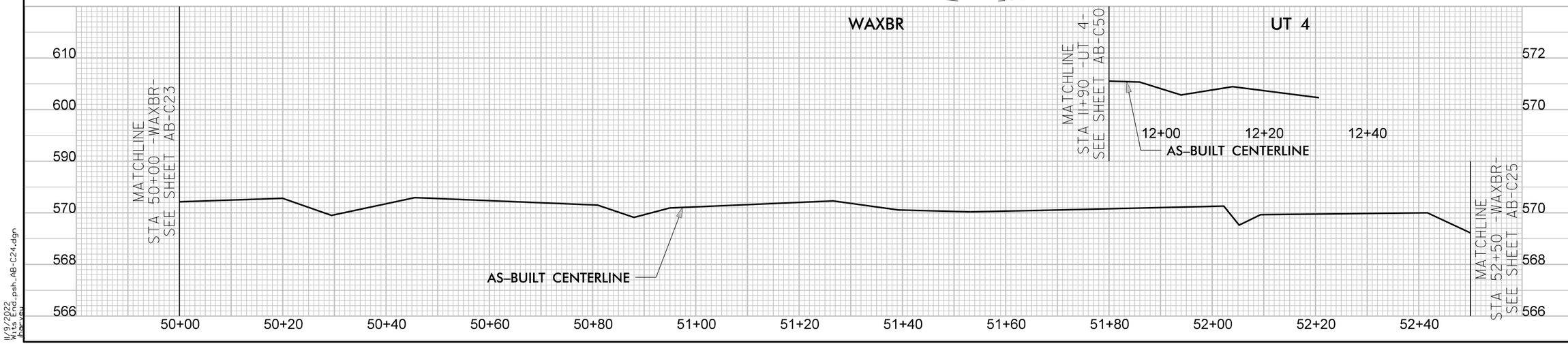
| | |
|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB-C23 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | AB–C23 |

11/9/2022
Wits End_psh_AB-C23.dgn
Parker

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83

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NORTH CAROLINA PROFESSIONAL
SEAL L-4194 LAND SURVEYOR
JOHN ASHLEY RUDOLPH
A4B8B0246D54EC...

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C24 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C24*** |

11/9/2022
Wits End_psh_AB-C24.dgn
Harvey

20′ 10′ 0 20′ 40′
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END RESTORATION
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MATCHLINE
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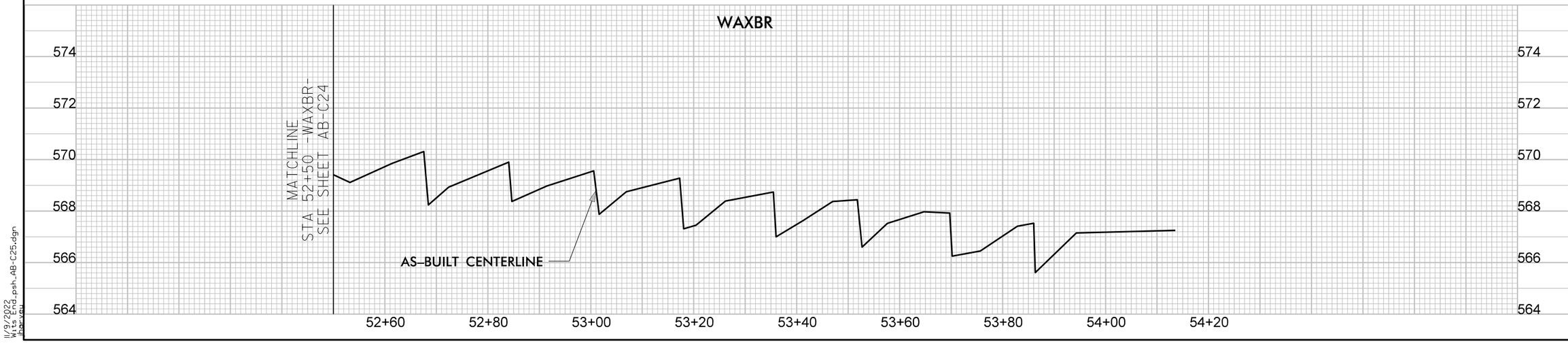


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NORTH CAROLINA
PROFESSIONAL
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

*PROJECT # :* 1221-20024
*DRAWING NAME:* WITS END PSH AB-C25
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C25***



11/9/2022
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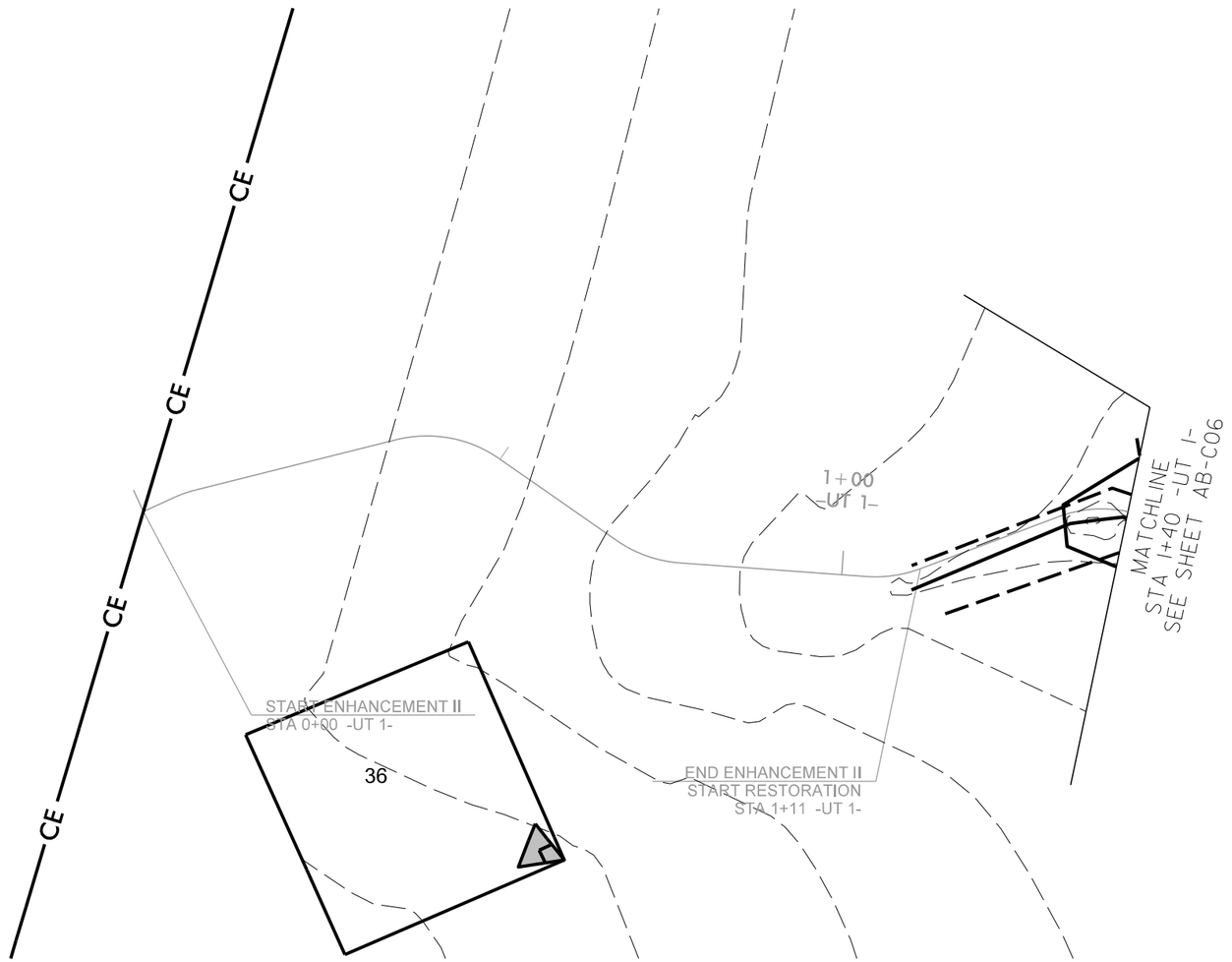
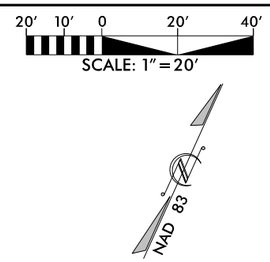
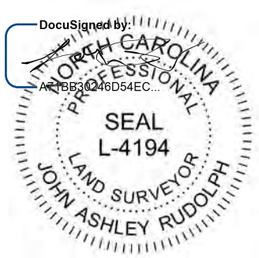
jgarvey

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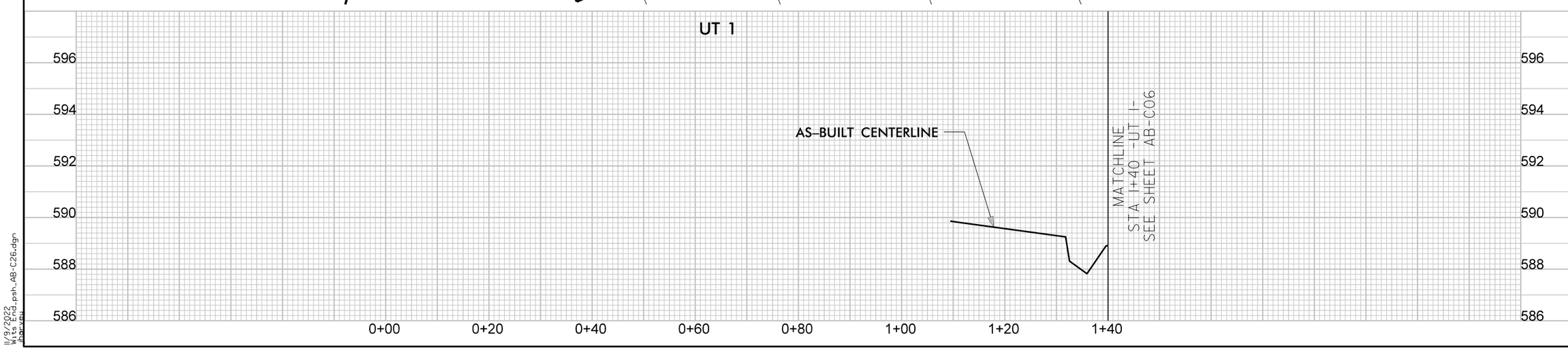


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**WITS END**
**UNION COUNTY, NC**

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|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C26 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C26*** |

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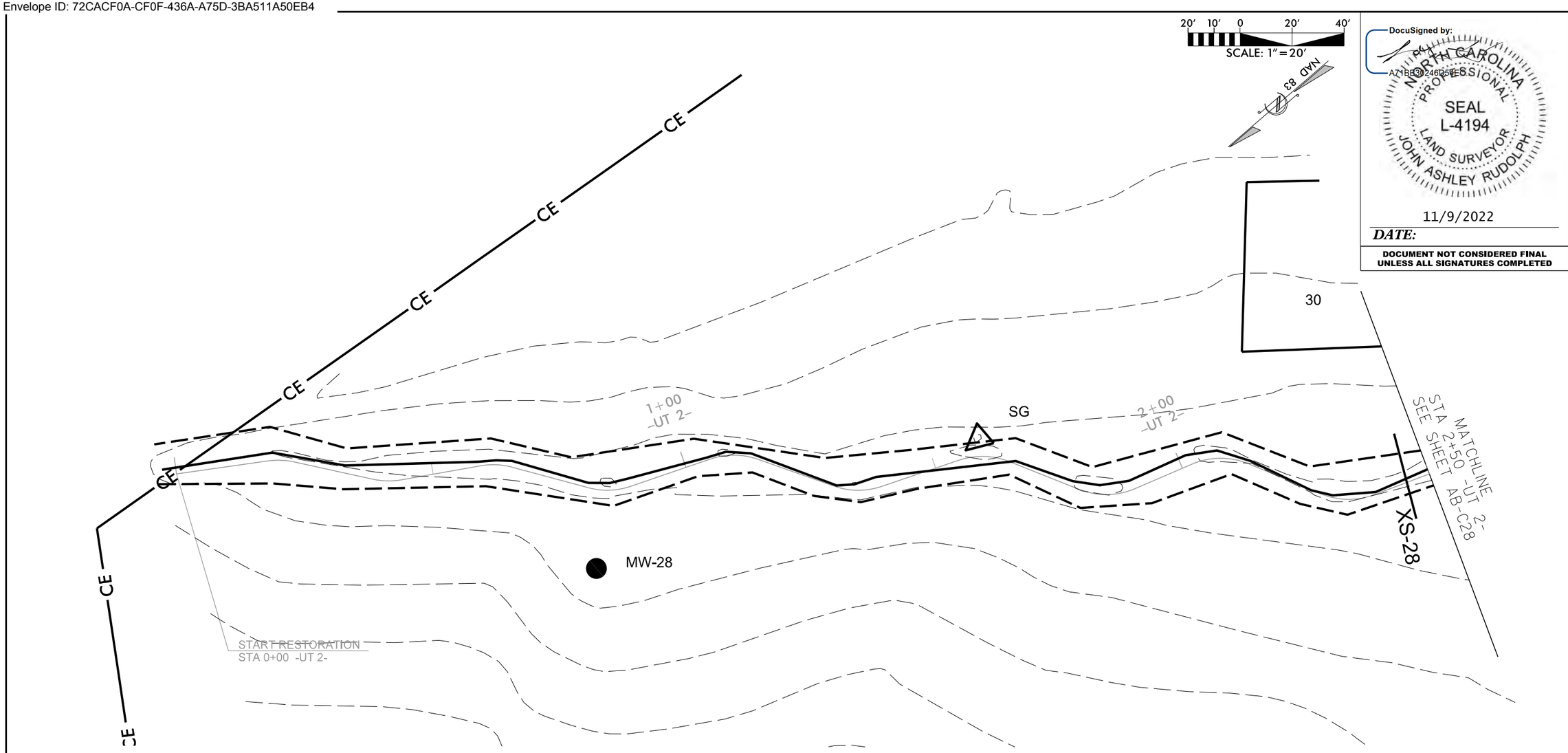


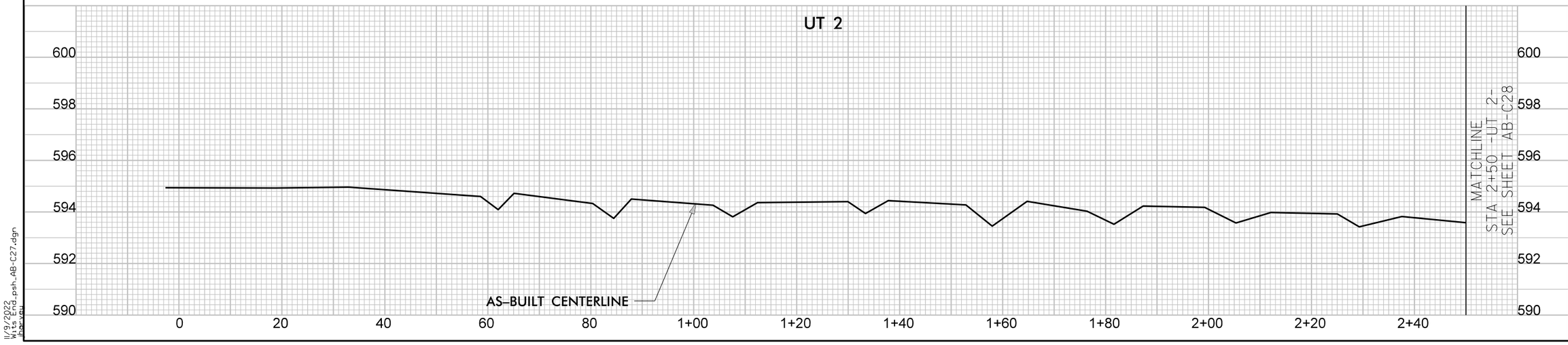


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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C27 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | *AB–C27* |

11/9/2022
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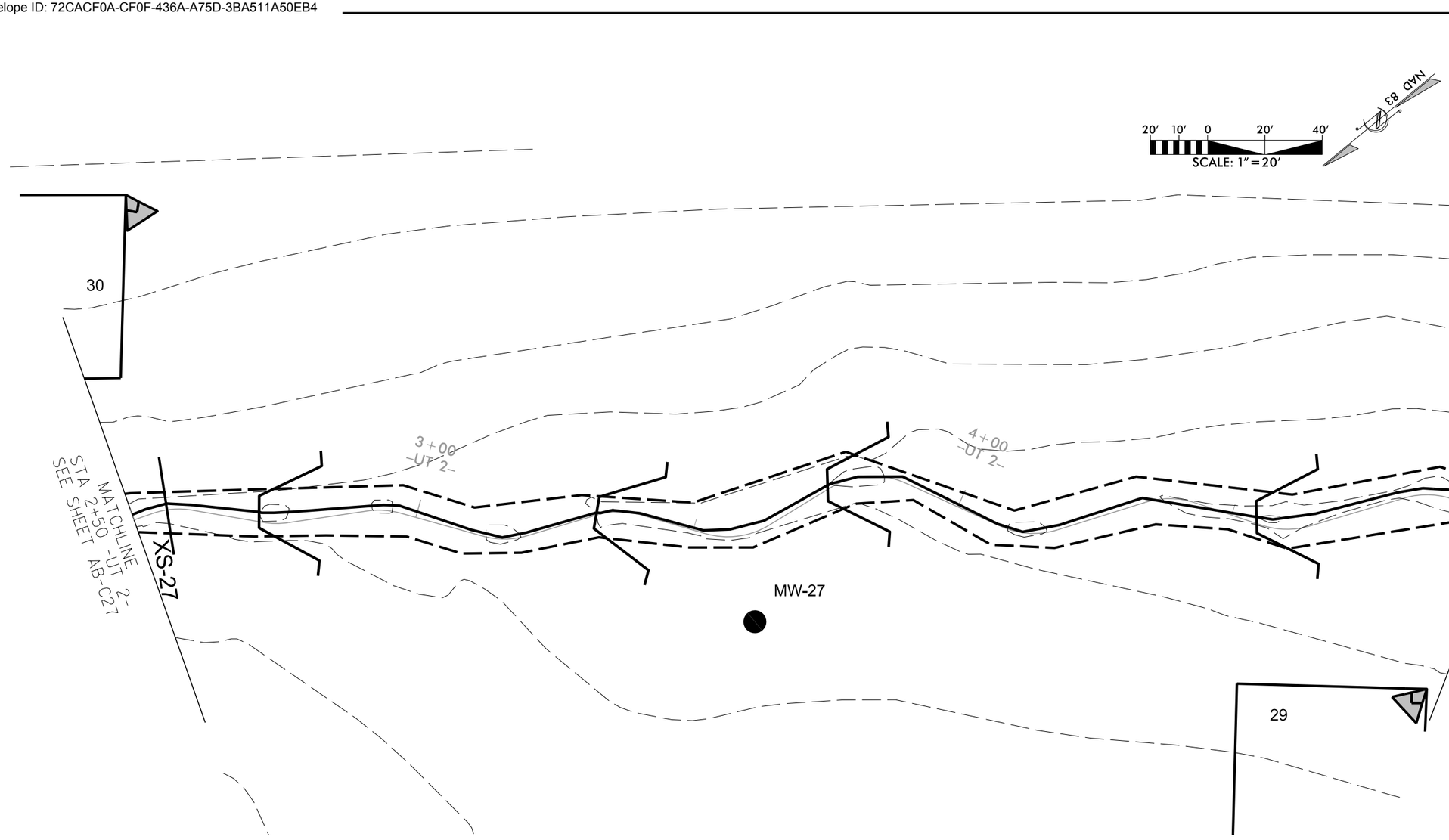
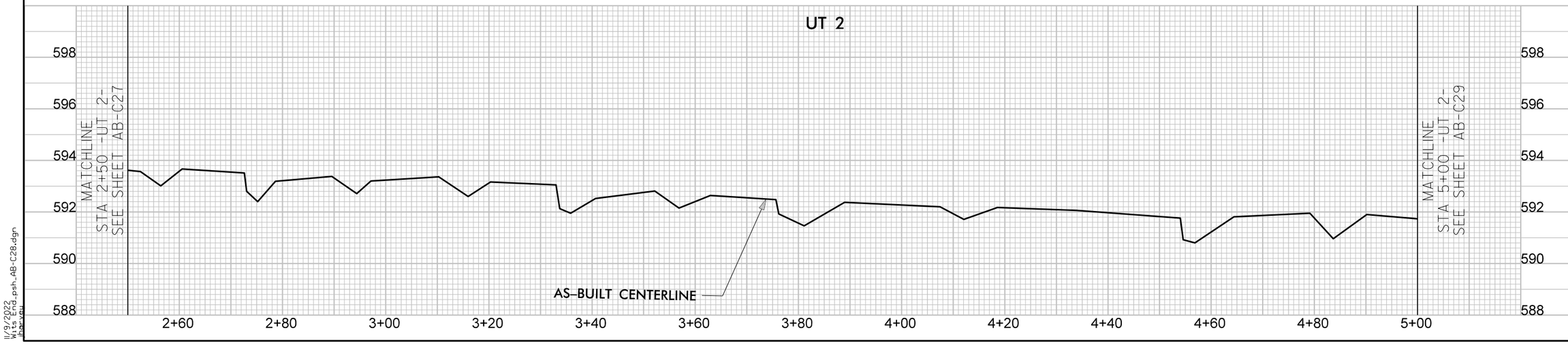
jharvey

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**AS-BUILT SURVEY**

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| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C28 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |

SHEET NO.
***AB–C28***

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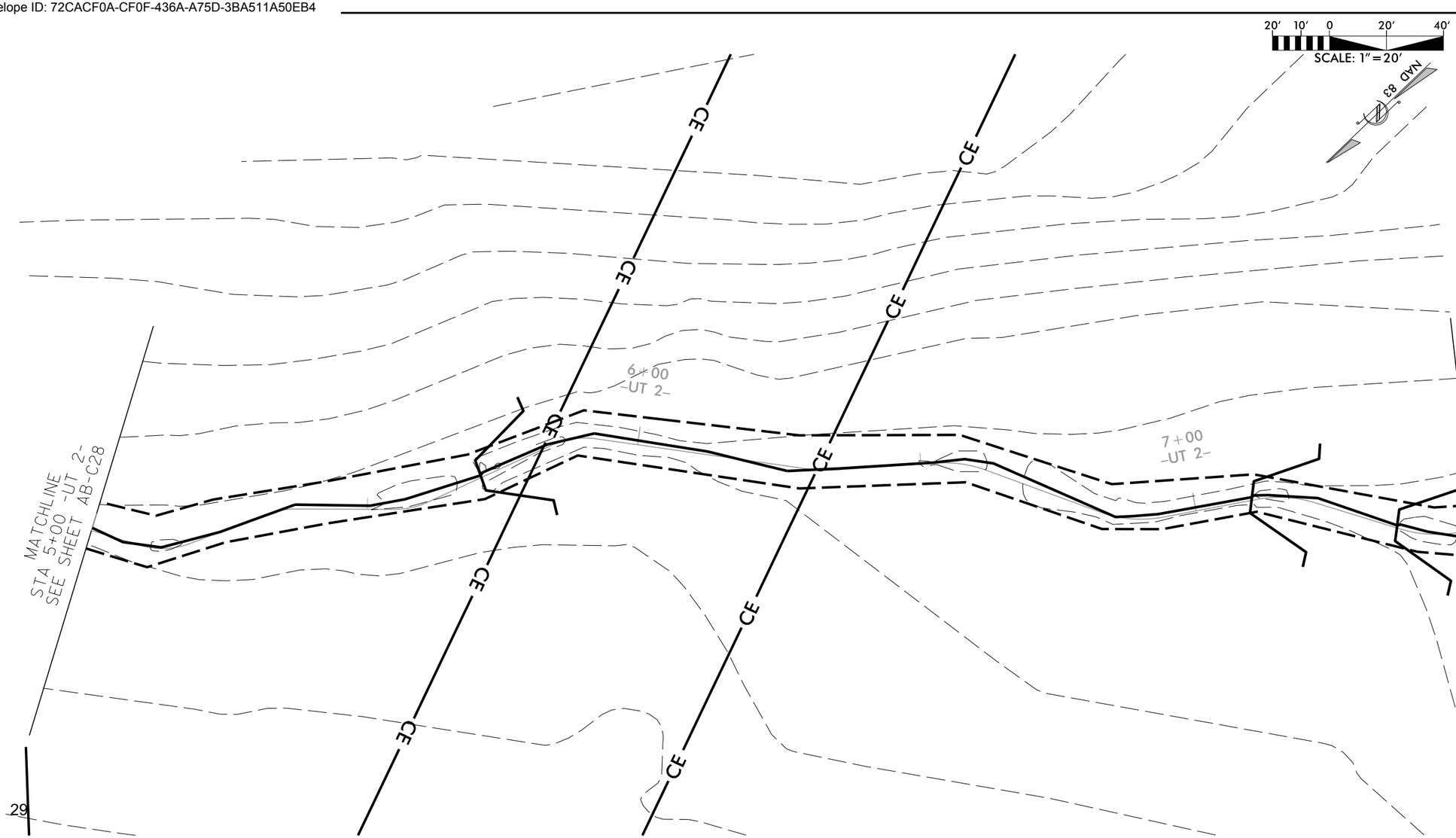


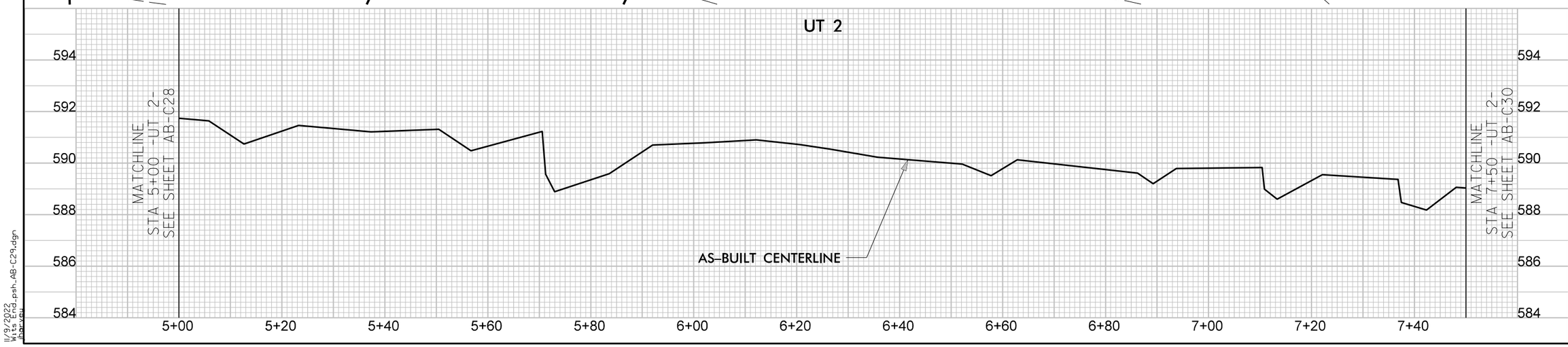


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JOHN ASHLEY RUDOLPH
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JOHN ASHLEY RUDOLPH

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**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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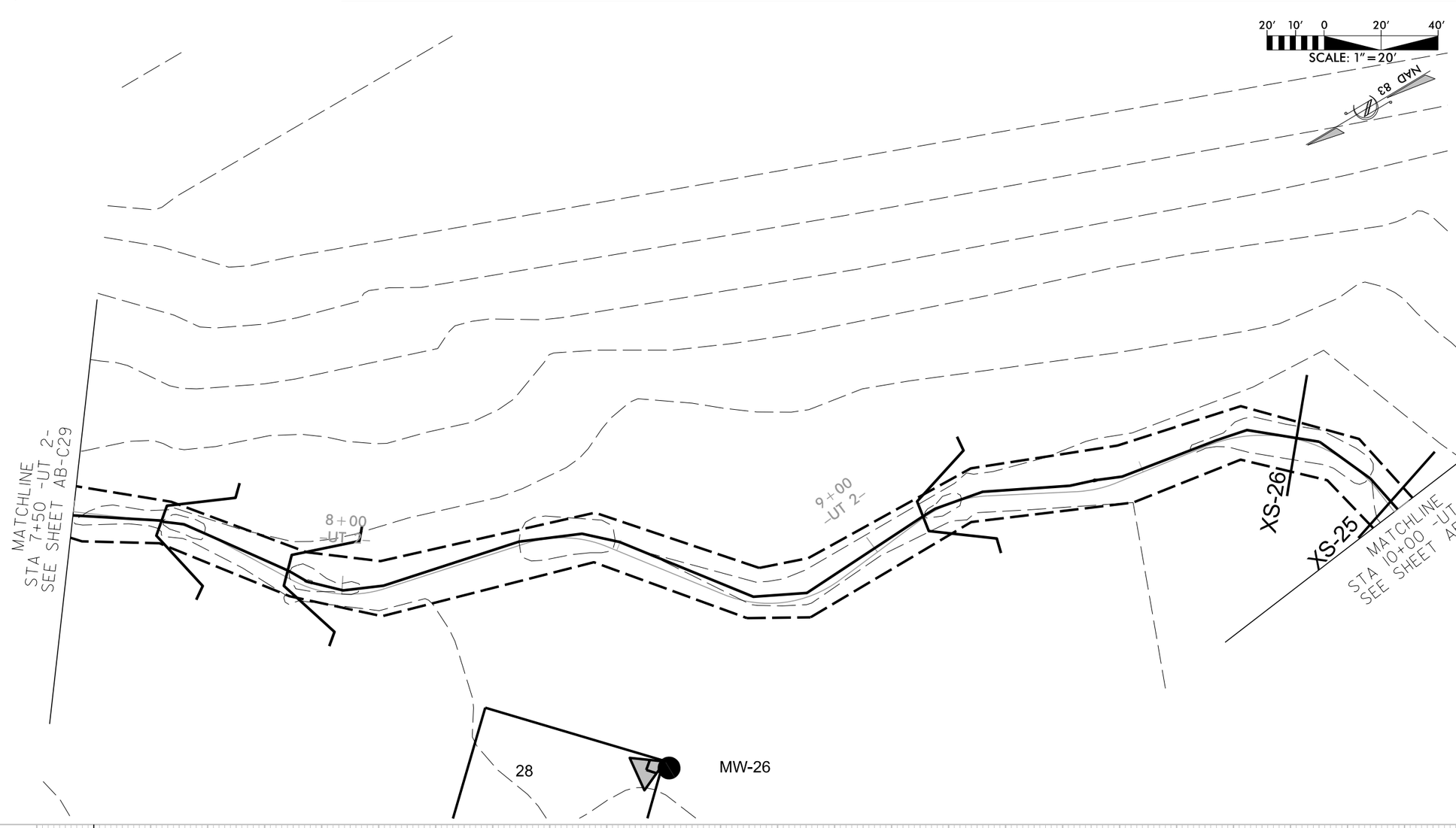
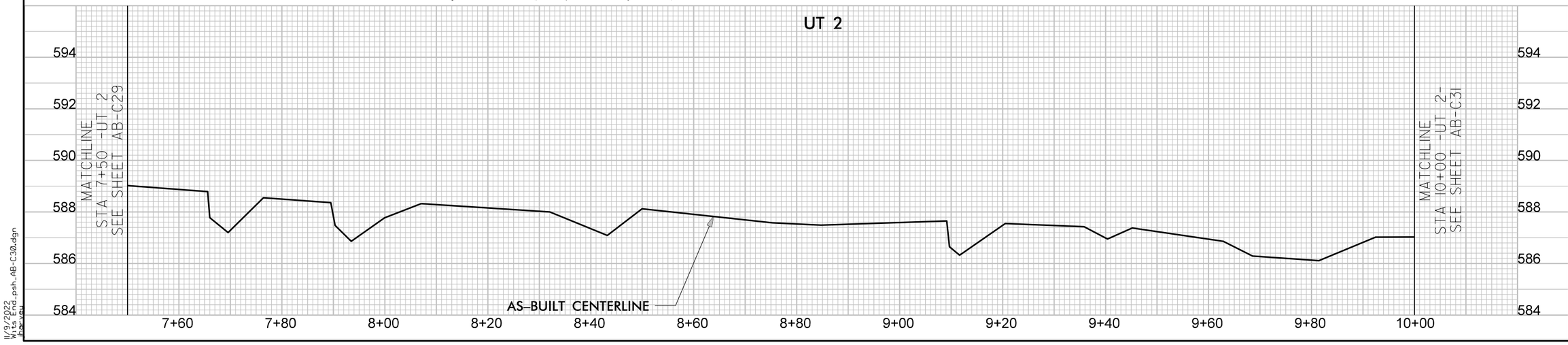
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C29 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB-C29*** |

11/9/2022
Wits End_psh-AB-C29.dgn
Jarvis

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**UNION COUNTY, NC**

**AS-BUILT SURVEY**

PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-C30
DATE: 2021
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–C30***

11/9/2022
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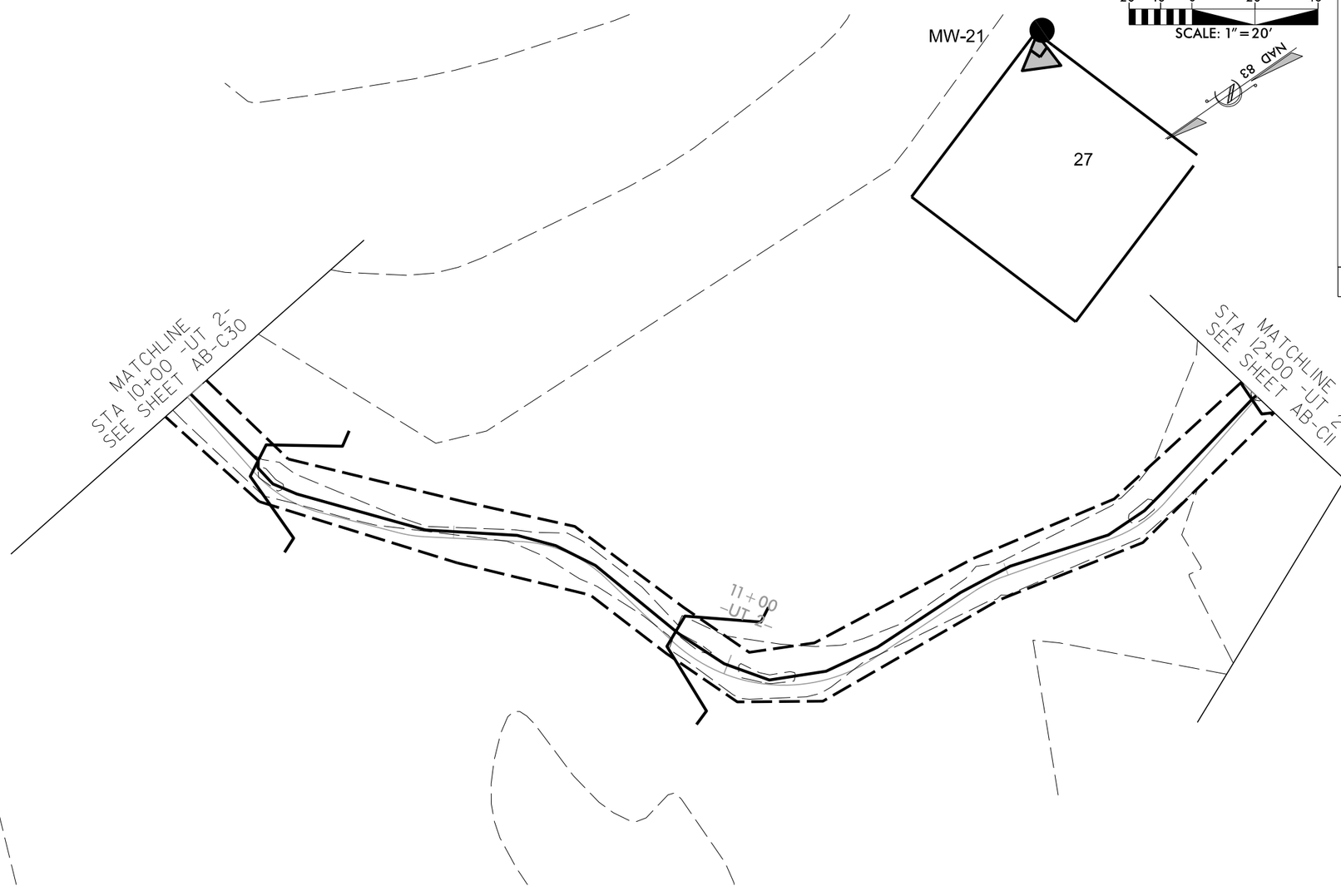
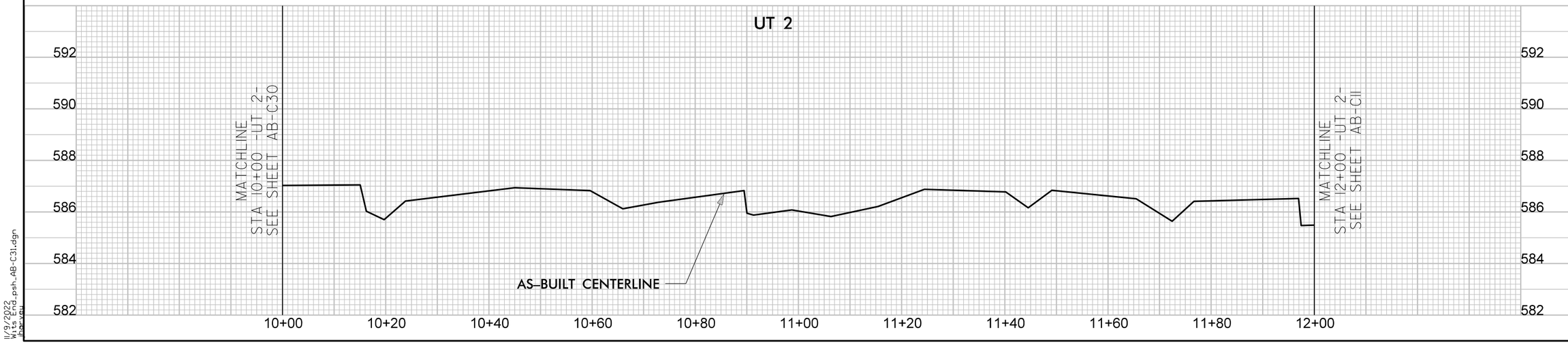
Darren

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11/9/2022

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# WITS END
UNION COUNTY, NC

# AS-BUILT SURVEY

PROJECT # :
1221-20024

DRAWING NAME:
WITS END PSH AB-C31

DATE:
2022

DRAWN BY:
JRH

REVIEWED BY:
JGD

REVISIONS:

SHEET NO.
***AB–C31***



11/9/2022
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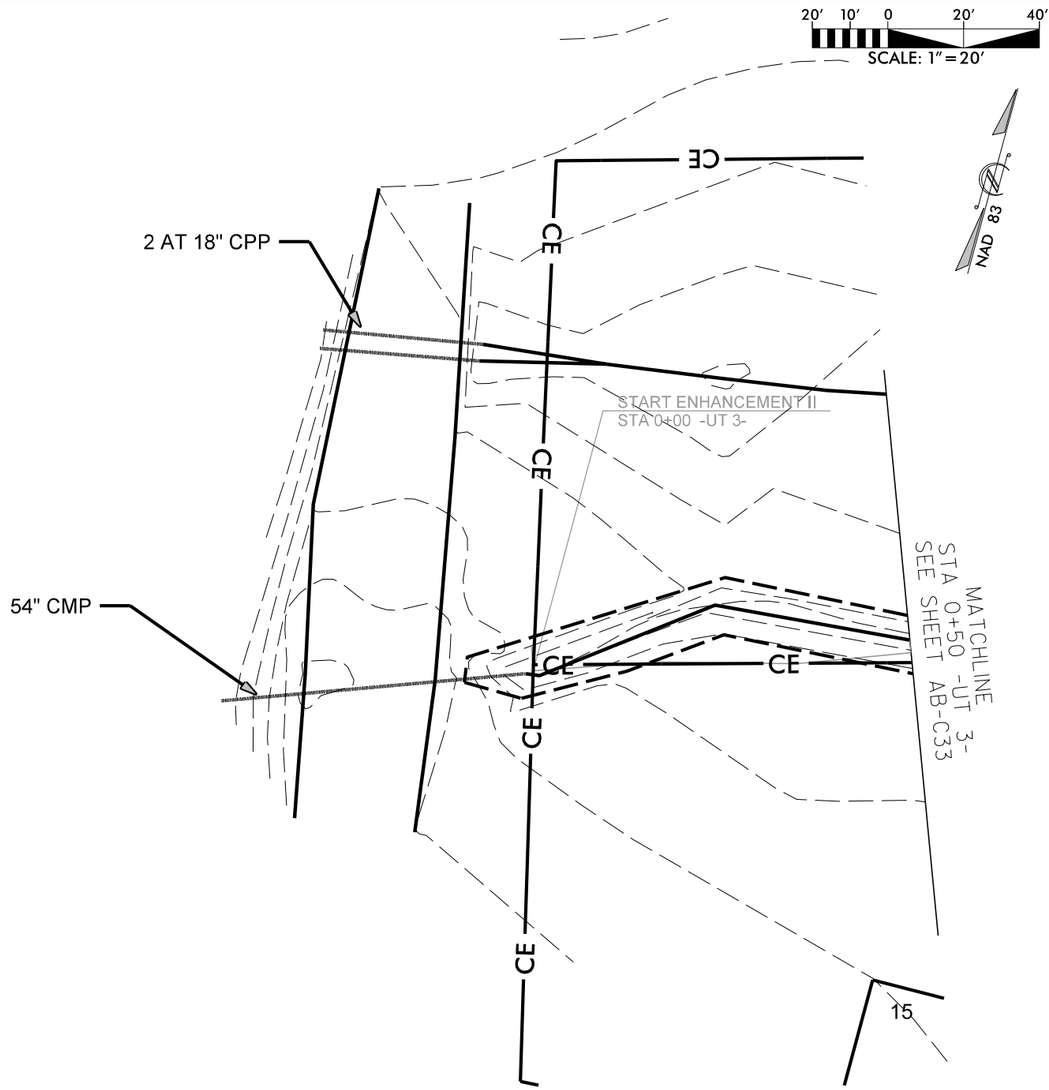
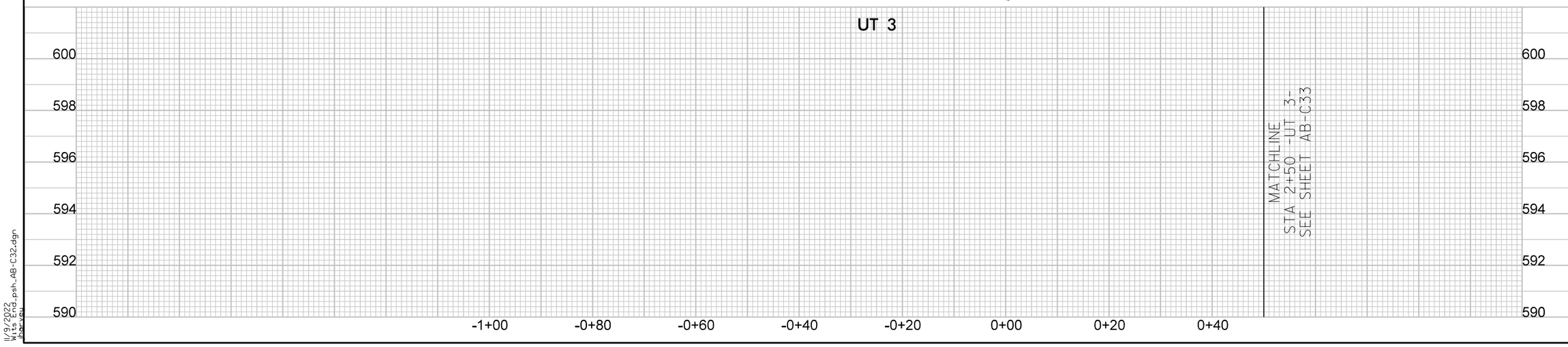
jharvell

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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C32 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C32*** |

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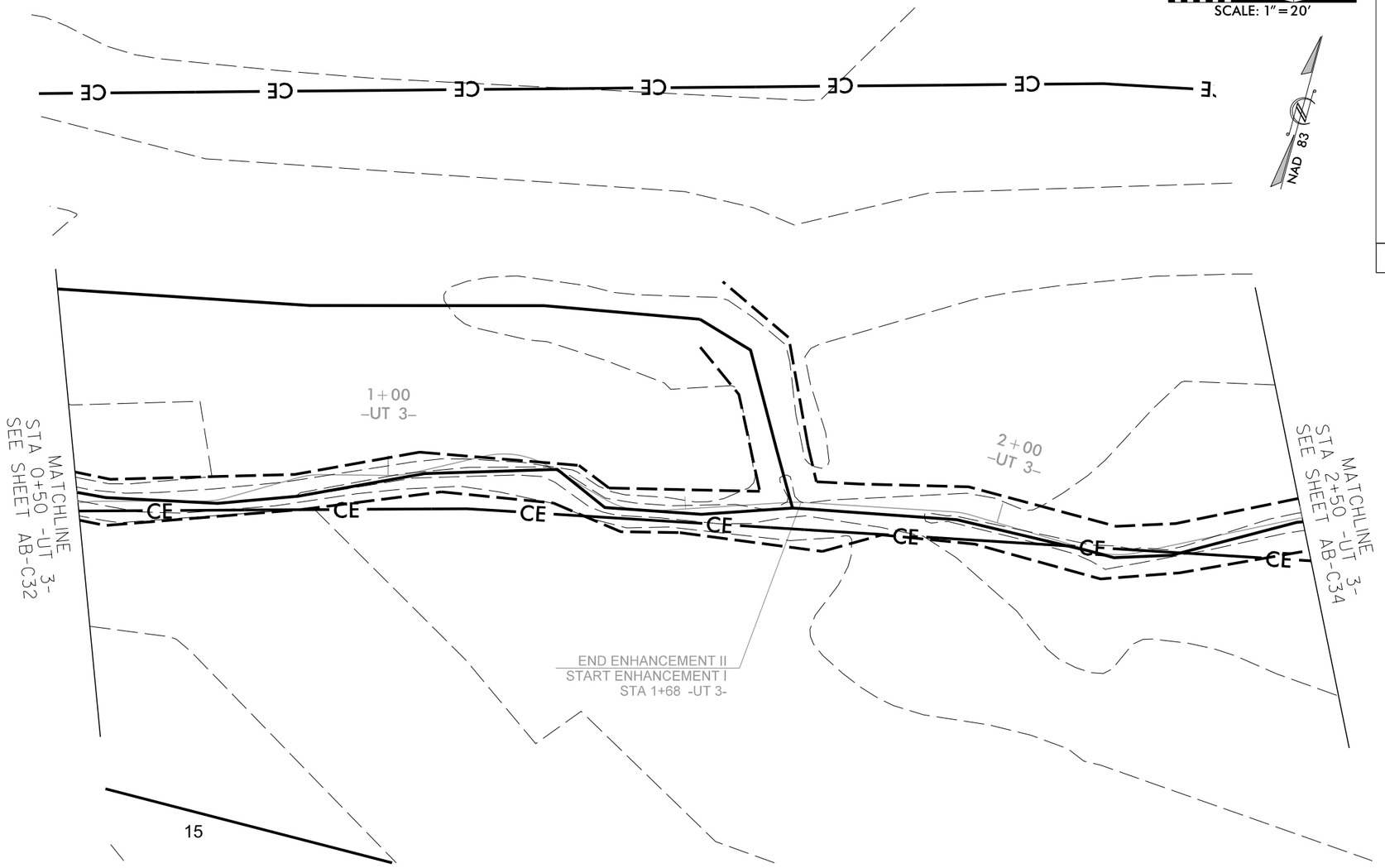
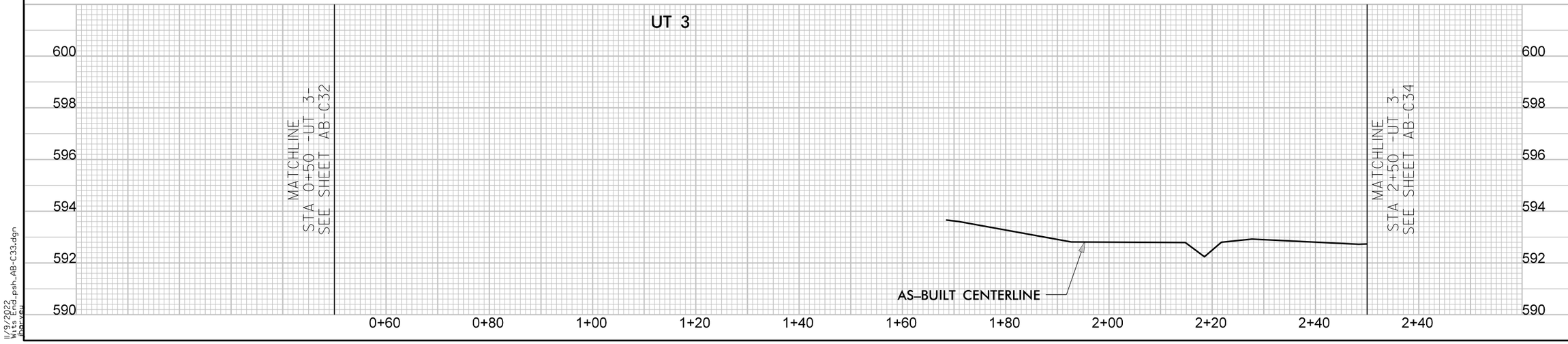
Wits End_psh_AB-C32.dgn
harveu

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

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# WITS END
UNION COUNTY, NC

## AS-BUILT SURVEY

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|---|---|
| PROJECT # : | 122I-20024 |
| DRAWING NAME: | WITS END PSH AB-C33 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C33*** |

11/9/2022
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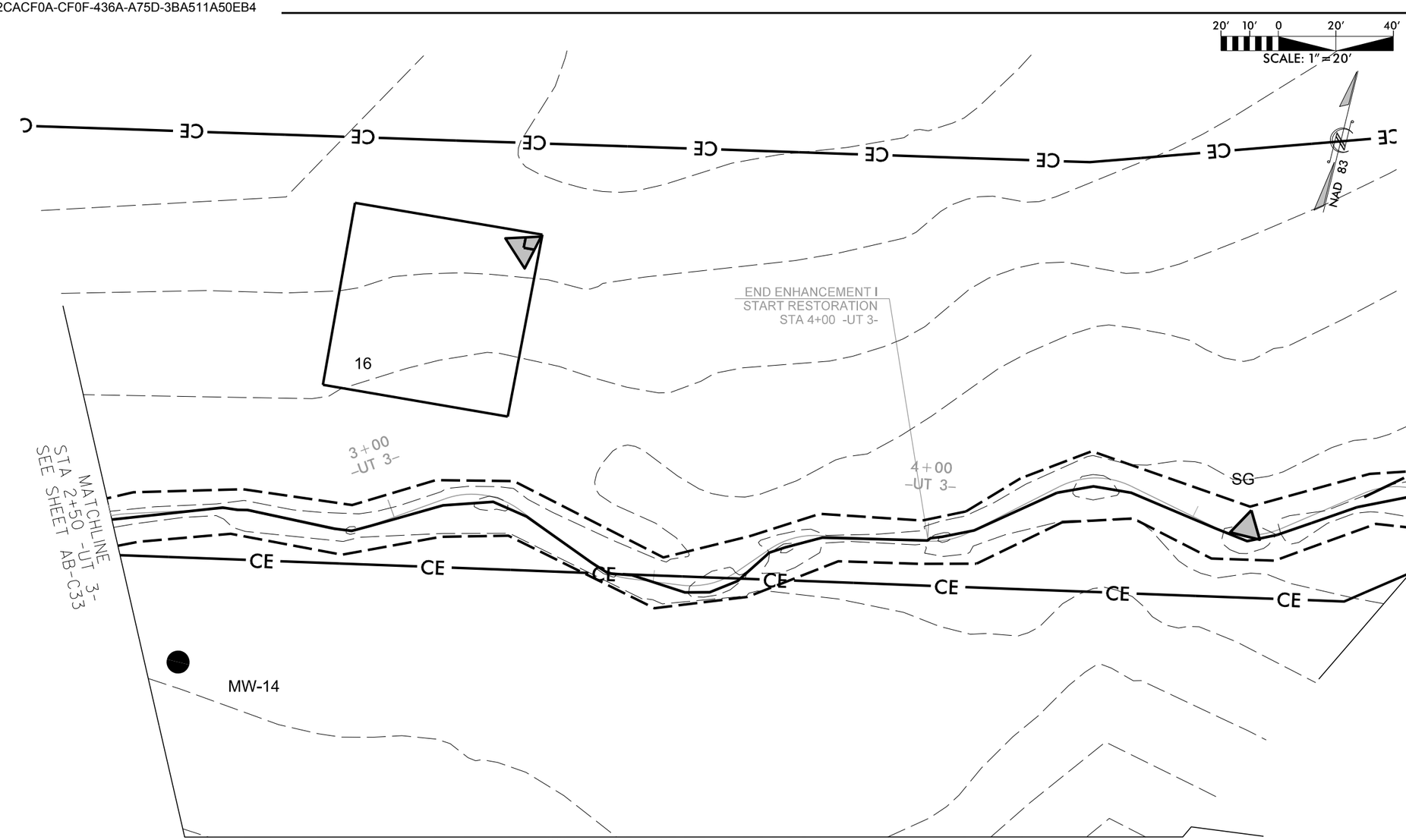


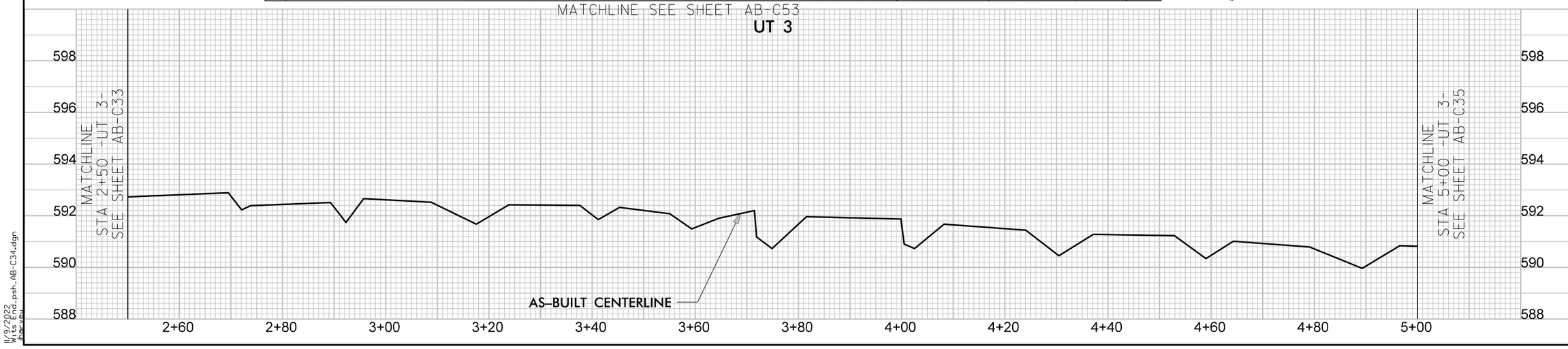


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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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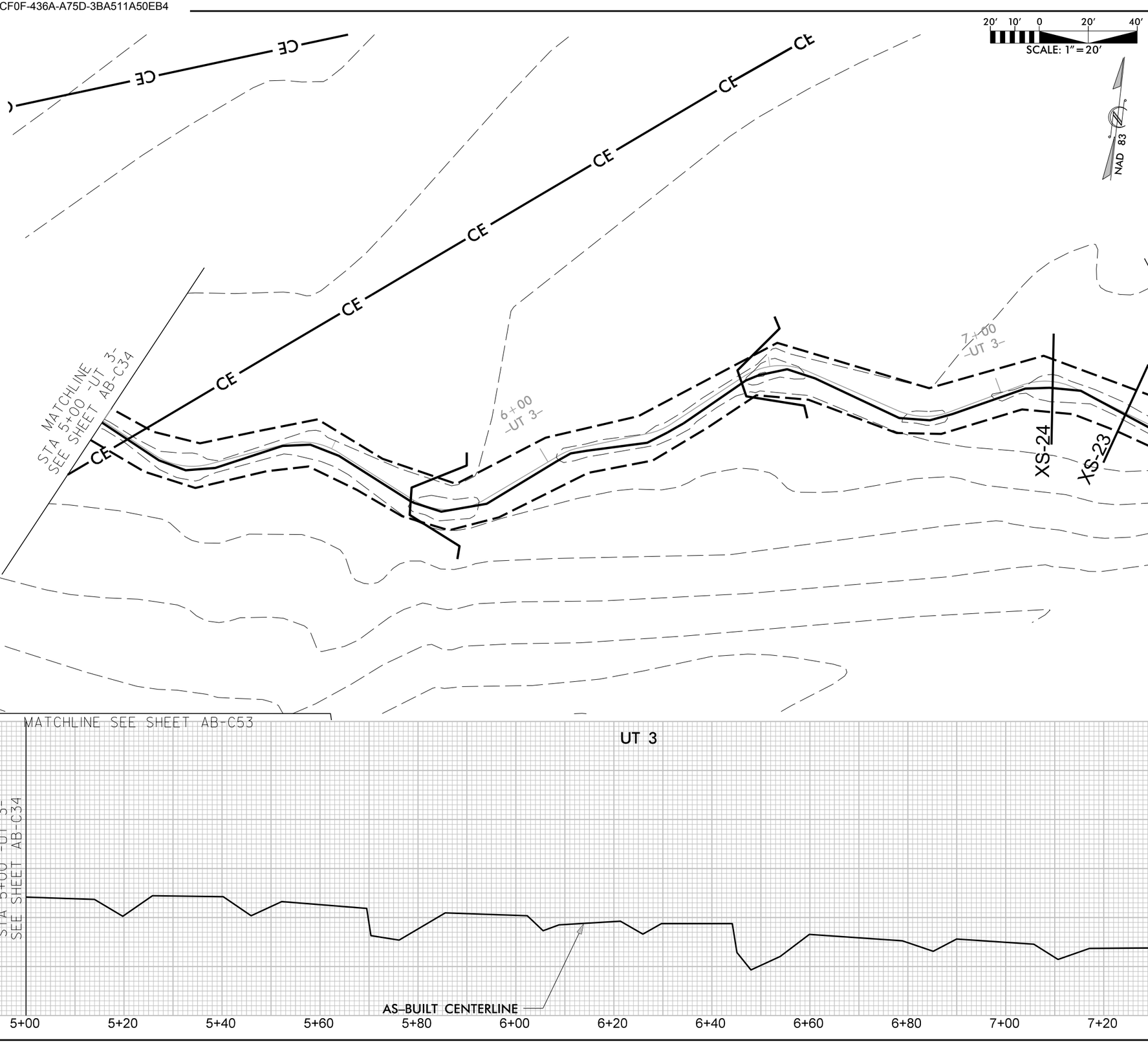
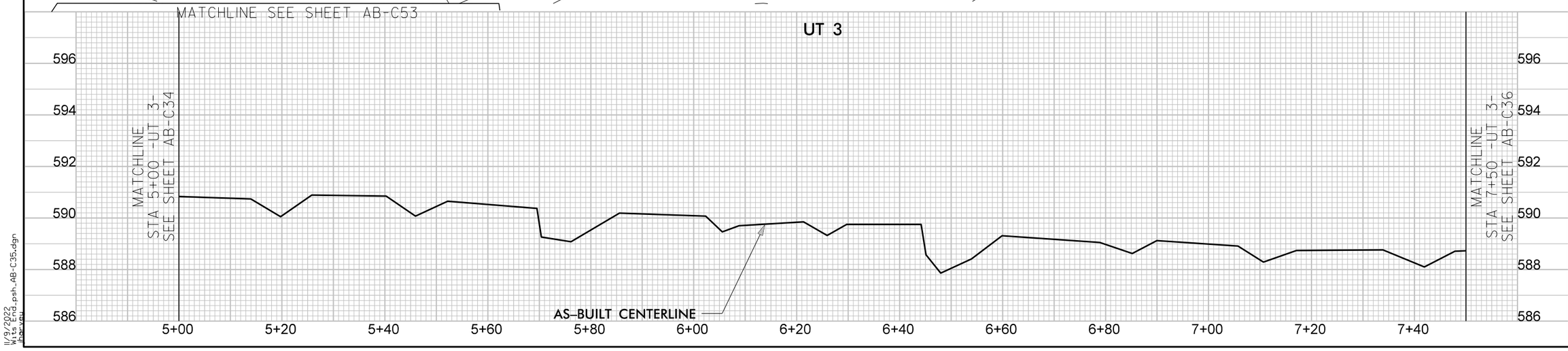
|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C34 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |

*SHEET NO.*

***AB–C34***

11/9/2022
Wits End_psh_AB-C34.dgn
Jarvis

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C35 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C35*** |



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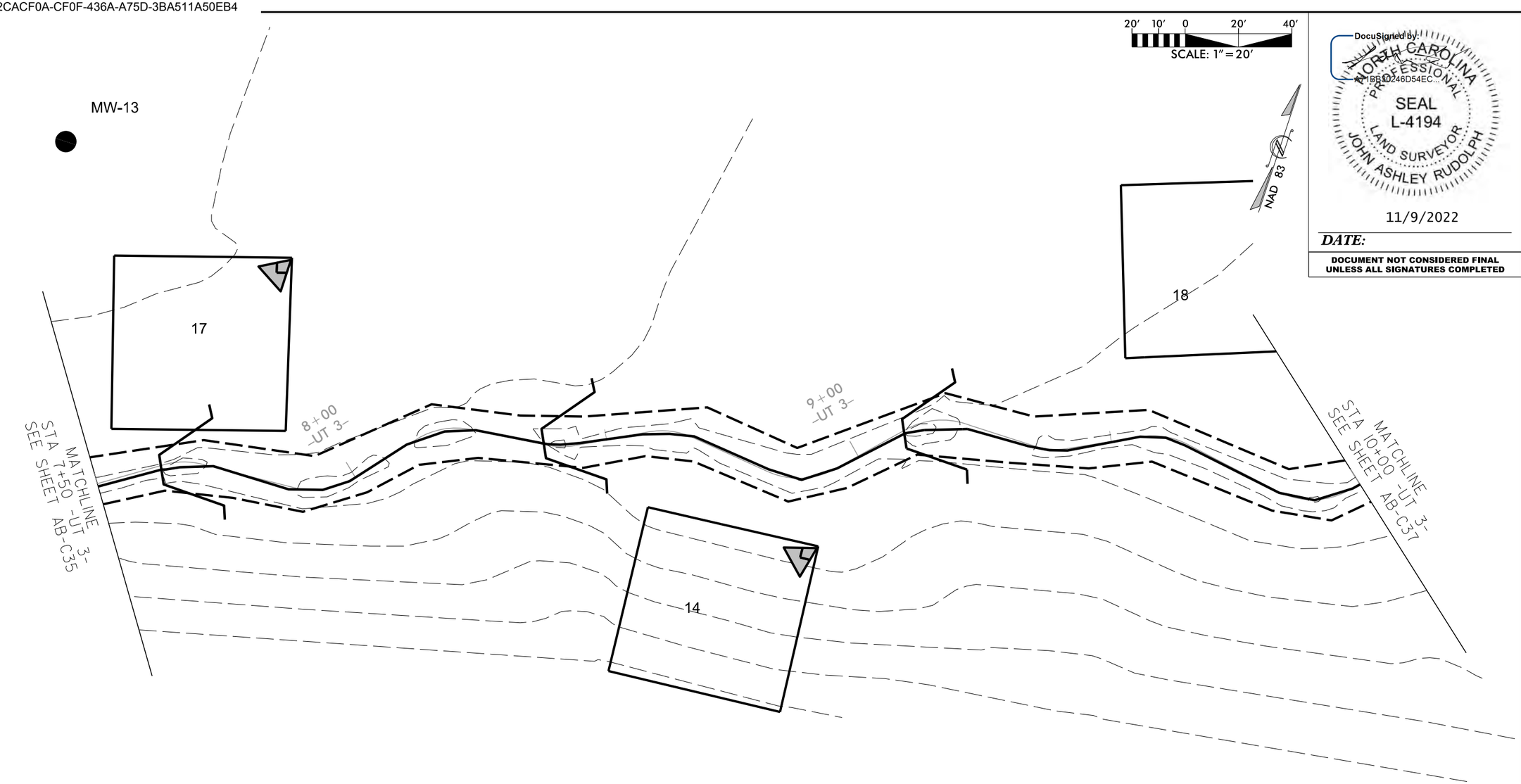
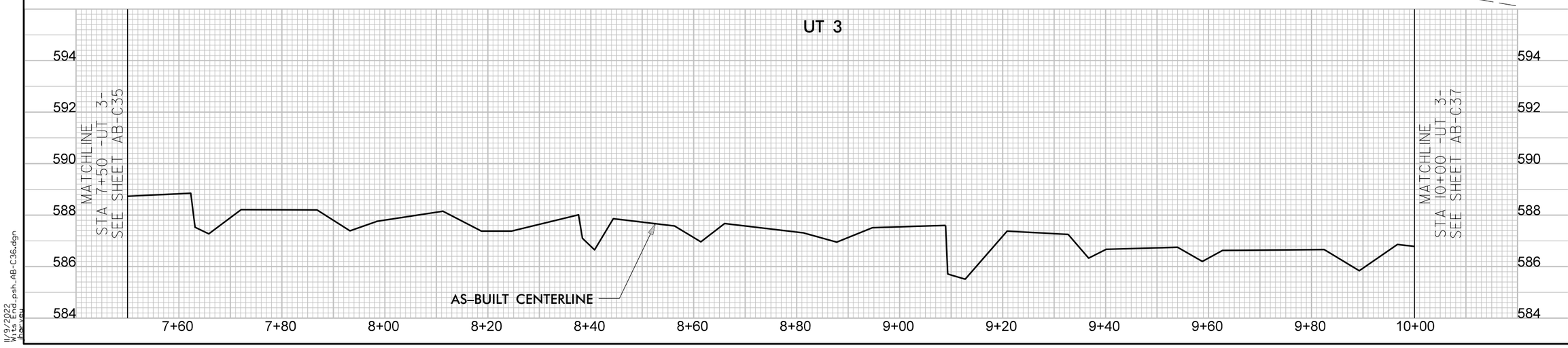
jharvey

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C36 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |

*SHEET NO.*
***AB–C36***

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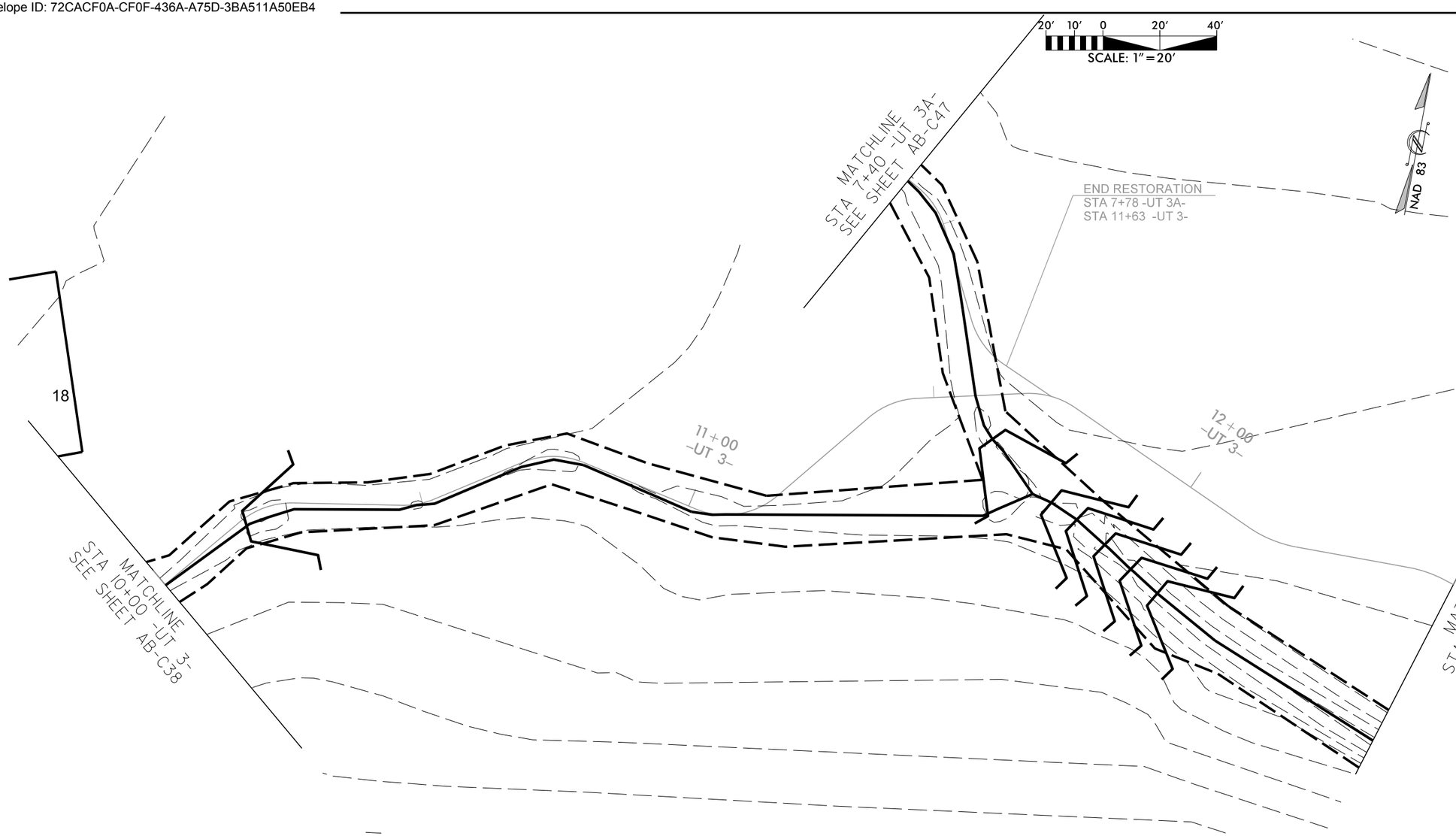
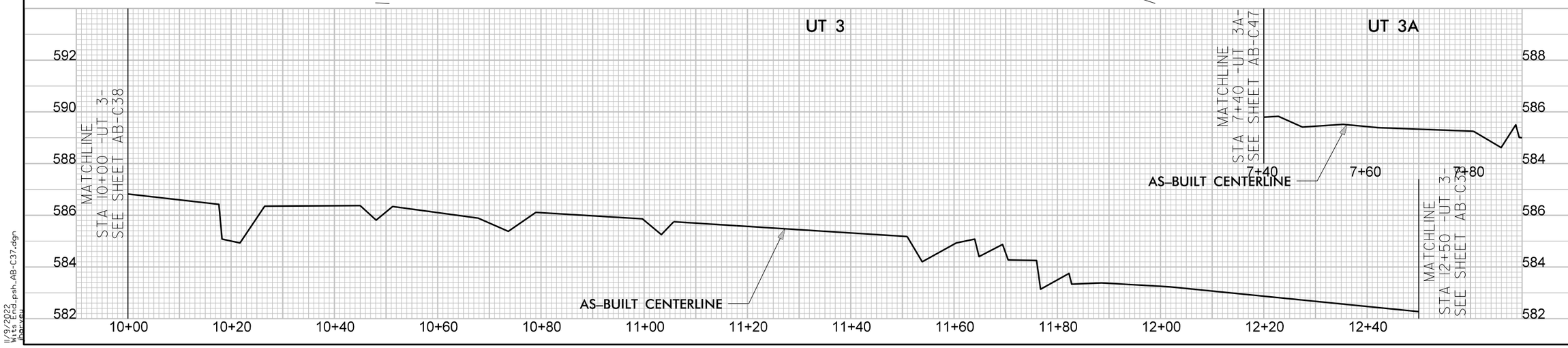
Darren

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11/9/2022

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**AS-BUILT SURVEY**

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|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C37 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C37*** |



11/9/2022
Wits End_psh_AB-C37.dgn
jharvey

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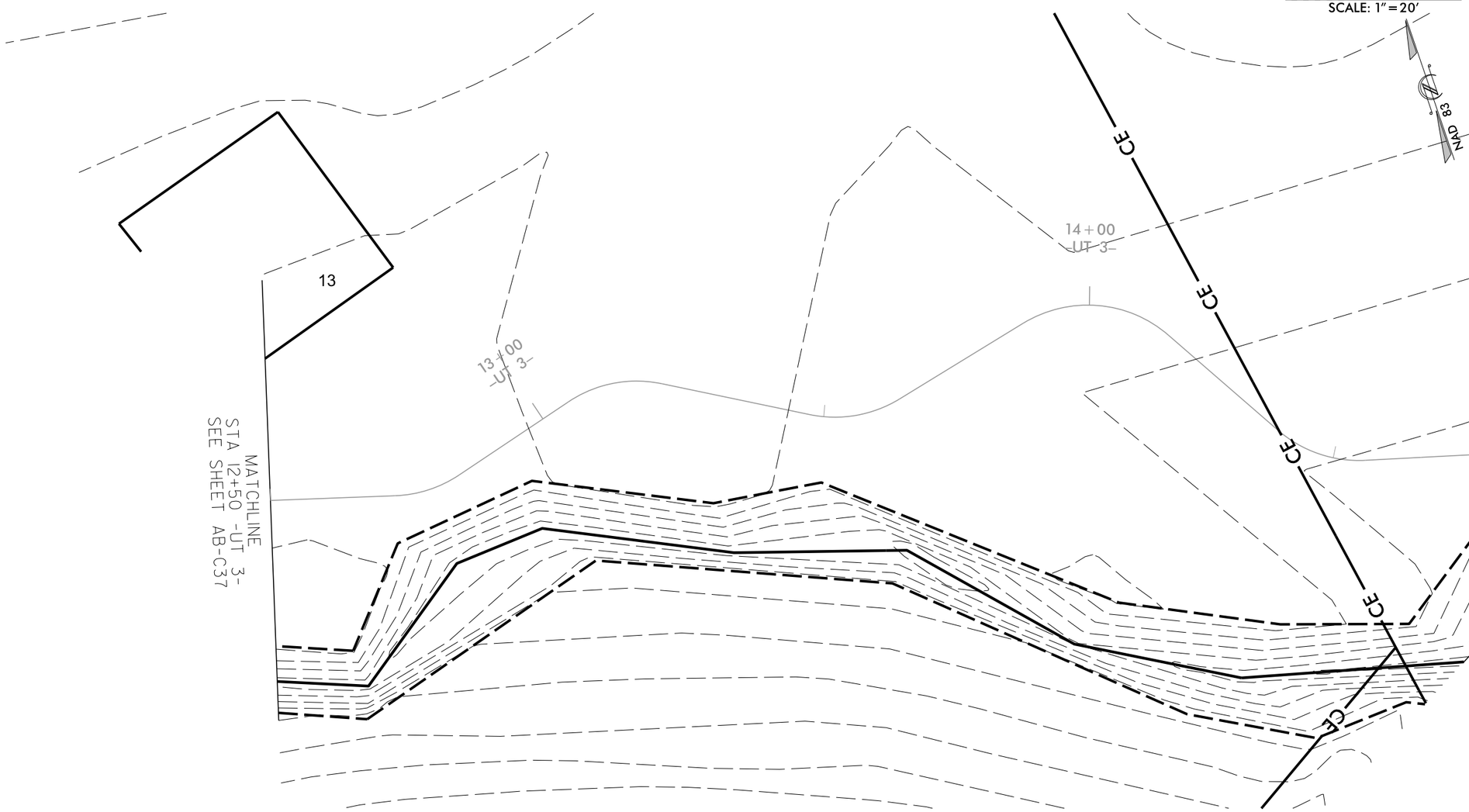
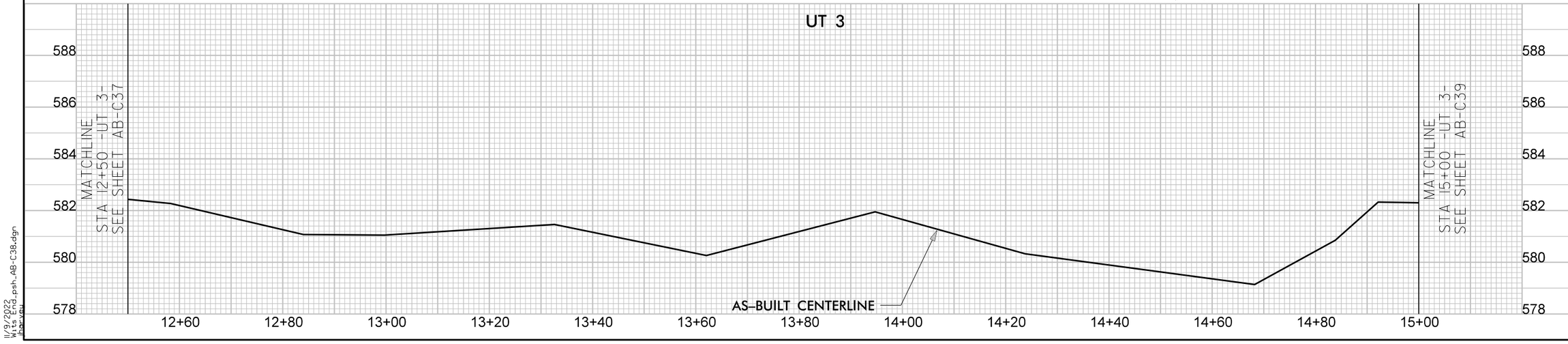
SCALE: 1″ = 20′

NAD 83




DocuSigned by:
A71B53024D954EC...

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC

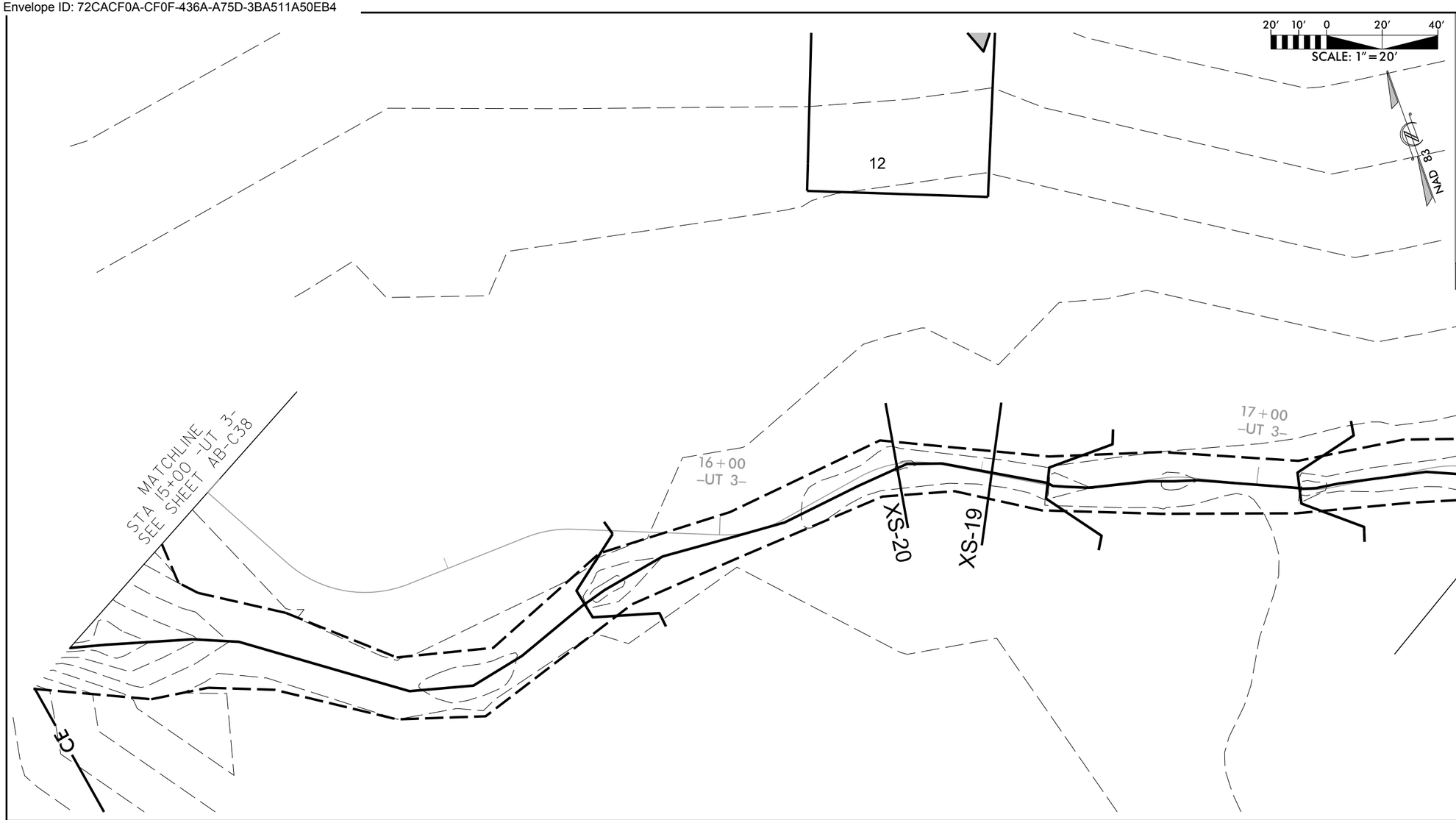


**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C38 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C38*** |

11/9/2022
Wits End_psh_AB-C38.dgn
jharvell

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11/9/2022

***DATE:***

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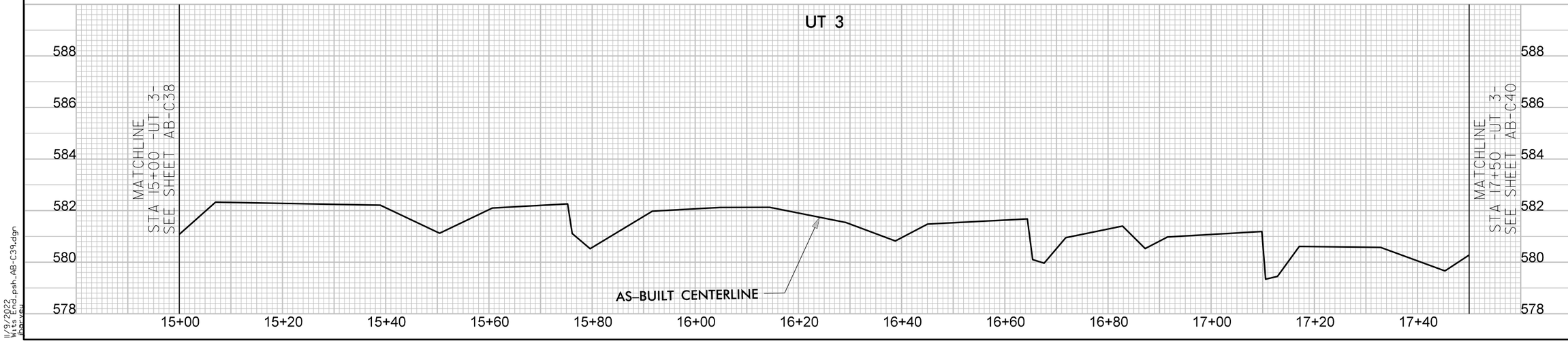


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# WITS END
UNION COUNTY, NC

# AS-BUILT SURVEY

*PROJECT # :* I22I-20024

*DRAWING NAME:* WITS END PSH AB-C39

*DATE:* 2022

*DRAWN BY:* JRH

*REVIEWED BY:* JGD

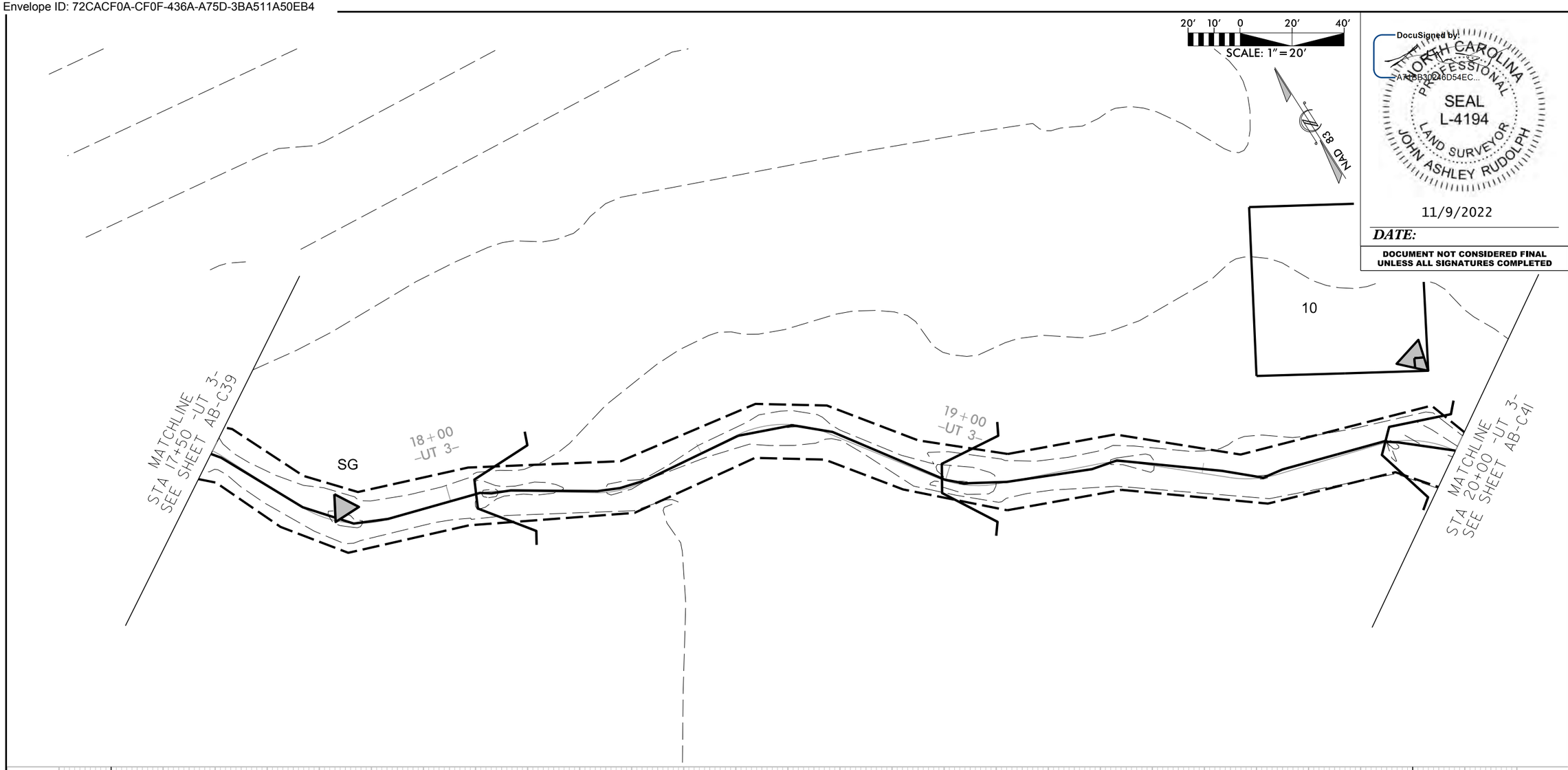
*REVISIONS:*

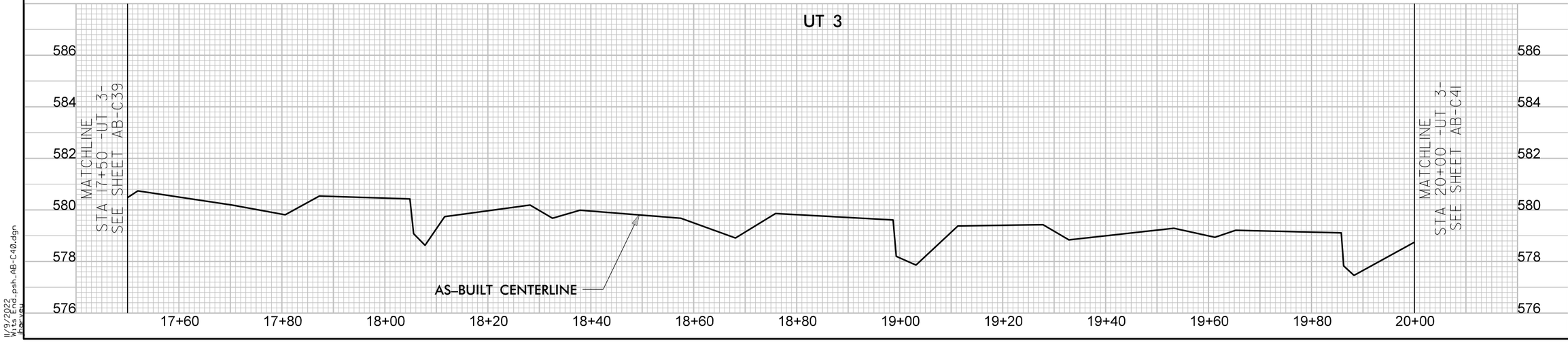
*SHEET NO.*

***AB–C39***



11/9/2022
Wits End_psh_AB-C39.dgn
jharvey

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11/9/2022

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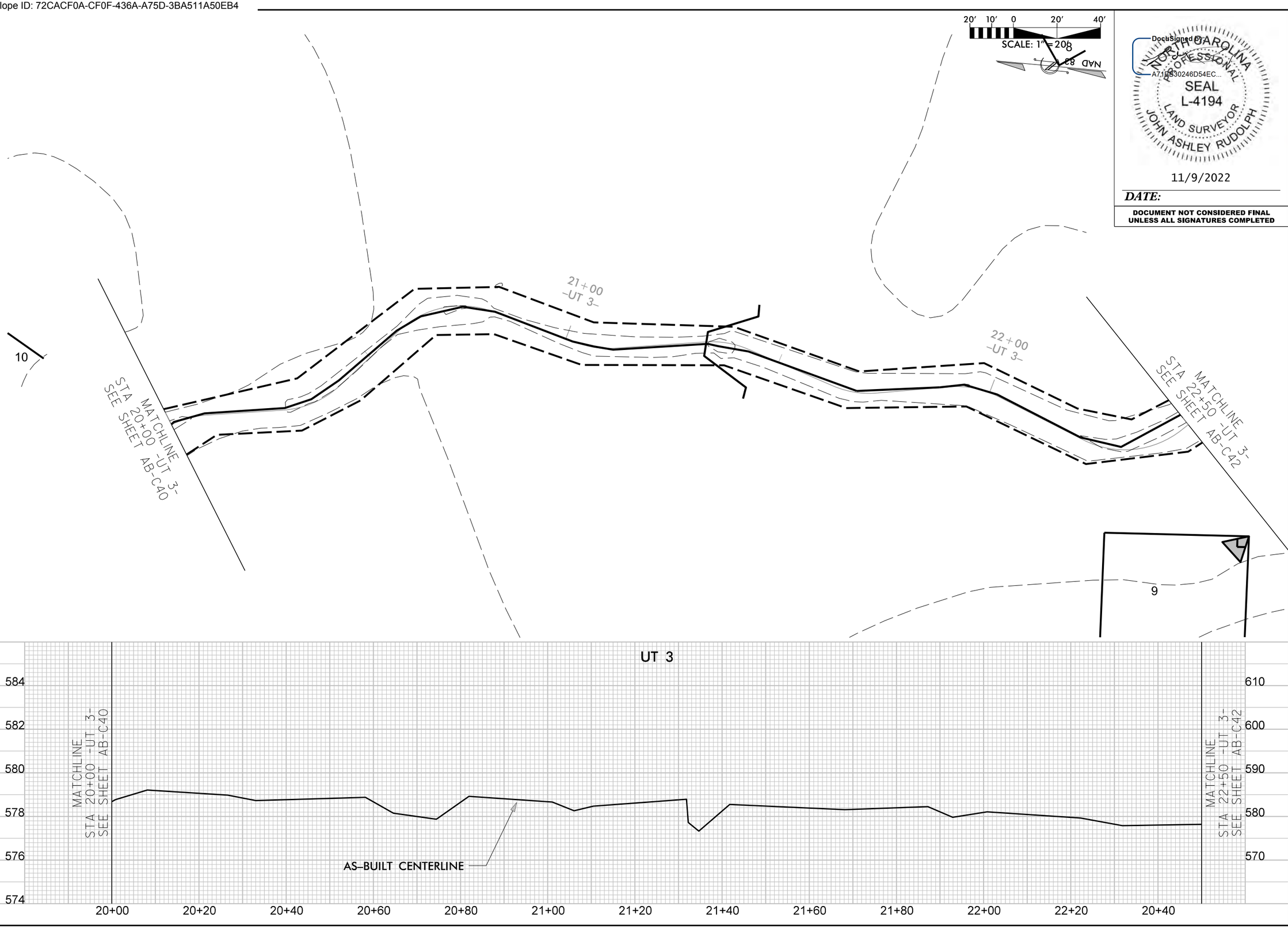
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C40 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |

*SHEET NO.*
***AB–C40***

11/9/2022
Wits End_psh_AB-C40.dgn
jharvey




DocuSigned by:
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11/9/2022

***DATE:***

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# WITS END
UNION COUNTY, NC

## AS-BUILT SURVEY

| | |
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C41 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C41*** |

11/9/2022
Wits End_psh_AB-C41.dgn
Darren

20′ 10′ 0 20′ 40′

SCALE: 1″ = 20′

NAD 83

MW-8

MATCHLINE
STA 22+50 -UT 3-
SEE SHEET AB-C41

23+00
-UT 3-

24+00
-UT 3-

MATCHLINE
STA 25+00 -UT 3-
SEE SHEET AB-C43

UT 3

582
580
578
576
574
572

MATCHLINE
STA 22+50 -UT 3-
SEE SHEET AB-C41

AS-BUILT CENTERLINE

MATCHLINE
STA 25+00 -UT 3-
SEE SHEET AB-C43

22+60 22+80 23+00 23+20 23+40 23+60 23+80 24+00 24+20 24+40 24+60 24+80 25+00

DocuSigned by:
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NORTH CAROLINA
PROFESSIONAL
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

*DATE:*

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**WITS END**
**UNION COUNTY, NC**

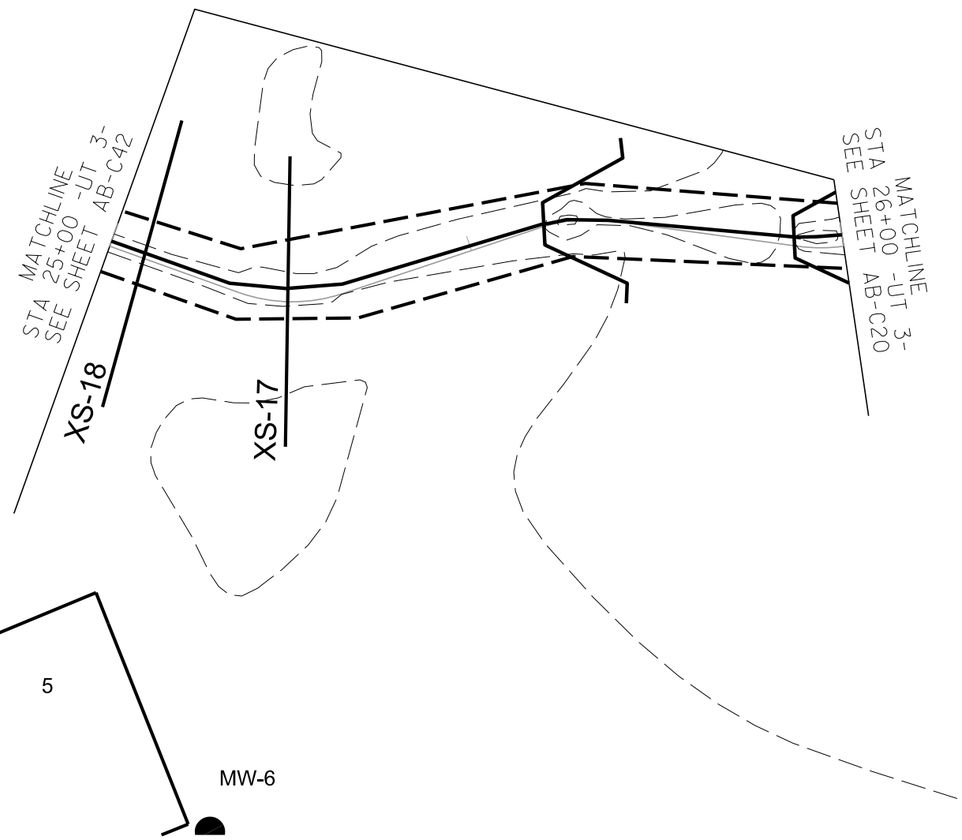
**AS-BUILT SURVEY**



PROJECT # : 1221-20024
DRAWING NAME: WITS END PSH AB-C42
DATE: 2023
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO. ***AB–C42***

11/9/2022
Wits End_psh_AB-C42.dgn
Jarvis

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SCALE: 1″ = 20′

NAD 83

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ITHE NORTH CAROLINA PROFESSIONAL
A41BB30046D54EC...
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
*DATE:*

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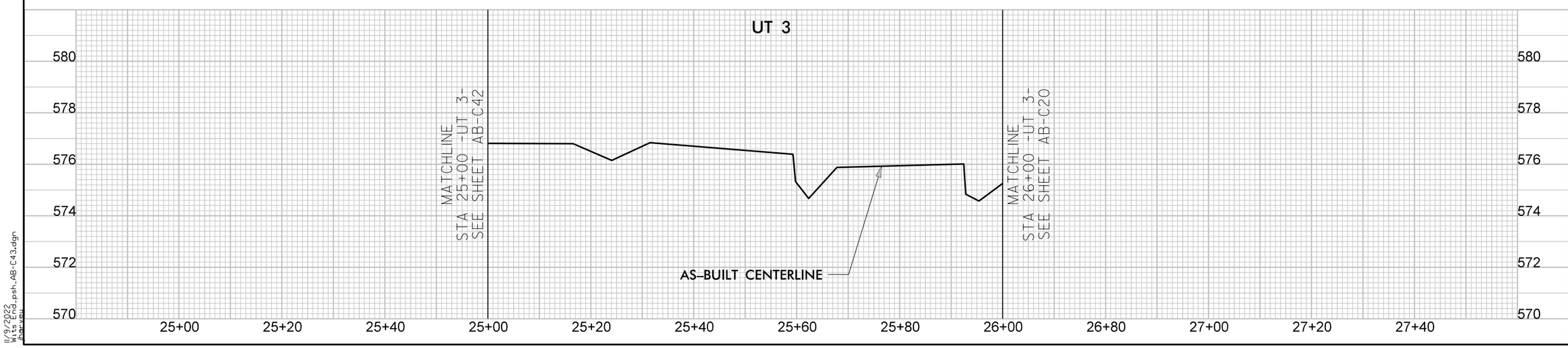


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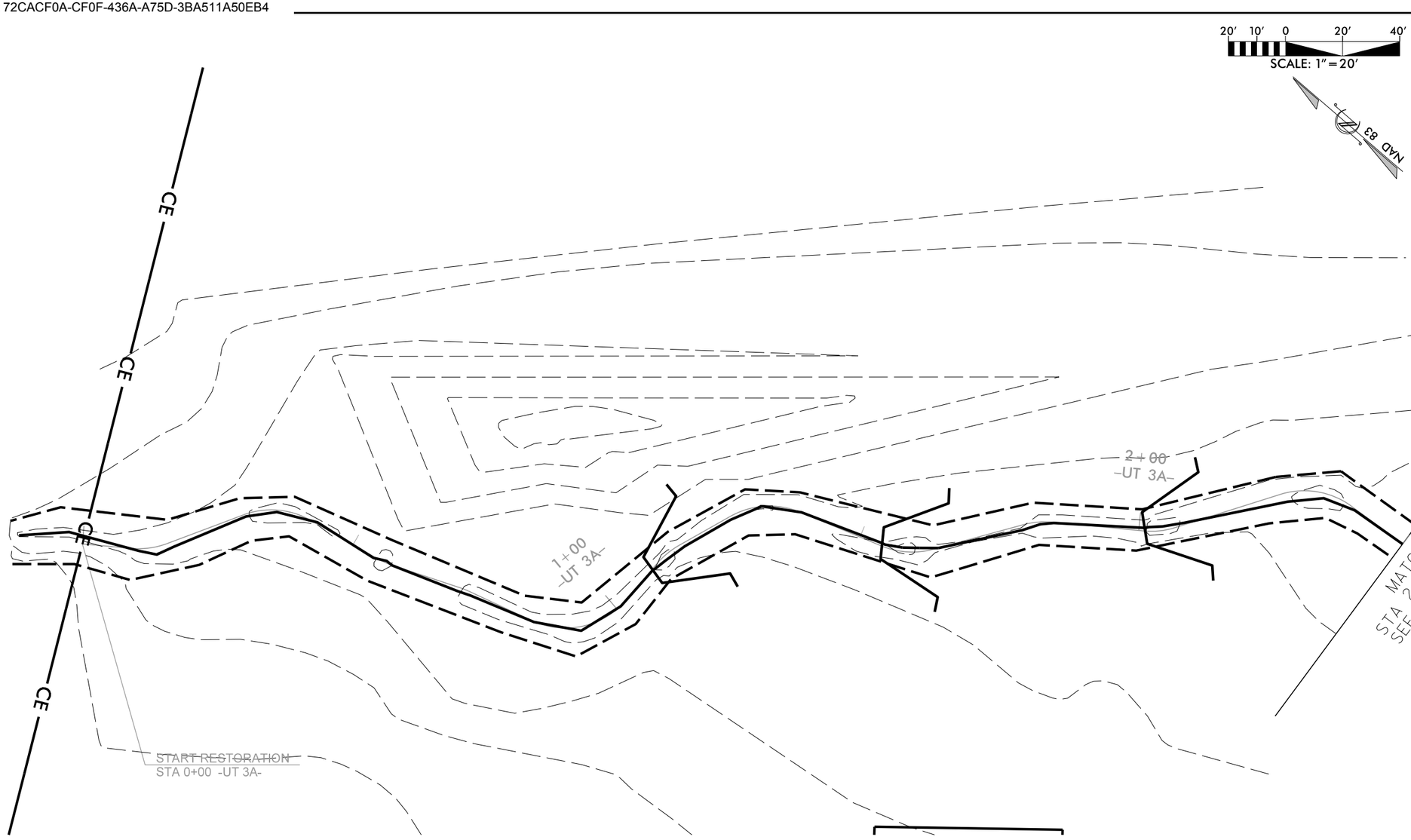
**WITS END**
**UNION COUNTY, NC**

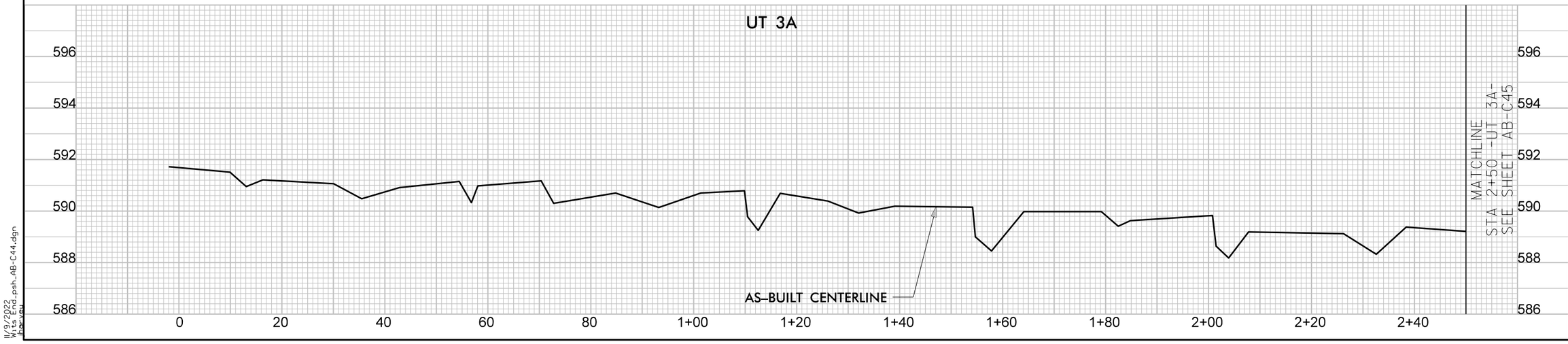
**AS-BUILT SURVEY**

*PROJECT # :* 1221-20024
*DRAWING NAME:* WITS END PSH AB-C43
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C43***

11/9/2022
Wits End_psh_AB-C43.dgn
Jarvis




DocuSigned by:
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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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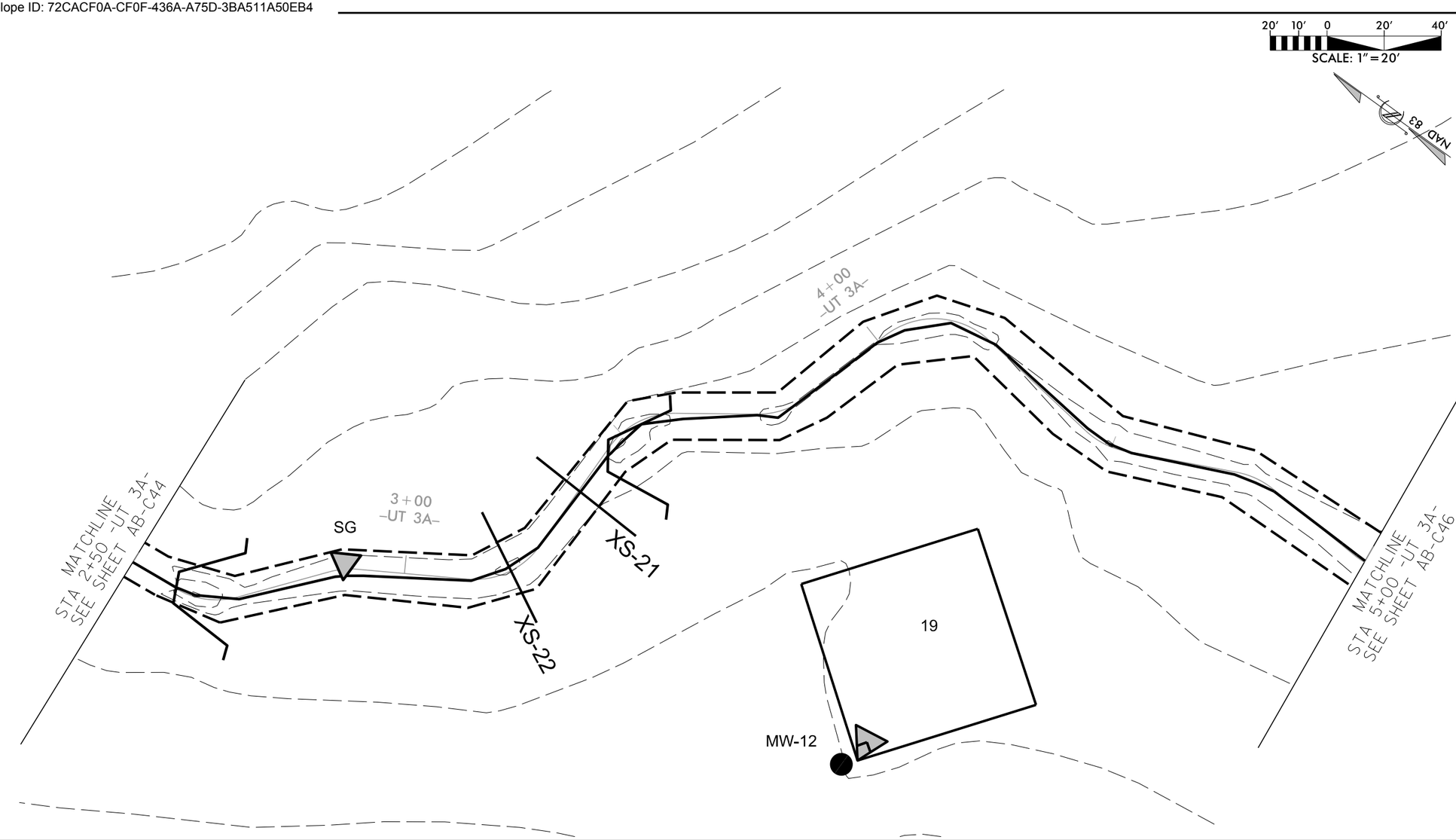
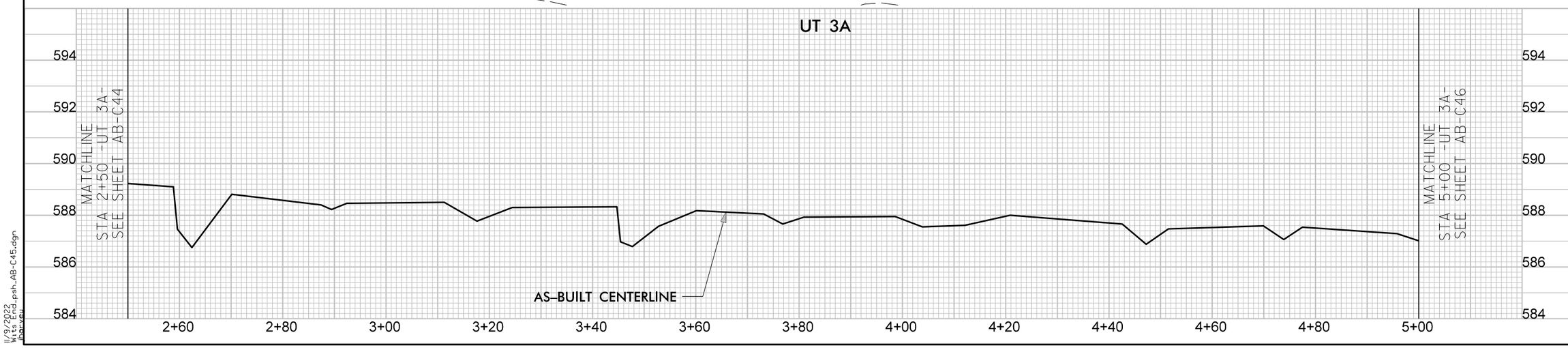
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C44 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB-C44*** |



11/9/2022
Wits End_psh_AB-C44.dgn
jgreen

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NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH
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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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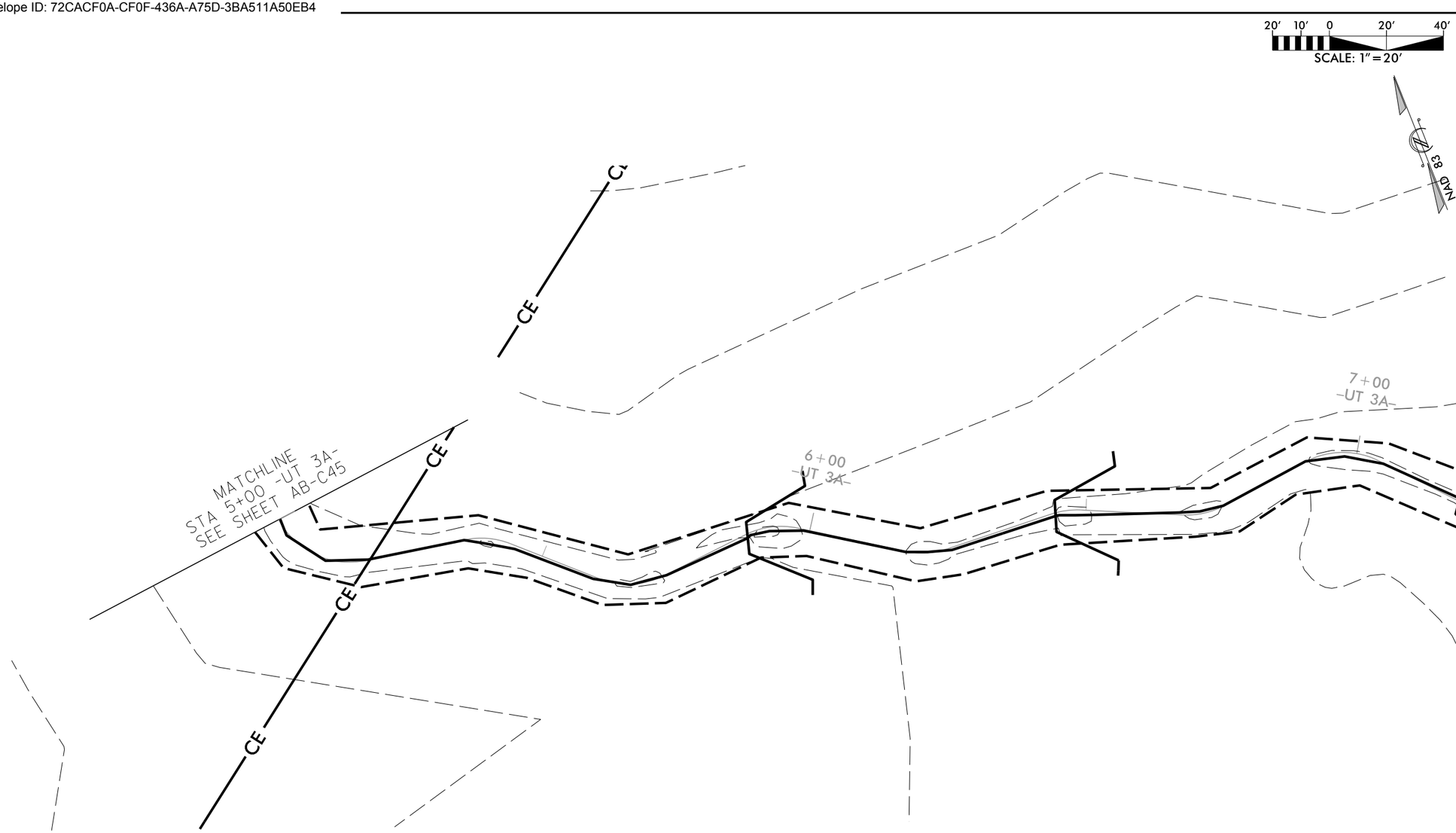
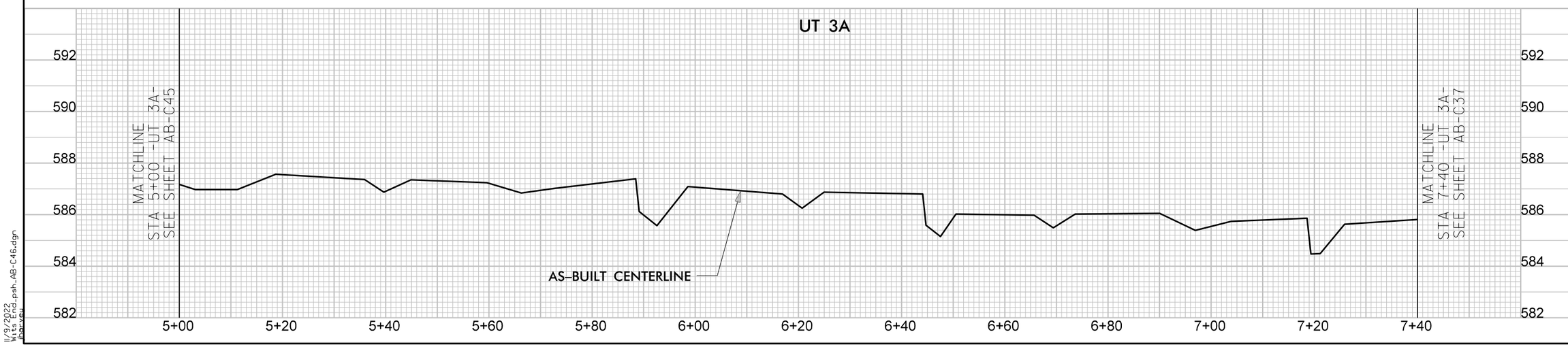
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C45 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C45*** |

11/9/2022
Wits End_psh_AB-C45.dgn
jharvey




DocuSigned by:
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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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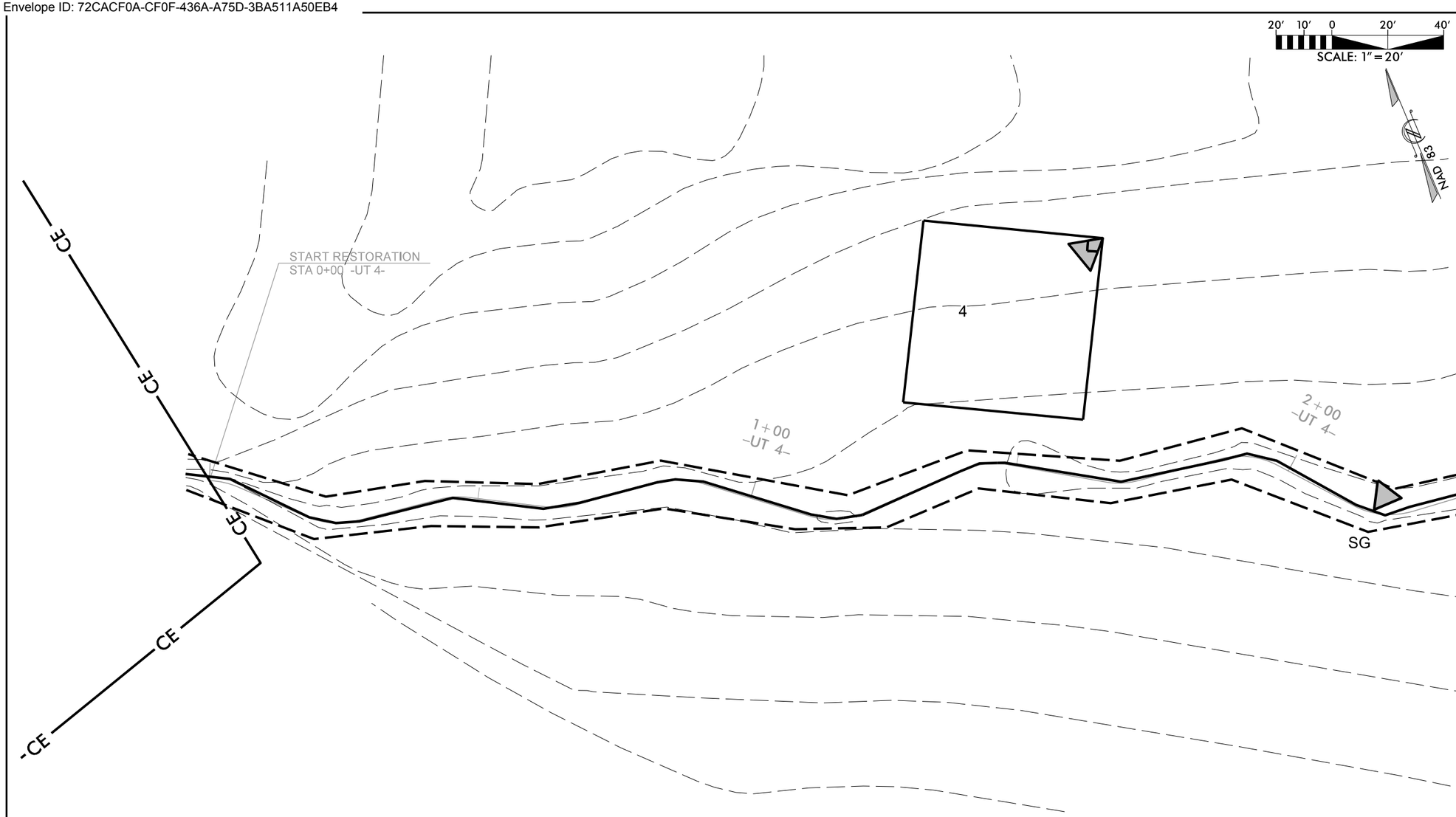
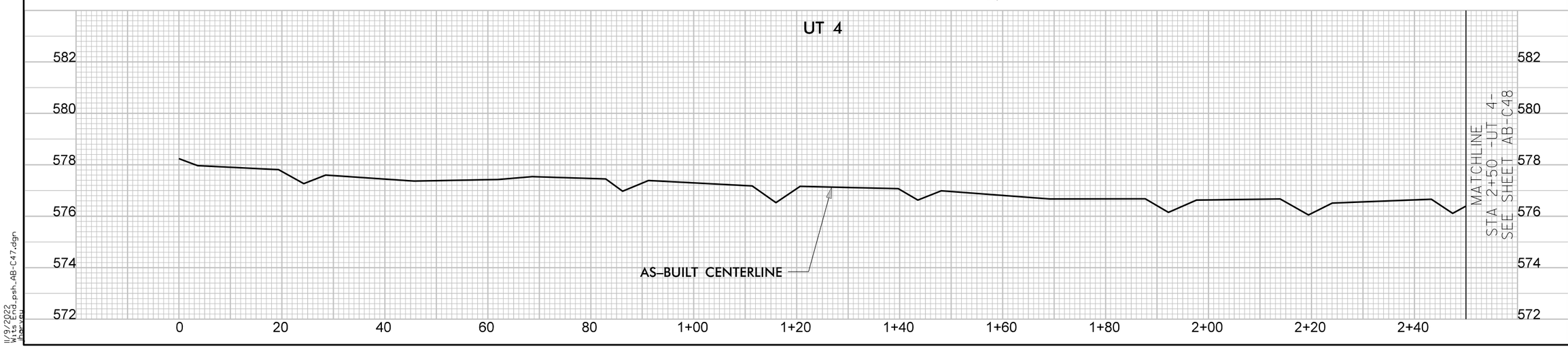
|---|---|
| PROJECT # : | 1221-20024 |
| DRAWING NAME: | WITS END PSH AB-C46 |
| DATE: | 2022 |
| DRAWN BY: | JRH |
| REVIEWED BY: | JGD |
| REVISIONS: | |
| SHEET NO. | ***AB–C46*** |

11/9/2022
Wits End_psh_AB-C46.dgn
jharvey

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NORTH CAROLINA
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L-4194
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JOHN ASHLEY RUDOLPH

11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AB-BUILT SURVEY**

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|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C47 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C47*** |

11/9/2022
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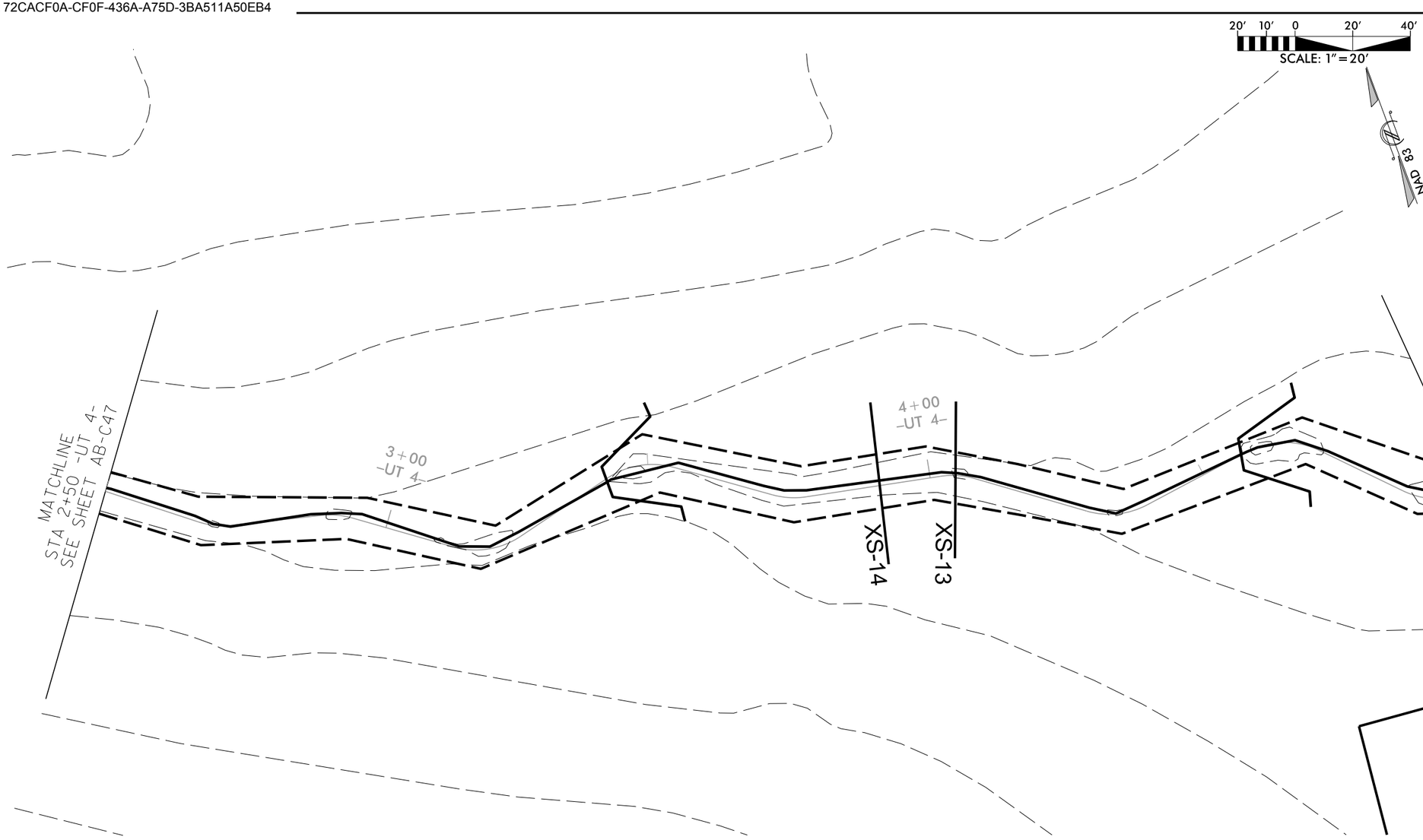
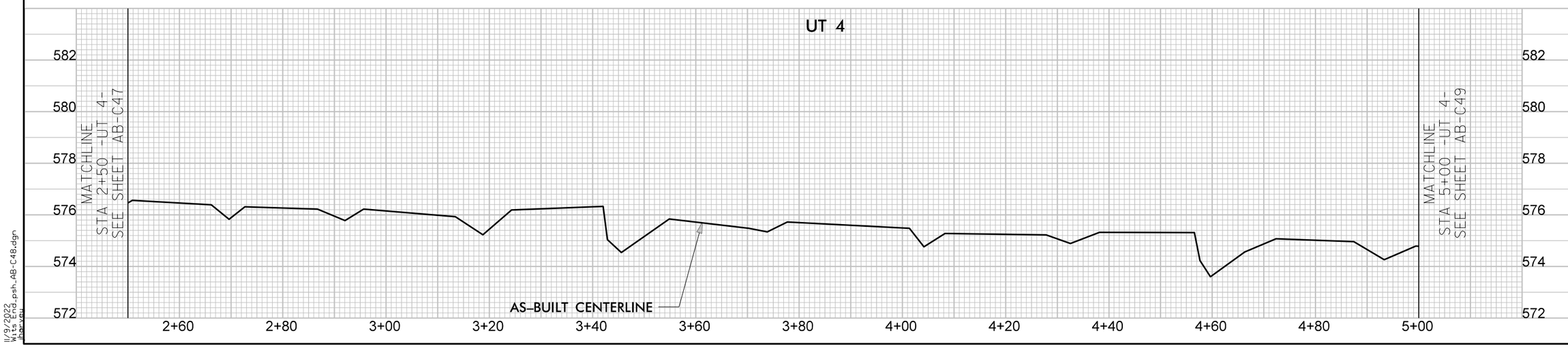
jharden

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11/9/2022

***DATE:***

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**WITS END**

**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 122I-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C48 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C48*** |

11/9/2022
Wits End_psh_AB-C48.dgn
Parker

20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83

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11/9/2022
*DATE:*

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2

6+00 -UT 4-

7+00 -UT 4-

MATCHLINE STA 5+00 -UT 4- SEE SHEET AB-C48

MATCHLINE STA 7+50 -UT 4- SEE SHEET AB-C50

MW-3

UT 4

MATCHLINE STA 5+00 -UT 4- SEE SHEET AB-C48

MATCHLINE STA 7+50 -UT 4- SEE SHEET AB-C50

AS-BUILT CENTERLINE

580
578
576
574
572
570

5+00 5+20 5+40 5+60 5+80 6+00 6+20 6+40 6+60 6+80 7+00 7+20 7+40

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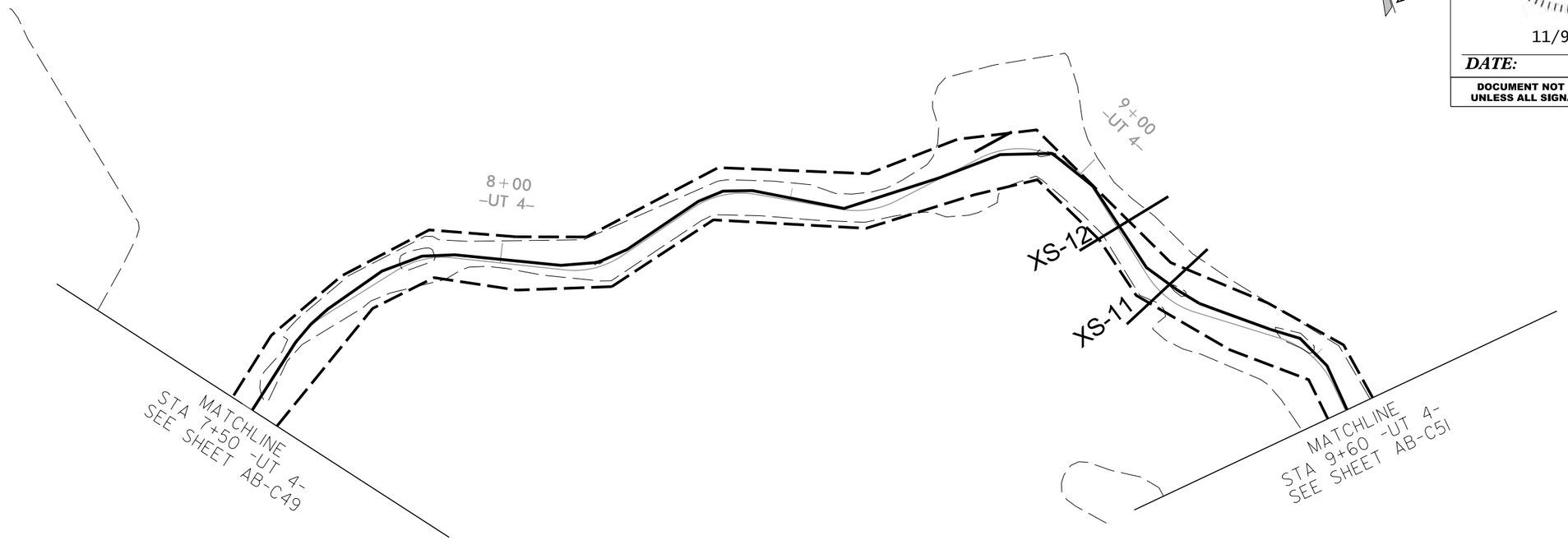
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

*PROJECT # :* 1221-20024
*DRAWING NAME:* WITS END PSH AB-C49
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C49***

11/9/2022
Wits End_psh_AB-C49.dgn
Jarvis




20′ 10′ 0 20′ 40′
SCALE: 1″ = 20′

NAD 83

DocuSigned by:
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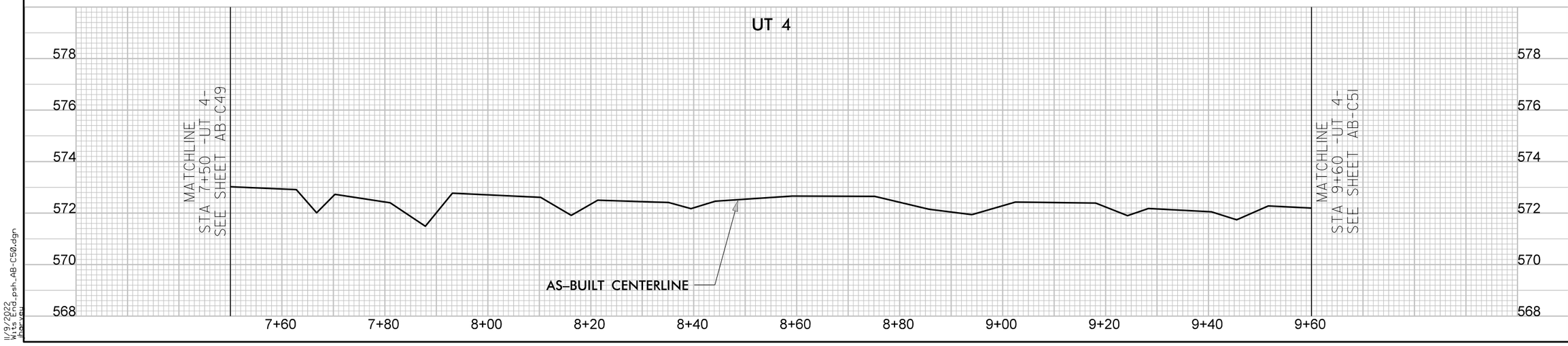
NORTH CAROLINA
PROFESSIONAL
SEAL
L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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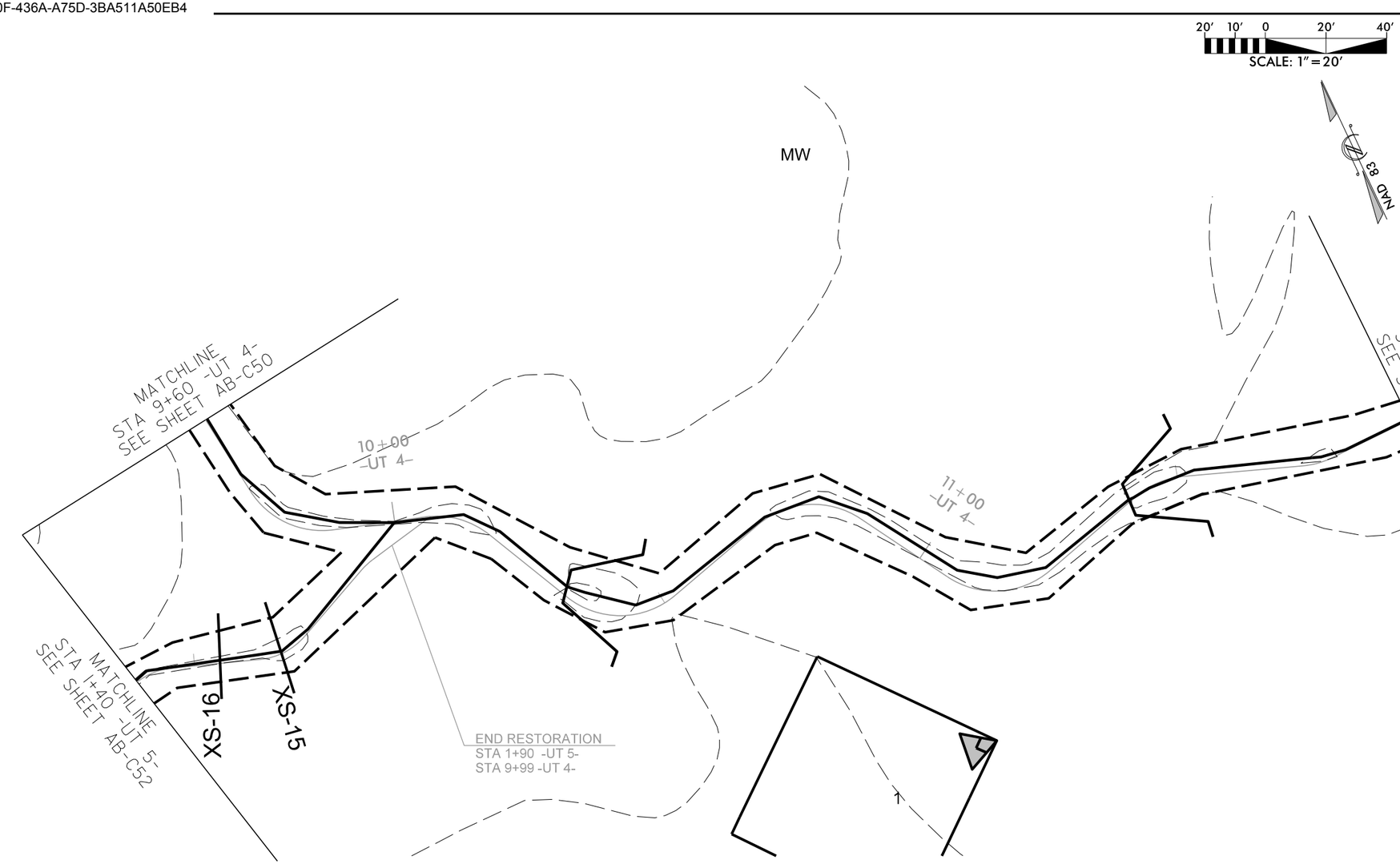
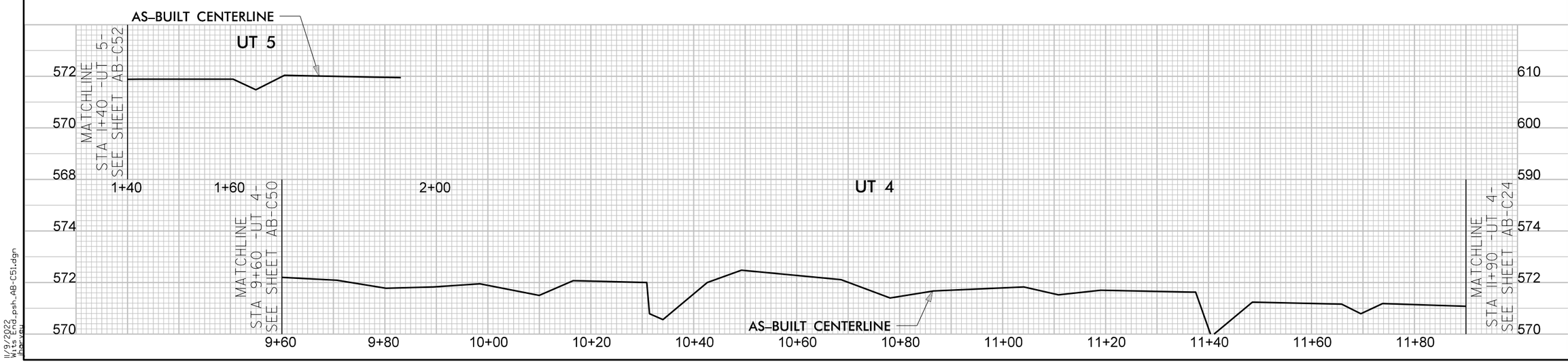
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C50 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C50*** |



11/9/2022
Wits End_psh_AB-C50.dgn
jarvey

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11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

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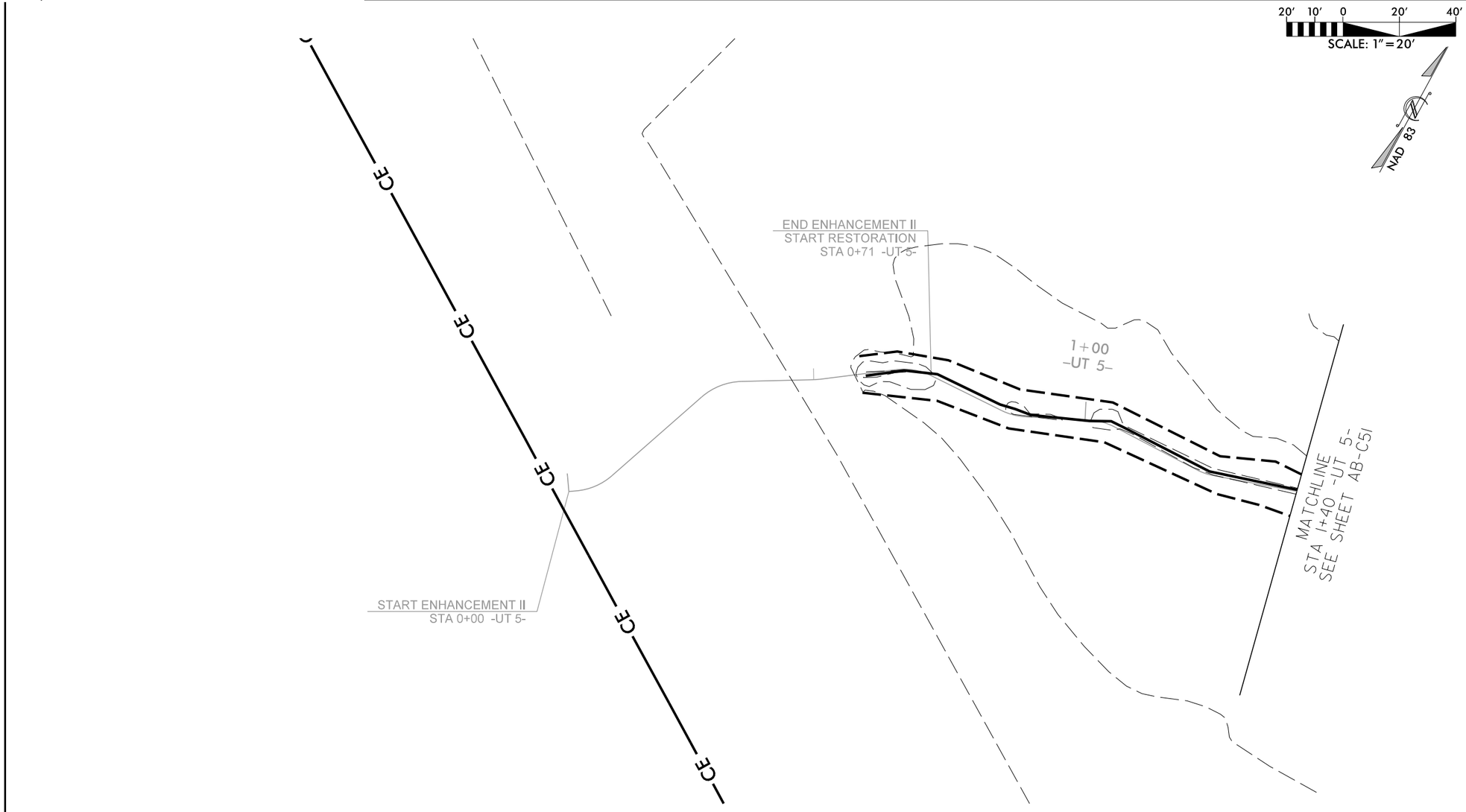
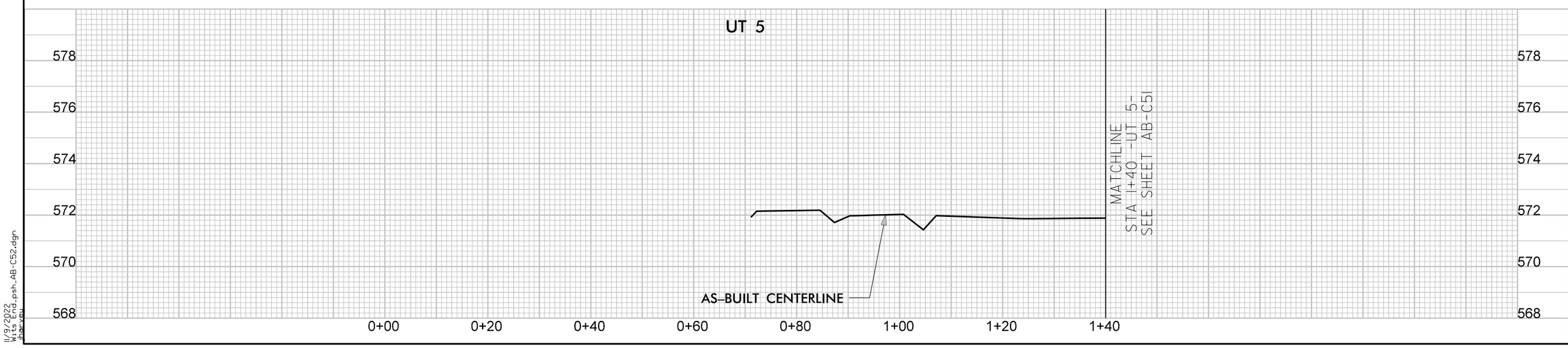
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C51 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C51*** |

11/9/2022
Wits End_psh_AB-C51.dgn
Darren

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L-4194
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JOHN ASHLEY RUDOLPH

11/9/2022

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C52 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C52*** |

11/9/2022
Wits End_psh_AB-C52.dgn
Harvey

20' 10' 0 20' 40'

SCALE: 1" = 20'

NAD 83

DocuSigned by:
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11/9/2022

***DATE:***

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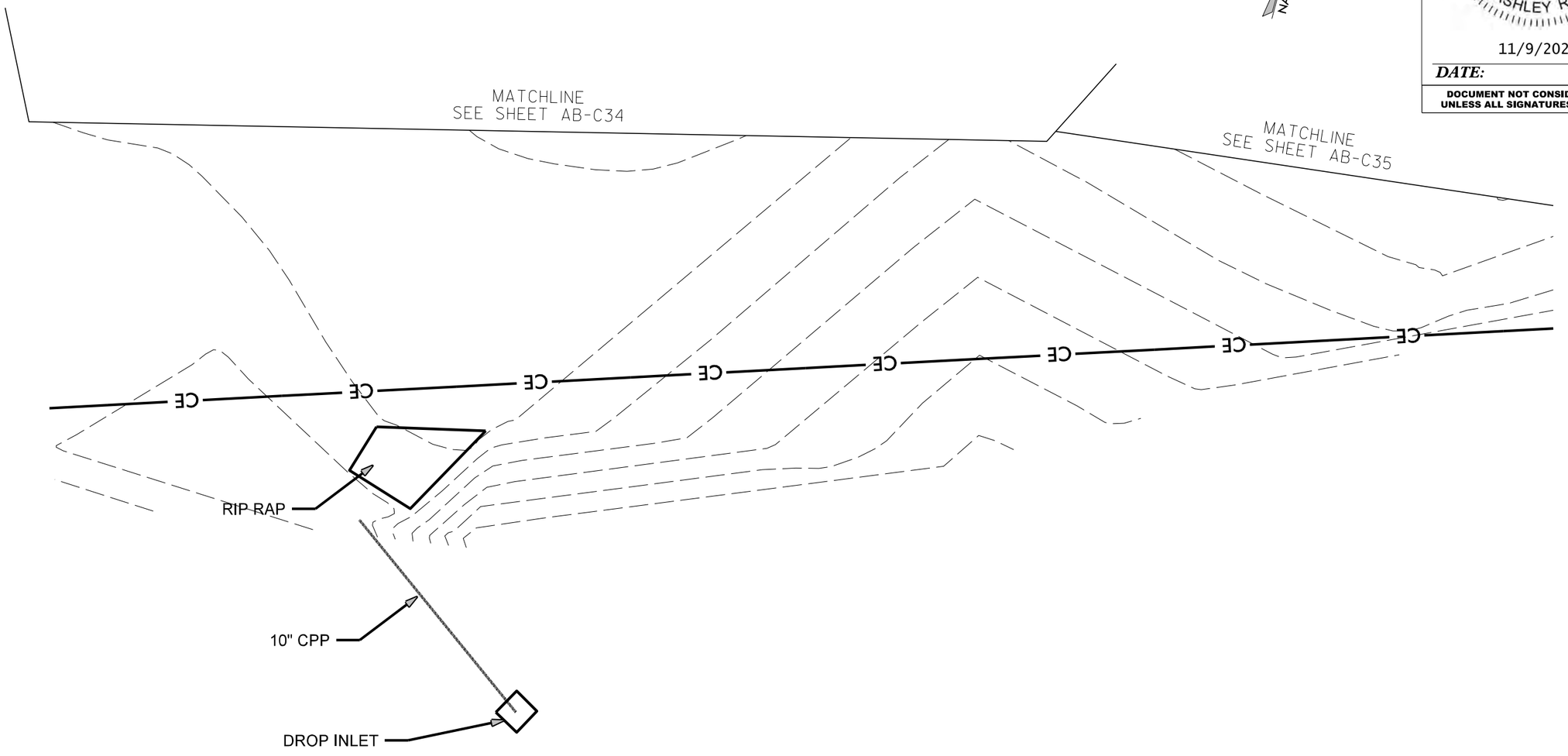



k2 design group

Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT SURVEY**

| | |
|---|---|
| *PROJECT # :* | 1221-20024 |
| *DRAWING NAME:* | WITS END PSH AB-C53 |
| *DATE:* | 2022 |
| *DRAWN BY:* | JRH |
| *REVIEWED BY:* | JGD |
| *REVISIONS:* | |
| *SHEET NO.* | ***AB–C53*** |

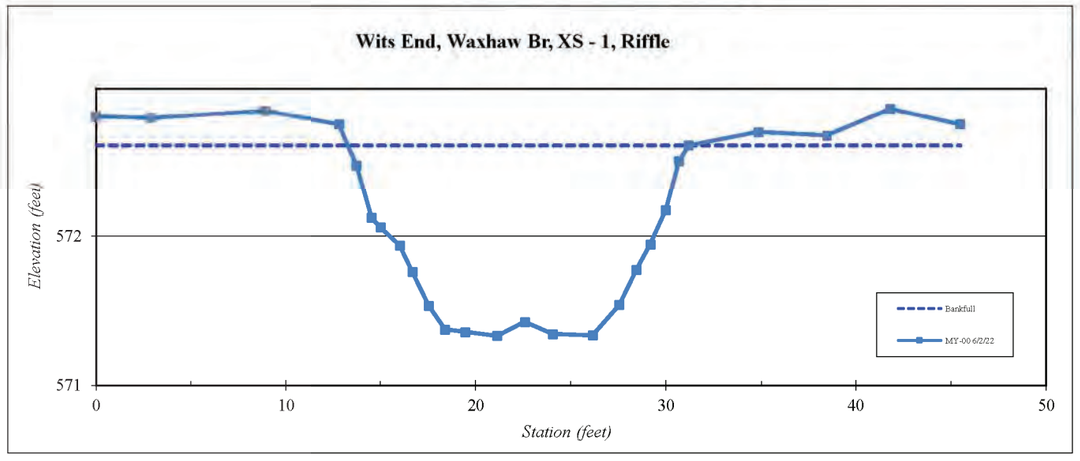
11/9/2022
Wits End_psh_AB-C53.dgn
jharvell

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -1 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.0 |
| 2.9 | 573.0 |
| 8.9 | 573.0 |
| 12.8 | 572.9 |
| 13.7 | 572.6 |
| 14.5 | 572.2 |
| 15.0 | 572.1 |
| 16.0 | 572.0 |
| 16.7 | 571.8 |
| 17.5 | 571.6 |
| 18.4 | 571.4 |
| 19.5 | 571.4 |
| 21.1 | 571.3 |
| 22.6 | 571.4 |
| 24.0 | 571.3 |
| 26.1 | 571.3 |
| 27.5 | 571.6 |
| 28.4 | 571.8 |
| 29.2 | 572.0 |
| 30.0 | 572.3 |
| 30.7 | 572.66 |
| 31.2 | 572.8 |
| 34.8 | 572.9 |
| 38.5 | 572.9 |
| 41.8 | 573.1 |
| 45.5 | 572.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.78 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 571.33 |
| **LTOB Elevation:** | 572.78 |
| **LTOB Max Depth:** | 1.45 |
| **LTOB Cross Sectional Area:** | 19.0 |

| | |
|---|---|
| **Stream Type** | E/C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C54
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C54***

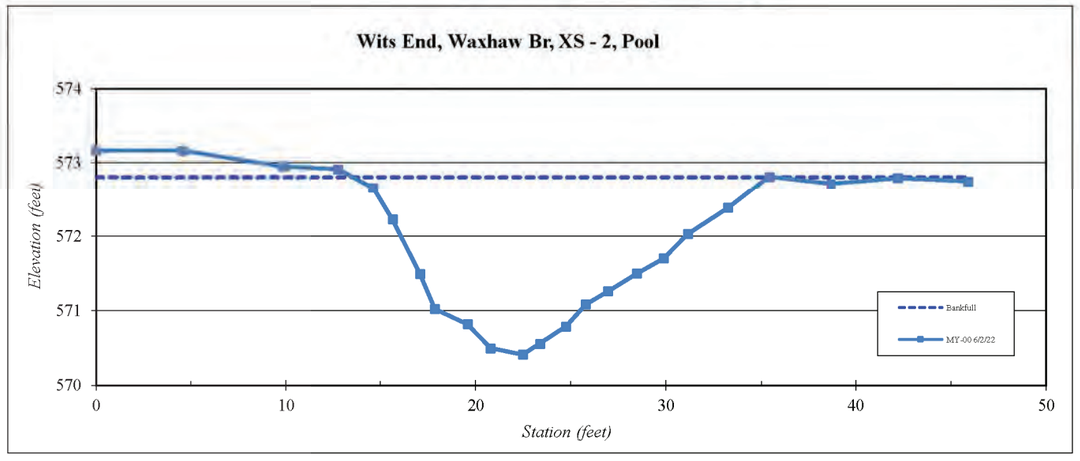
11/9/2022
Wits End_psh_AB-C54.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -2 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.4 |
| 4.6 | 573.4 |
| 9.8 | 573.2 |
| 12.8 | 573.1 |
| 14.6 | 572.8 |
| 15.6 | 572.3 |
| 17.1 | 571.5 |
| 17.9 | 571.0 |
| 19.6 | 570.7 |
| 20.8 | 570.4 |
| 22.5 | 570.3 |
| 23.4 | 570.5 |
| 24.7 | 570.7 |
| 25.8 | 571.0 |
| 27.0 | 571.2 |
| 28.5 | 571.5 |
| 29.9 | 571.7 |
| 31.1 | 572.1 |
| 33.3 | 572.5 |
| 35.4 | 573.0 |
| 38.7 | 572.89 |
| 42.2 | 573.0 |
| 45.9 | 572.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.99 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 570.29 |
| **LTOB Elevation:** | 572.99 |
| **LTOB Max Depth:** | 2.70 |
| **LTOB Cross Sectional Area:** | 32.2 |


| | |
|---|---|
| **Stream Type** | E/C |

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LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C55
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C55***

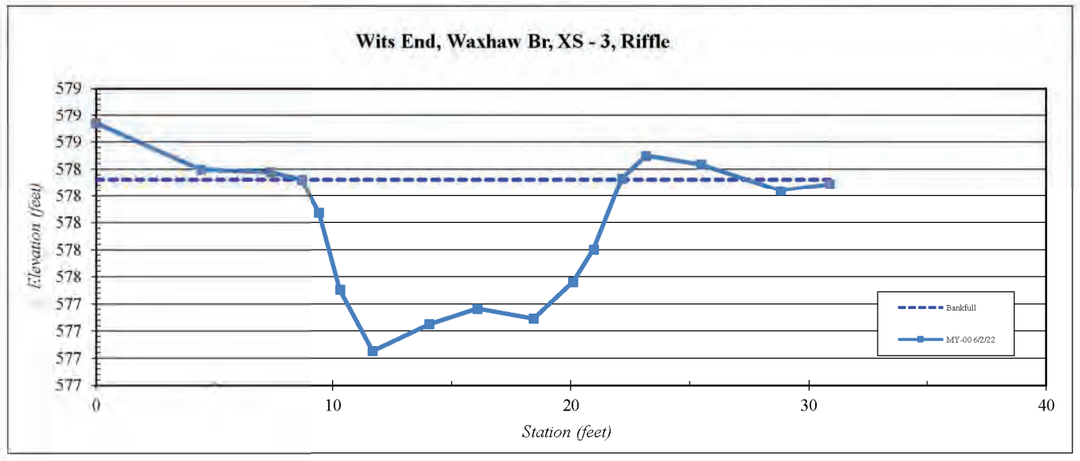
11/9/2022
Wits End_psh_AB-C55.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -3 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.7 |
| 4.4 | 578.4 |
| 7.4 | 578.4 |
| 8.7 | 578.3 |
| 9.4 | 578.1 |
| 10.3 | 577.5 |
| 11.7 | 577.1 |
| 14.1 | 577.3 |
| 16.1 | 577.4 |
| 18.4 | 577.3 |
| 20.1 | 577.6 |
| 21.0 | 577.8 |
| 22.1 | 578.3 |
| 23.2 | 578.5 |
| 25.5 | 578.4 |
| 28.8 | 578.2 |
| 30.9 | 578.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 578.32 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 577.06 |
| **LTOB Elevation:** | 578.32 |
| **LTOB Max Depth:** | 1.27 |
| **LTOB Cross Sectional Area:** | 11.5 |

| | |
|---|---|
| **Stream Type** | E/C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C56
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C56***

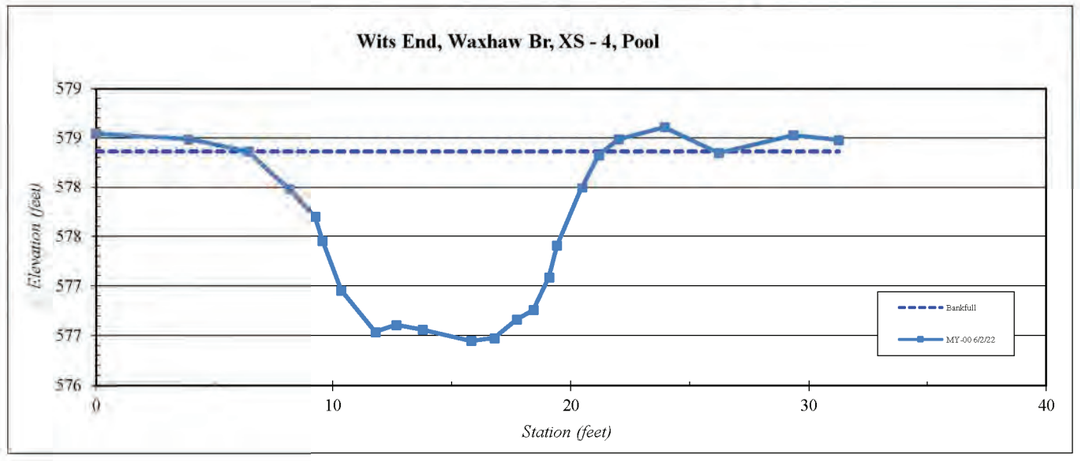
11/9/2022
Wits End_psh_AB-C56.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -4 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.5 |
| 3.9 | 578.5 |
| 6.4 | 578.4 |
| 8.1 | 578.0 |
| 9.3 | 577.7 |
| 9.6 | 577.5 |
| 10.4 | 577.0 |
| 11.8 | 576.5 |
| 12.7 | 576.6 |
| 13.8 | 576.6 |
| 15.8 | 576.4 |
| 16.8 | 576.5 |
| 17.7 | 576.7 |
| 18.4 | 576.8 |
| 19.1 | 577.1 |
| 19.4 | 577.4 |
| 20.5 | 578.0 |
| 21.2 | 578.3 |
| 22.0 | 578.5 |
| 23.9 | 578.6 |
| 26.2 | 578.35 |
| 29.3 | 578.5 |
| 31.3 | 578.5 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 578.36 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 576.45 |
| **LTOB Elevation:** | 578.36 |
| **LTOB Max Depth:** | 1.92 |
| **LTOB Cross Sectional Area:** | 18.6 |

| | |
|---|---|
| **Stream Type** | E/C |

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11/9/2022

***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : I221-20024
DRAWING NAME: WITS END PSH AB-C57
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C57***

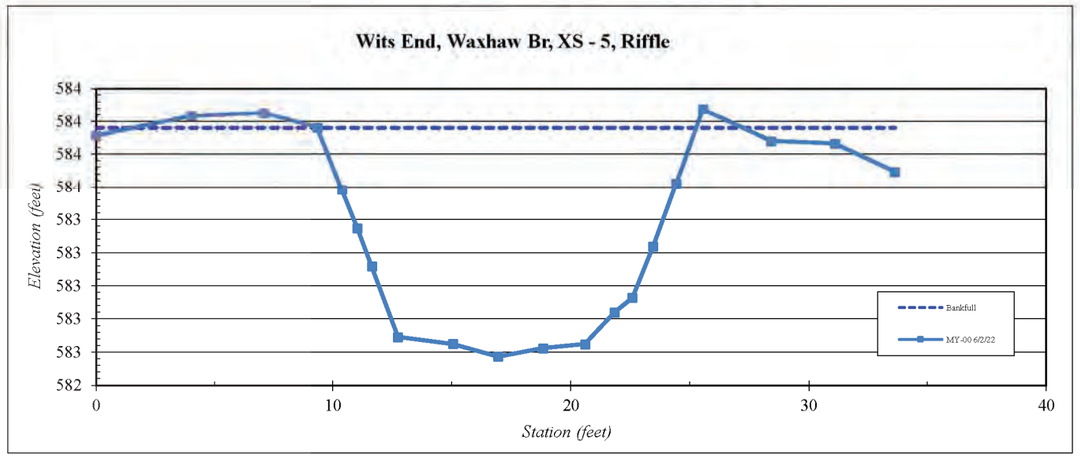
11/9/2022
Wits End_psh_AB-C57.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -5 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.9 |
| 4.0 | 584.0 |
| 7.1 | 584.1 |
| 9.3 | 584.0 |
| 10.4 | 583.6 |
| 11.0 | 583.3 |
| 11.6 | 583.1 |
| 12.7 | 582.7 |
| 15.0 | 582.7 |
| 16.9 | 582.6 |
| 18.8 | 582.6 |
| 20.6 | 582.6 |
| 21.8 | 582.8 |
| 22.6 | 582.9 |
| 23.5 | 583.2 |
| 24.4 | 583.6 |
| 25.6 | 584.1 |
| 28.4 | 583.9 |
| 31.1 | 583.9 |
| 33.6 | 583.7 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 583.96 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 582.57 |
| **LTOB Elevation:** | 583.96 |
| **LTOB Max Depth:** | 1.39 |
| **LTOB Cross Sectional Area:** | 16.3 |

| | |
|---|---|
| **Stream Type** | E/C |

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JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C58
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C58***

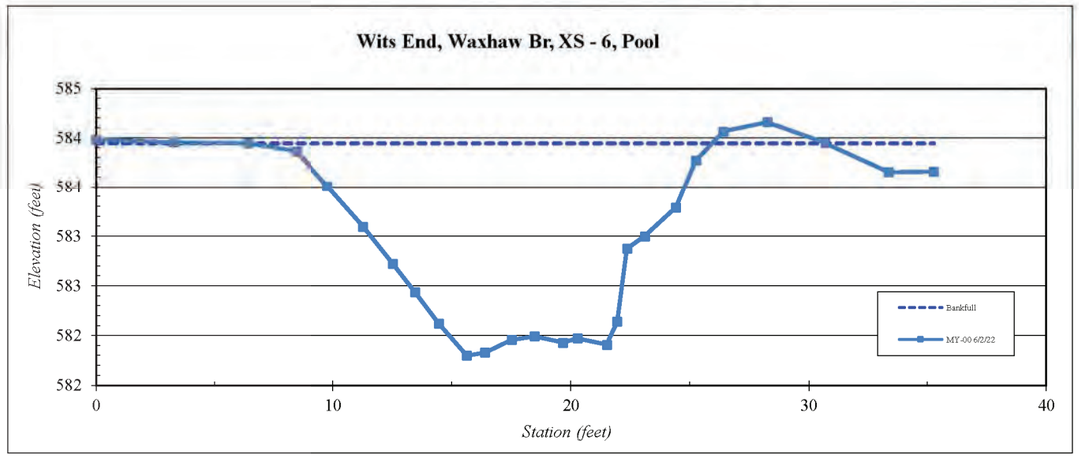
11/9/2022
Wits End_psh_AB-C58.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -6 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 584.0 |
| 3.3 | 584.0 |
| 6.4 | 583.9 |
| 8.4 | 583.9 |
| 9.8 | 583.5 |
| 11.3 | 583.1 |
| 12.5 | 582.7 |
| 13.4 | 582.4 |
| 14.4 | 582.1 |
| 15.6 | 581.8 |
| 16.4 | 581.8 |
| 17.5 | 582.0 |
| 18.5 | 582.0 |
| 19.7 | 581.9 |
| 20.3 | 582.0 |
| 21.5 | 581.9 |
| 21.9 | 582.1 |
| 22.4 | 582.9 |
| 23.1 | 583.0 |
| 24.4 | 583.3 |
| 25.2 | 583.77 |
| 26.4 | 584.1 |
| 28.3 | 584.2 |
| 30.7 | 583.9 |
| 33.4 | 583.7 |
| 35.3 | 583.7 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 583.94 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.80 |
| **LTOB Elevation:** | 583.94 |
| **LTOB Max Depth:** | 2.14 |
| **LTOB Cross Sectional Area:** | 23.5 |

| | |
|---|---|
| **Stream Type** | E/C |

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LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C59
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C59***

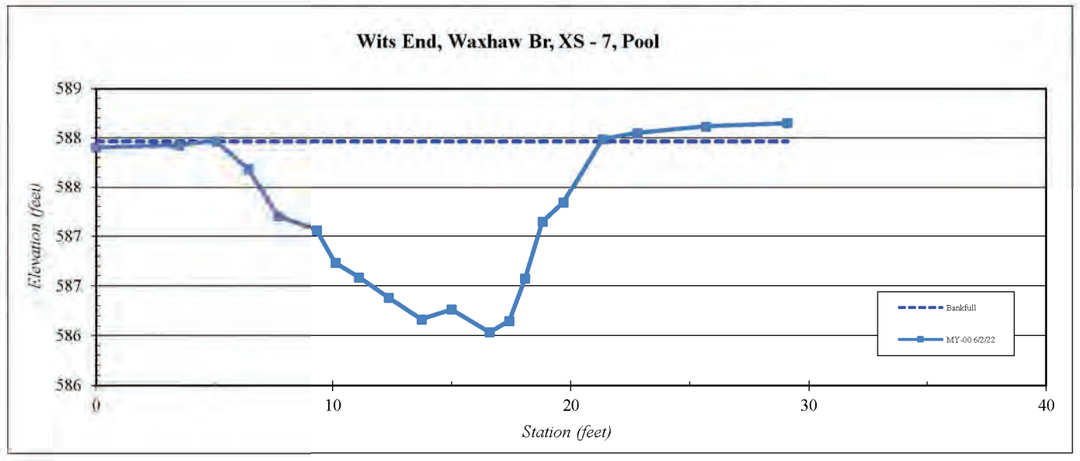
11/9/2022
Wits End_psh_AB-C59.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -7 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 587.9 |
| 3.5 | 587.9 |
| 5.0 | 588.0 |
| 6.4 | 587.7 |
| 7.7 | 587.2 |
| 9.3 | 587.1 |
| 10.1 | 586.7 |
| 11.1 | 586.6 |
| 12.4 | 586.4 |
| 13.7 | 586.2 |
| 15.0 | 586.3 |
| 16.6 | 586.0 |
| 17.4 | 586.1 |
| 18.1 | 586.6 |
| 18.8 | 587.1 |
| 19.7 | 587.3 |
| 21.3 | 588.0 |
| 22.8 | 588.0 |
| 25.7 | 588.1 |
| 29.1 | 588.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 587.97 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.03 |
| **LTOB Elevation:** | 587.97 |
| **LTOB Max Depth:** | 1.93 |
| **LTOB Cross Sectional Area:** | 18.2 |

| | |
|---|---|
| **Stream Type** | C |

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11/9/2022
***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C60
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C60***

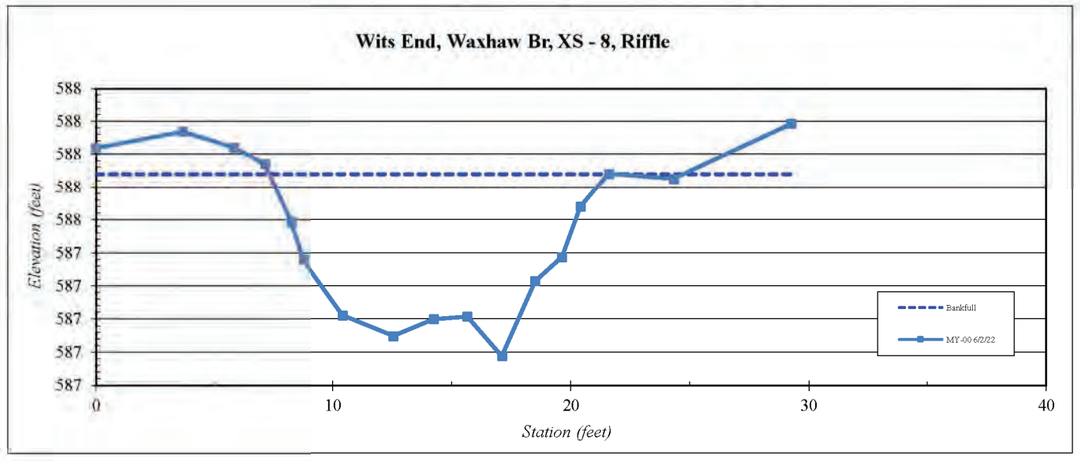
11/9/2022
Wits End_psh_AB-C60.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -8 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.0 |
| 3.7 | 588.1 |
| 5.8 | 588.0 |
| 7.1 | 587.9 |
| 8.2 | 587.6 |
| 8.7 | 587.4 |
| 10.4 | 587.0 |
| 12.5 | 586.9 |
| 14.2 | 587.0 |
| 15.7 | 587.0 |
| 17.1 | 586.8 |
| 18.5 | 587.2 |
| 19.6 | 587.4 |
| 20.4 | 587.7 |
| 21.6 | 587.9 |
| 24.3 | 587.9 |
| 29.3 | 588.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 587.88 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.78 |
| **LTOB Elevation:** | 587.88 |
| **LTOB Max Depth:** | 1.10 |
| **LTOB Cross Sectional Area:** | 10.0 |

| | |
|---|---|
| **Stream Type** | C |

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LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C61
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C61***

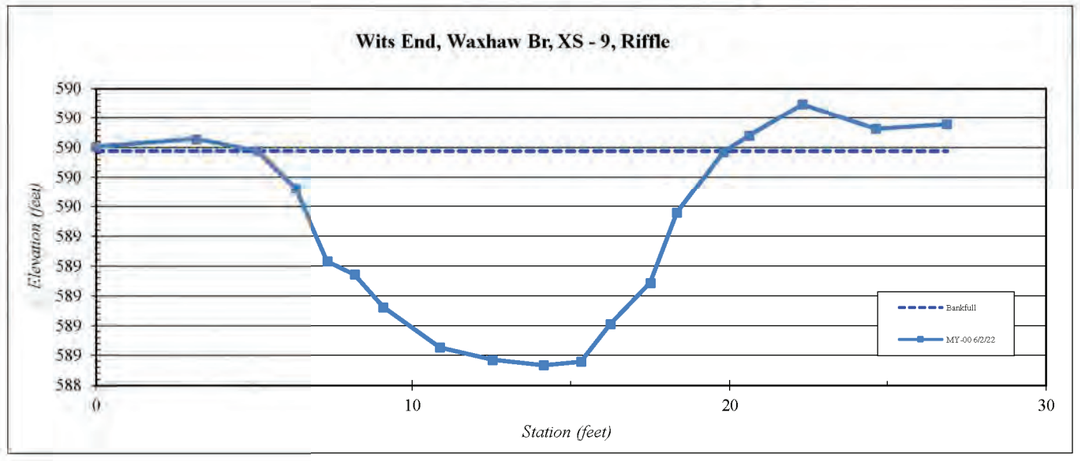
11/9/2022
Wits End_psh_AB-C61.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -9 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.0 |
| 3.2 | 590.1 |
| 5.1 | 590.0 |
| 6.3 | 589.7 |
| 7.3 | 589.2 |
| 8.2 | 589.1 |
| 9.1 | 588.9 |
| 10.9 | 588.7 |
| 12.5 | 588.6 |
| 14.1 | 588.5 |
| 15.3 | 588.6 |
| 16.2 | 588.8 |
| 17.5 | 589.1 |
| 18.3 | 589.6 |
| 19.8 | 590.0 |
| 20.6 | 590.1 |
| 22.3 | 590.3 |
| 24.6 | 590.1 |
| 26.9 | 590.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.98 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.56 |
| **LTOB Elevation:** | 589.98 |
| **LTOB Max Depth:** | 1.42 |
| **LTOB Cross Sectional Area:** | 13.9 |

| | |
|---|---|
| **Stream Type** | E/C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH
PRELIMINARY
NOT FOR CONSTRUCTION

11/9/2022
*DATE:*

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

k2 design group

Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C62
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C62***

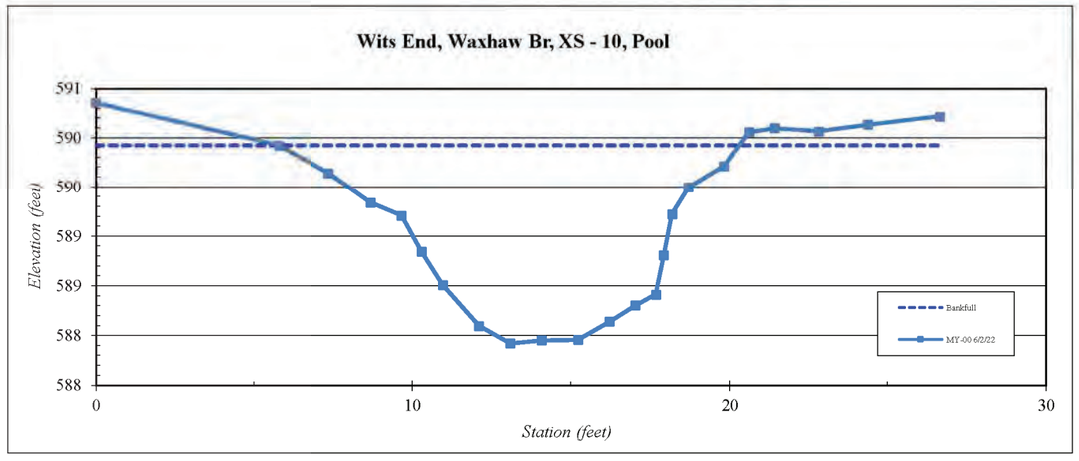
11/9/2022
Wits End_psh_AB-C62.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | Waxhaw Br, XS -10 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.4 |
| 5.8 | 589.9 |
| 7.4 | 589.6 |
| 8.7 | 589.3 |
| 9.7 | 589.2 |
| 10.3 | 588.8 |
| 11.0 | 588.5 |
| 12.1 | 588.1 |
| 13.1 | 587.9 |
| 14.1 | 588.0 |
| 15.2 | 588.0 |
| 16.2 | 588.1 |
| 17.0 | 588.3 |
| 17.7 | 588.4 |
| 17.9 | 588.8 |
| 18.2 | 589.2 |
| 18.7 | 589.5 |
| 19.8 | 589.7 |
| 20.6 | 590.1 |
| 21.4 | 590.1 |
| 22.8 | 590.06 |
| 24.4 | 590.1 |
| 26.6 | 590.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.92 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 587.92 |
| **LTOB Elevation:** | 589.92 |
| **LTOB Max Depth:** | 2.00 |
| **LTOB Cross Sectional Area:** | 16.3 |


| | |
|---|---|
| **Stream Type** | E/C |

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LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C63
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C63***

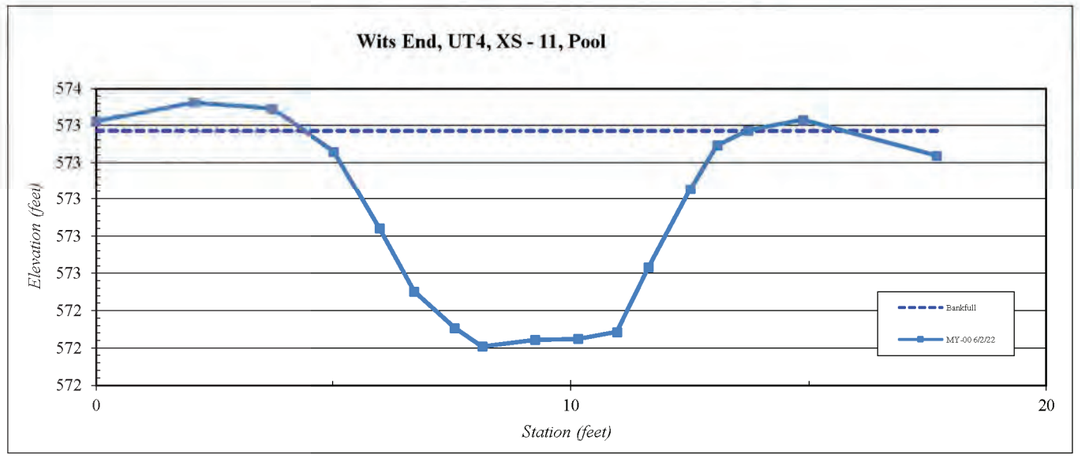
11/9/2022
Wits End_psh_AB-C63.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -11 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.4 |
| 2.1 | 573.5 |
| 3.7 | 573.5 |
| 5.0 | 573.3 |
| 6.0 | 572.8 |
| 6.7 | 572.5 |
| 7.6 | 572.3 |
| 8.1 | 572.2 |
| 9.2 | 572.2 |
| 10.2 | 572.2 |
| 11.0 | 572.3 |
| 11.6 | 572.6 |
| 12.5 | 573.1 |
| 13.1 | 573.3 |
| 13.7 | 573.4 |
| 14.9 | 573.4 |
| 17.7 | 573.2 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 573.37 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.21 |
| **LTOB Elevation:** | 573.37 |
| **LTOB Max Depth:** | 1.16 |
| **LTOB Cross Sectional Area:** | 6.7 |

| | |
|---|---|
| **Stream Type** | E/C |

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11/9/2022
***DATE:***

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-C64
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C64***

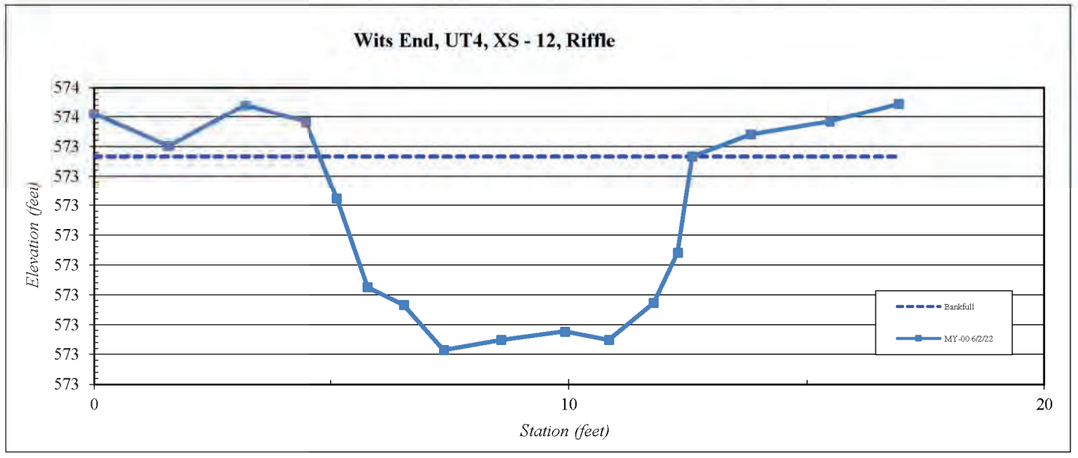
11/9/2022
Wits End_psh_AB-C64.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -12 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.5 |
| 1.6 | 573.4 |
| 3.2 | 573.5 |
| 4.5 | 573.5 |
| 5.1 | 573.2 |
| 5.8 | 572.9 |
| 6.5 | 572.9 |
| 7.4 | 572.7 |
| 8.6 | 572.7 |
| 9.9 | 572.8 |
| 10.8 | 572.7 |
| 11.8 | 572.9 |
| 12.3 | 573.0 |
| 12.6 | 573.4 |
| 13.8 | 573.4 |
| 15.5 | 573.5 |
| 16.9 | 573.5 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 573.37 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.72 |
| **LTOB Elevation:** | 573.37 |
| **LTOB Max Depth:** | 0.65 |
| **LTOB Cross Sectional Area:** | 4.0 |

| | |
|---|---|
| **Stream Type** | E/C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* I22I-20024
*DRAWING NAME:* WITS END PSH AB-C65
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C65***

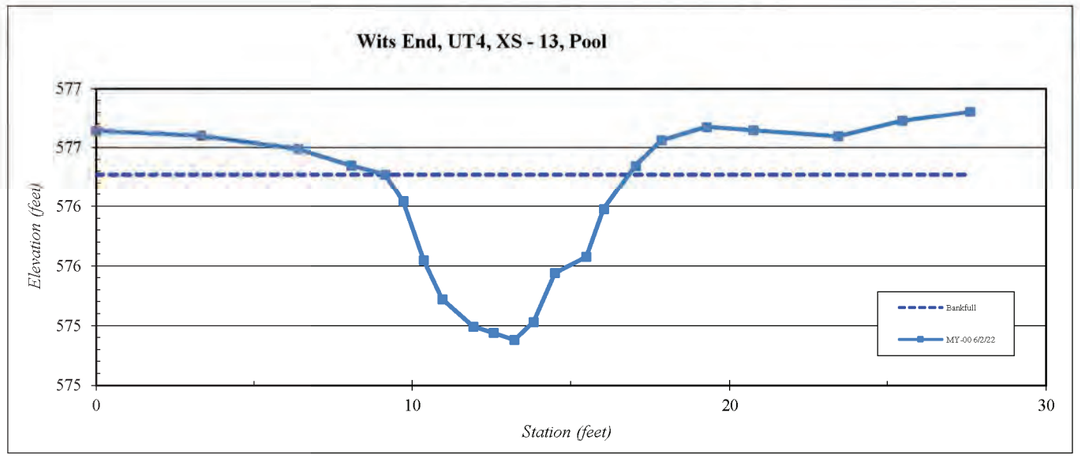
11/9/2022
Wits End_psh_AB-C65.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -13 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 576.6 |
| 3.3 | 576.6 |
| 6.4 | 576.5 |
| 8.1 | 576.3 |
| 9.1 | 576.3 |
| 9.7 | 576.0 |
| 10.4 | 575.5 |
| 11.0 | 575.2 |
| 11.9 | 575.0 |
| 12.6 | 574.9 |
| 13.2 | 574.9 |
| 13.8 | 575.0 |
| 14.5 | 575.4 |
| 15.5 | 575.6 |
| 16.0 | 576.0 |
| 17.0 | 576.3 |
| 17.9 | 576.6 |
| 19.3 | 576.7 |
| 20.7 | 576.6 |
| 23.4 | 576.6 |
| 25.5 | 576.73 |
| 27.6 | 576.8 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 576.28 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 574.88 |
| **LTOB Elevation:** | 576.28 |
| **LTOB Max Depth:** | 1.39 |
| **LTOB Cross Sectional Area:** | 6.4 |

| | |
|---|---|
| **Stream Type** | E/C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* I22I-20024
*DRAWING NAME:* WITS END PSH AB-C66
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C66***

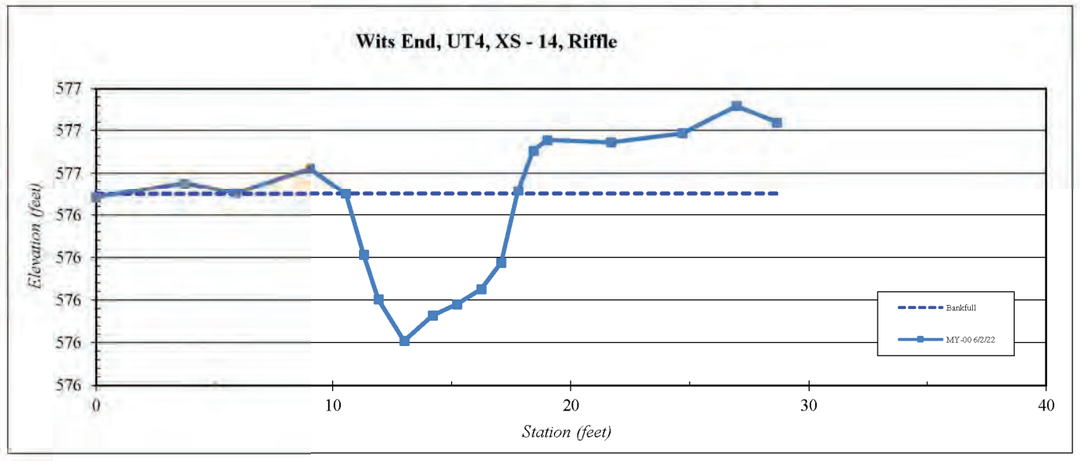
11/9/2022
Wits End_psh_AB-C66.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT4, XS -14 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 576.5 |
| 3.7 | 576.6 |
| 5.9 | 576.5 |
| 9.0 | 576.6 |
| 10.5 | 576.5 |
| 11.3 | 576.2 |
| 11.9 | 576.0 |
| 13.0 | 575.8 |
| 14.2 | 575.9 |
| 15.2 | 576.0 |
| 16.2 | 576.1 |
| 17.1 | 576.2 |
| 17.8 | 576.5 |
| 18.4 | 576.7 |
| 19.0 | 576.8 |
| 21.7 | 576.7 |
| 24.7 | 576.8 |
| 27.0 | 576.9 |
| 28.6 | 576.8 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 576.50 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 575.81 |
| **LTOB Elevation:** | 576.50 |
| **LTOB Max Depth:** | 0.69 |
| **LTOB Cross Sectional Area:** | 3.2 |

| | |
|---|---|
| **Stream Type** | E/C |

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**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C67
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C67***

11/9/2022
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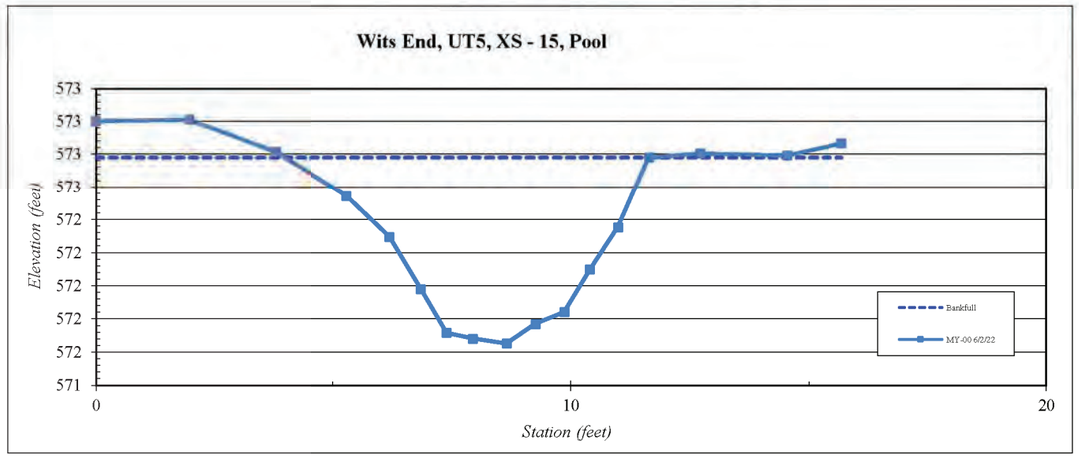
jarven

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT5, XS -15 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.0 |
| 2.0 | 573.0 |
| 3.8 | 572.8 |
| 5.3 | 572.5 |
| 6.2 | 572.3 |
| 6.8 | 572.0 |
| 7.4 | 571.7 |
| 7.9 | 571.7 |
| 8.6 | 571.7 |
| 9.3 | 571.8 |
| 9.9 | 571.8 |
| 10.4 | 572.1 |
| 11.0 | 572.4 |
| 11.6 | 572.8 |
| 12.7 | 572.8 |
| 14.5 | 572.8 |
| 15.7 | 572.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.78 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 571.65 |
| **LTOB Elevation:** | 572.78 |
| **LTOB Max Depth:** | 1.13 |
| **LTOB Cross Sectional Area:** | 4.9 |

| | |
|---|---|
| **Stream Type** | E/C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C68
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C68***

11/9/2022
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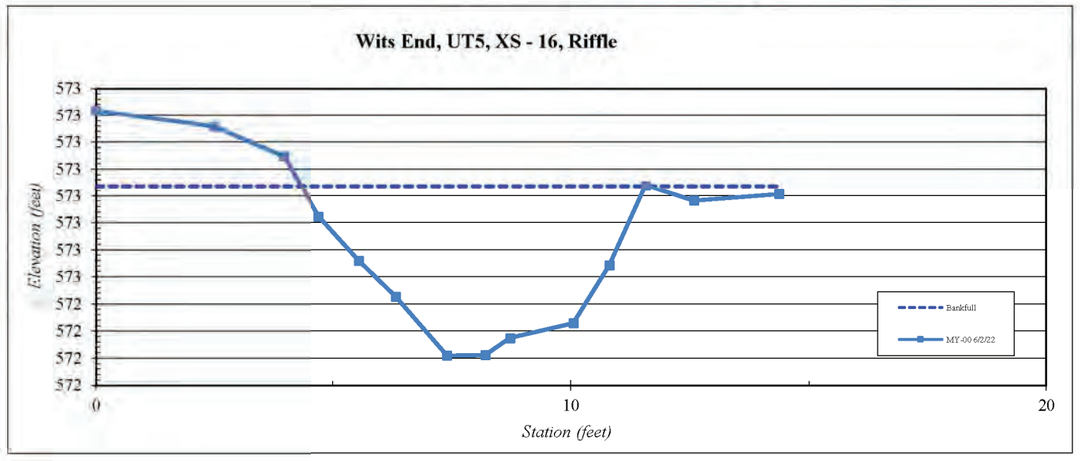
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT5, XS -16 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 573.1 |
| 2.5 | 573.1 |
| 4.0 | 572.9 |
| 4.7 | 572.7 |
| 5.5 | 572.6 |
| 6.3 | 572.4 |
| 7.4 | 572.2 |
| 8.2 | 572.2 |
| 8.7 | 572.3 |
| 10.1 | 572.3 |
| 10.8 | 572.5 |
| 11.6 | 572.8 |
| 12.6 | 572.8 |
| 14.4 | 572.8 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 572.84 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 572.21 |
| **LTOB Elevation:** | 572.84 |
| **LTOB Max Depth:** | 0.63 |
| **LTOB Cross Sectional Area:** | 3.0 |

| | |
|---|---|
| **Stream Type** | E/C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C69
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C69***

11/9/2022
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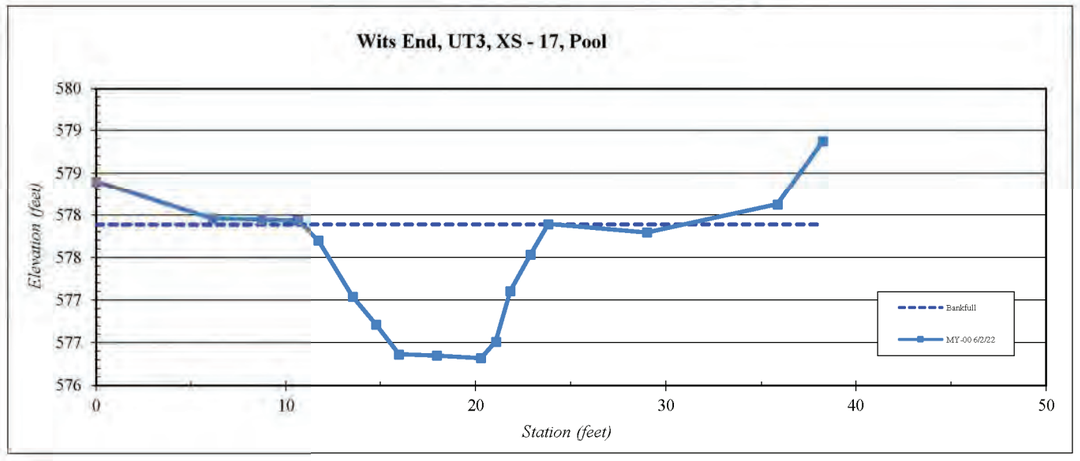
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -17 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 578.4 |
| 6.1 | 578.0 |
| 8.7 | 577.9 |
| 10.6 | 577.9 |
| 11.7 | 577.7 |
| 13.5 | 577.0 |
| 14.8 | 576.7 |
| 16.0 | 576.4 |
| 18.0 | 576.3 |
| 20.3 | 576.3 |
| 21.1 | 576.5 |
| 21.8 | 577.1 |
| 22.9 | 577.5 |
| 23.8 | 577.9 |
| 29.0 | 577.8 |
| 35.8 | 578.1 |
| 38.2 | 578.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 577.89 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 576.32 |
| **LTOB Elevation:** | 577.89 |
| **LTOB Max Depth:** | 1.57 |
| **LTOB Cross Sectional Area:** | 13.3 |

| | |
|---|---|
| **Stream Type** | C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C70
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C70***

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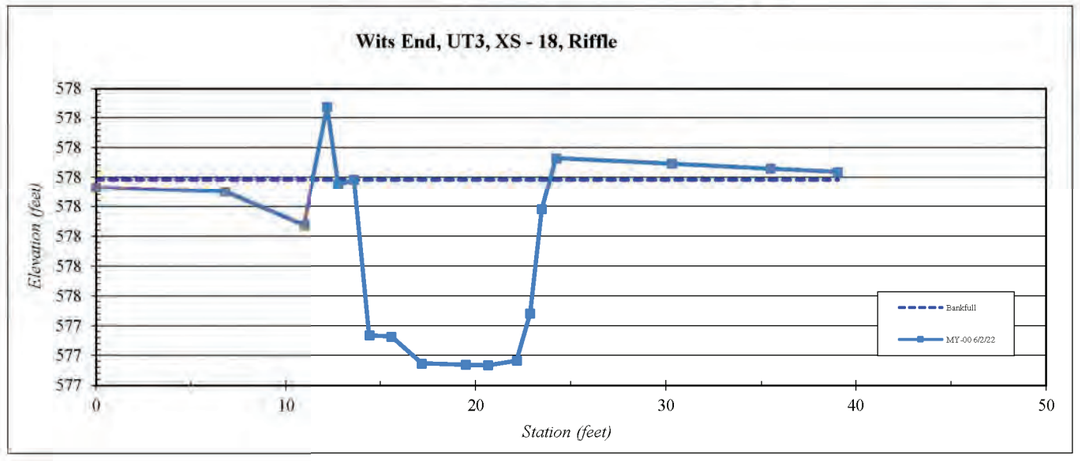
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -18 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 577.9 |
| 6.8 | 577.9 |
| 11.0 | 577.7 |
| 12.2 | 578.1 |
| 12.8 | 577.9 |
| 13.6 | 577.9 |
| 14.4 | 577.4 |
| 15.6 | 577.4 |
| 17.2 | 577.3 |
| 19.5 | 577.3 |
| 20.7 | 577.3 |
| 22.2 | 577.3 |
| 22.9 | 577.4 |
| 23.5 | 577.8 |
| 24.2 | 578.0 |
| 30.3 | 577.9 |
| 35.5 | 577.9 |
| 39.0 | 577.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 577.89 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 577.27 |
| **LTOB Elevation:** | 577.89 |
| **LTOB Max Depth:** | 0.63 |
| **LTOB Cross Sectional Area:** | 5.4 |

| | |
|---|---|
| **Stream Type** | C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : 122I-20024
DRAWING NAME: WITS END PSH AB-C71
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C71***

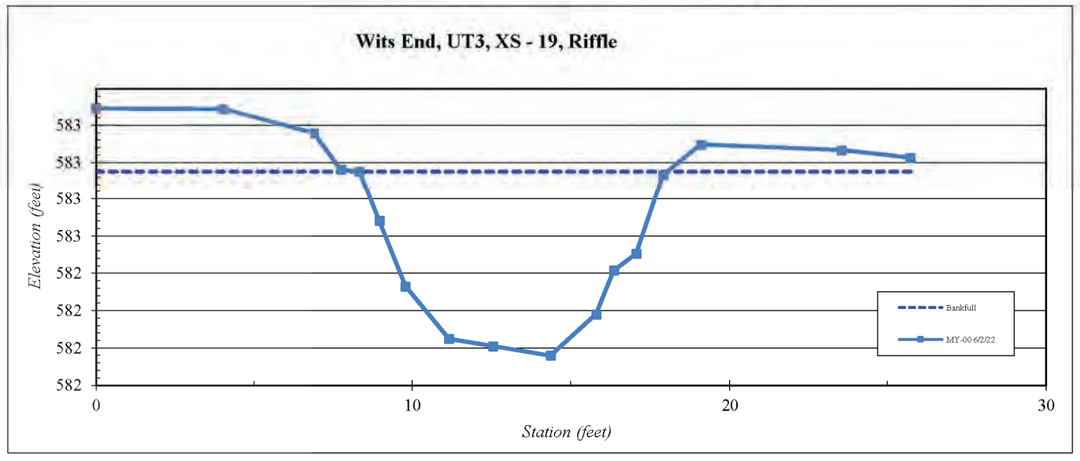
11/9/2022
Wits End_psh_AB-C71.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -19 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.3 |
| 4.0 | 583.3 |
| 6.9 | 583.2 |
| 7.8 | 583.0 |
| 8.3 | 583.0 |
| 9.0 | 582.7 |
| 9.8 | 582.3 |
| 11.2 | 582.0 |
| 12.5 | 582.0 |
| 14.4 | 582.0 |
| 15.8 | 582.2 |
| 16.4 | 582.4 |
| 17.1 | 582.5 |
| 17.9 | 582.9 |
| 19.1 | 583.1 |
| 23.6 | 583.1 |
| 25.7 | 583.0 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 582.95 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.96 |
| **LTOB Elevation:** | 582.95 |
| **LTOB Max Depth:** | 0.99 |
| **LTOB Cross Sectional Area:** | 6.7 |

| | |
|---|---|
| **Stream Type** | E/C |

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**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C72
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C72***

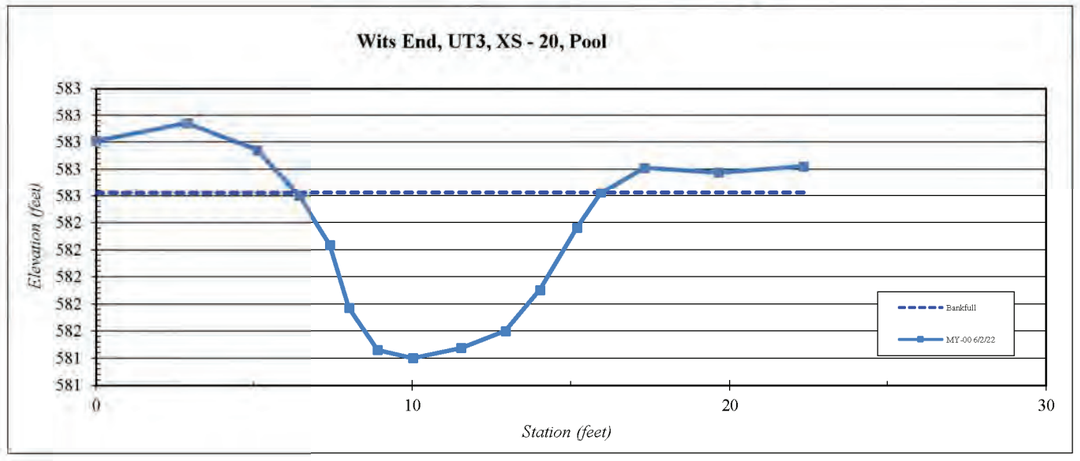
11/9/2022
Wits End_psh_AB-C72.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -20 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 583.0 |
| 2.9 | 583.1 |
| 5.1 | 582.9 |
| 6.4 | 582.6 |
| 7.4 | 582.2 |
| 8.0 | 581.8 |
| 8.9 | 581.5 |
| 10.0 | 581.4 |
| 11.5 | 581.5 |
| 12.9 | 581.6 |
| 14.0 | 581.9 |
| 15.2 | 582.4 |
| 15.9 | 582.6 |
| 17.3 | 582.8 |
| 19.7 | 582.8 |
| 22.3 | 582.8 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 582.62 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 581.40 |
| **LTOB Elevation:** | 582.62 |
| **LTOB Max Depth:** | 1.22 |
| **LTOB Cross Sectional Area:** | 7.7 |

| | |
|---|---|
| **Stream Type** | E/C |

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A71BB30246D54EC...

SEAL
L-4194
PROFESSIONAL
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

k2 design group

Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C73
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C73***

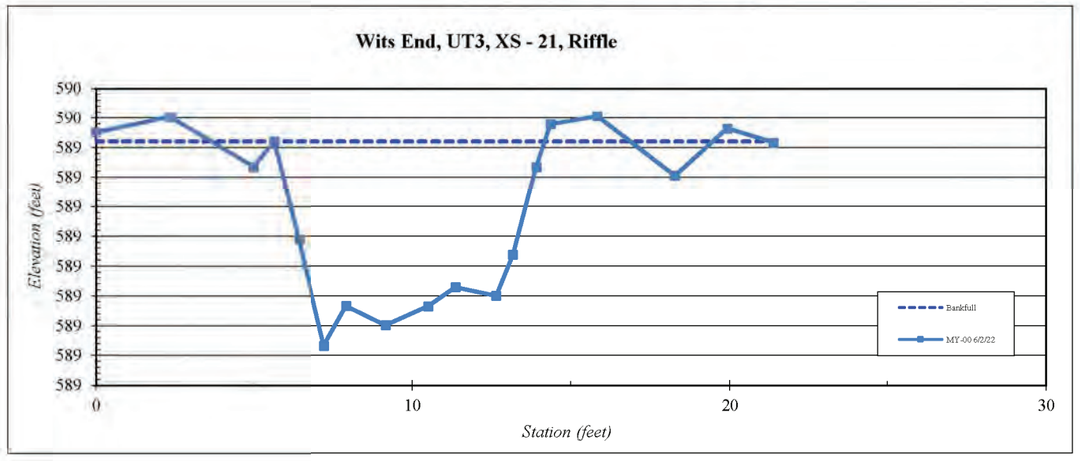
11/9/2022
Wits End_psh_AB-C73.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -21 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 589.5 |
| 2.4 | 589.5 |
| 5.0 | 589.3 |
| 5.6 | 589.4 |
| 6.4 | 589.1 |
| 7.2 | 588.7 |
| 7.9 | 588.9 |
| 9.2 | 588.8 |
| 10.5 | 588.9 |
| 11.4 | 588.9 |
| 12.7 | 588.9 |
| 13.2 | 589.0 |
| 13.9 | 589.3 |
| 14.4 | 589.5 |
| 15.8 | 589.5 |
| 18.3 | 589.3 |
| 19.9 | 589.5 |
| 21.4 | 589.4 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.42 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.73 |
| **LTOB Elevation:** | 589.42 |
| **LTOB Max Depth:** | 0.69 |
| **LTOB Cross Sectional Area:** | 4.0 |


| | |
|---|---|
| **Stream Type** | E/C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C74
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C74***

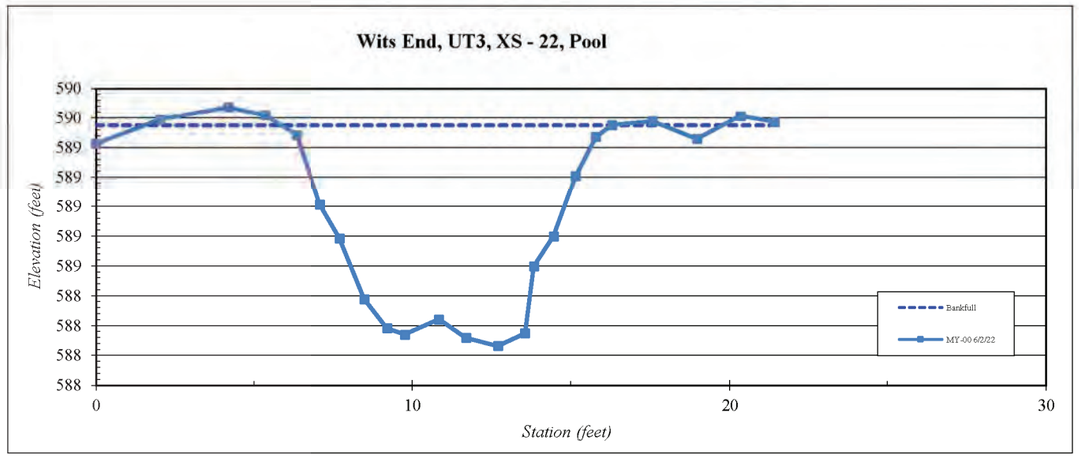
11/9/2022
Wits End_psh_AB-C74.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -22 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 589.4 |
| 2.0 | 589.6 |
| 4.2 | 589.7 |
| 5.3 | 589.6 |
| 6.3 | 589.5 |
| 7.1 | 589.0 |
| 7.7 | 588.8 |
| 8.5 | 588.4 |
| 9.2 | 588.2 |
| 9.8 | 588.1 |
| 10.8 | 588.2 |
| 11.7 | 588.1 |
| 12.7 | 588.1 |
| 13.6 | 588.1 |
| 13.8 | 588.6 |
| 14.5 | 588.8 |
| 15.2 | 589.2 |
| 15.8 | 589.5 |
| 16.3 | 589.6 |
| 17.6 | 589.6 |
| 19.0 | 589.46 |
| 20.3 | 589.6 |
| 21.4 | 589.6 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 589.55 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.06 |
| **LTOB Elevation:** | 589.55 |
| **LTOB Max Depth:** | 1.49 |
| **LTOB Cross Sectional Area:** | 9.8 |


| | |
|---|---|
| **Stream Type** | E/C |

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JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : I22I-20024
DRAWING NAME: WITS END PSH AB-C75
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C75***

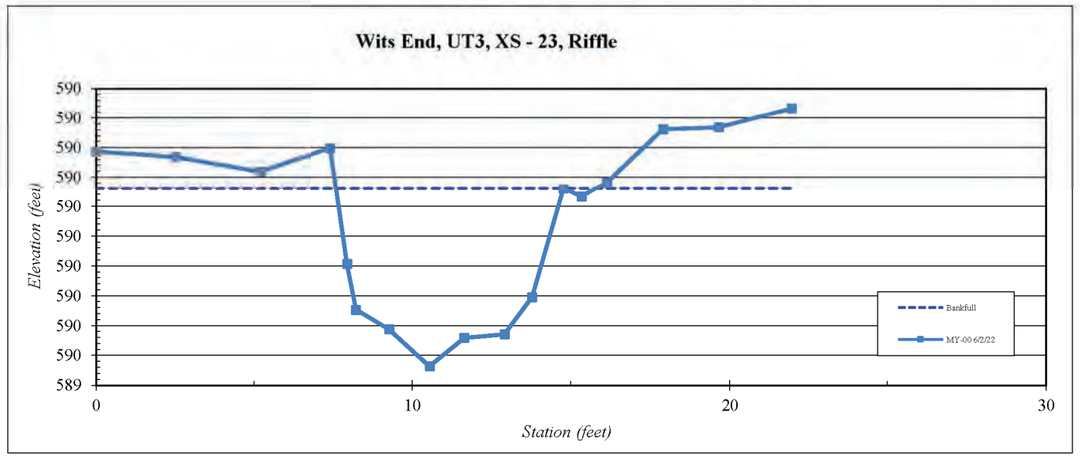
11/9/2022
Wits End_psh_AB-C75.dgn
Darren

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -23 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.2 |
| 2.5 | 590.2 |
| 5.2 | 590.1 |
| 7.4 | 590.2 |
| 7.9 | 589.8 |
| 8.2 | 589.7 |
| 9.3 | 589.6 |
| 10.5 | 589.5 |
| 11.6 | 589.6 |
| 12.9 | 589.6 |
| 13.8 | 589.7 |
| 14.8 | 590.1 |
| 15.3 | 590.0 |
| 16.1 | 590.1 |
| 17.9 | 590.3 |
| 19.7 | 590.3 |
| 22.0 | 590.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 590.06 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 589.47 |
| **LTOB Elevation:** | 590.06 |
| **LTOB Max Depth:** | 0.60 |
| **LTOB Cross Sectional Area:** | 3.1 |

| | |
|---|---|
| **Stream Type** | E/C |

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JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : I22I-20024
DRAWING NAME: WITS END PSH AB-C76
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C76***

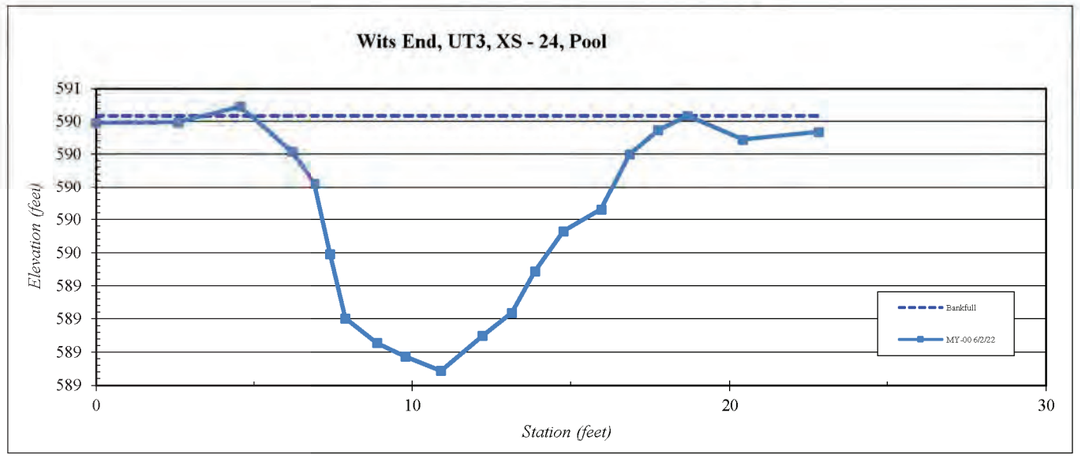
11/9/2022
Wits End_psh_AB-C76.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT3, XS -24 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 590.4 |
| 2.6 | 590.4 |
| 4.6 | 590.5 |
| 6.2 | 590.2 |
| 6.9 | 590.0 |
| 7.4 | 589.6 |
| 7.9 | 589.2 |
| 8.9 | 589.1 |
| 9.8 | 589.0 |
| 10.9 | 588.9 |
| 12.2 | 589.1 |
| 13.1 | 589.2 |
| 13.9 | 589.5 |
| 14.8 | 589.7 |
| 16.0 | 589.9 |
| 16.8 | 590.2 |
| 17.7 | 590.3 |
| 18.7 | 590.4 |
| 20.4 | 590.3 |
| 22.8 | 590.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 590.43 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 588.89 |
| **LTOB Elevation:** | 590.43 |
| **LTOB Max Depth:** | 1.54 |
| **LTOB Cross Sectional Area:** | 11.3 |

| | |
|---|---|
| **Stream Type** | E/C |

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11/9/2022

***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* 122I-20024
*DRAWING NAME:* WITS END PSH AB-C77
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C77***

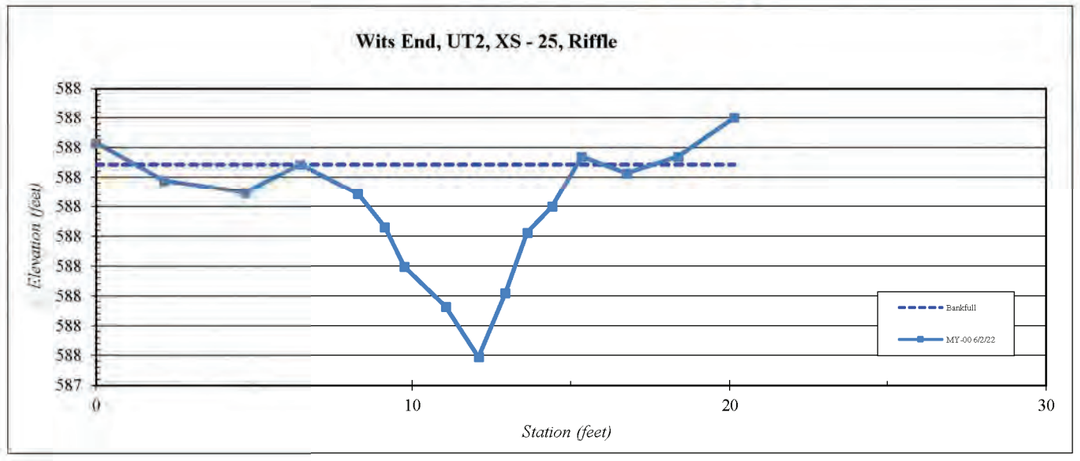
11/9/2022
Wits End_psh_AB-C77.dgn
Jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -25 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.2 |
| 2.2 | 588.1 |
| 4.7 | 588.0 |
| 6.5 | 588.1 |
| 8.3 | 588.0 |
| 9.1 | 587.9 |
| 9.8 | 587.8 |
| 11.1 | 587.7 |
| 12.1 | 587.5 |
| 12.9 | 587.7 |
| 13.6 | 587.9 |
| 14.4 | 588.0 |
| 15.3 | 588.2 |
| 16.8 | 588.1 |
| 18.4 | 588.2 |
| 20.1 | 588.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 588.14 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 587.49 |
| **LTOB Elevation:** | 588.14 |
| **LTOB Max Depth:** | 0.65 |
| **LTOB Cross Sectional Area:** | 2.4 |

| | |
|---|---|
| **Stream Type** | C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* I22I-20024
*DRAWING NAME:* WITS END PSH AB-C78
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C78***

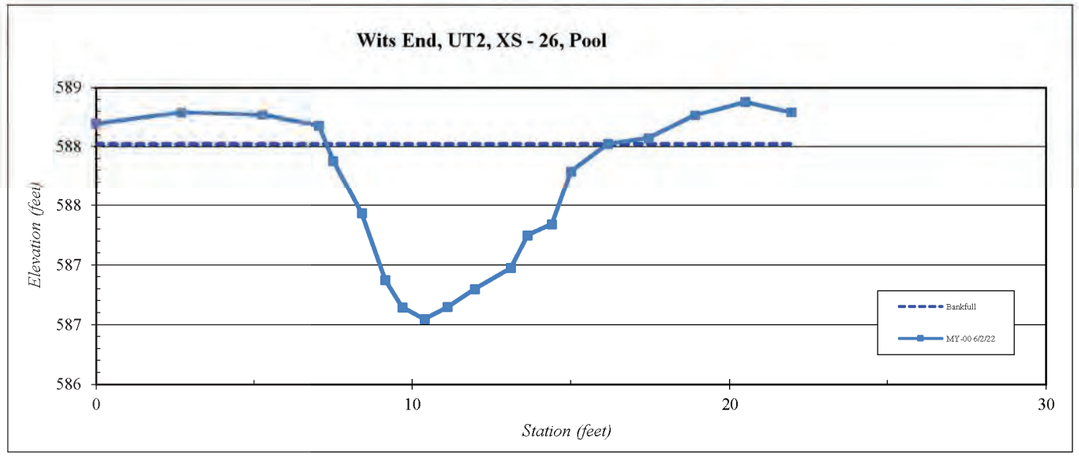
11/9/2022
Wits End_psh_AB-C78.dgn
jharvey

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -26 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 588.2 |
| 2.7 | 588.3 |
| 5.3 | 588.3 |
| 7.1 | 588.2 |
| 7.5 | 587.9 |
| 8.4 | 587.4 |
| 9.2 | 586.9 |
| 9.7 | 586.6 |
| 10.4 | 586.5 |
| 11.1 | 586.6 |
| 12.0 | 586.8 |
| 13.1 | 587.0 |
| 13.6 | 587.2 |
| 14.4 | 587.3 |
| 15.0 | 587.8 |
| 16.2 | 588.0 |
| 17.4 | 588.1 |
| 18.9 | 588.3 |
| 20.5 | 588.4 |
| 21.9 | 588.3 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 588.02 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 586.55 |
| **LTOB Elevation:** | 588.02 |
| **LTOB Max Depth:** | 1.48 |
| **LTOB Cross Sectional Area:** | 7.6 |


| | |
|---|---|
| **Stream Type** | C |

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PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

*PROJECT # :* I22I-20024
*DRAWING NAME:* WITS END PSH AB-C79
*DATE:* 2022
*DRAWN BY:* JRH
*REVIEWED BY:* JGD
*REVISIONS:*

*SHEET NO.*
***AB–C79***

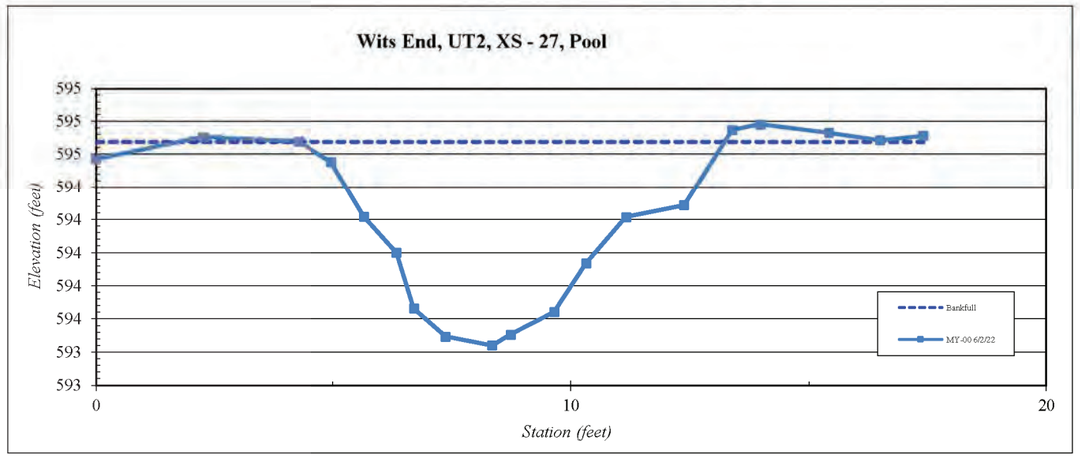
11/9/2022
Wits End_psh_AB-C79.dgn
jarven

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -27 |
| **Feature** | Pool |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 594.6 |
| 2.3 | 594.7 |
| 4.3 | 594.7 |
| 5.0 | 594.6 |
| 5.7 | 594.2 |
| 6.3 | 594.0 |
| 6.7 | 593.7 |
| 7.4 | 593.5 |
| 8.3 | 593.4 |
| 8.7 | 593.5 |
| 9.6 | 593.6 |
| 10.3 | 593.9 |
| 11.2 | 594.2 |
| 12.4 | 594.3 |
| 13.4 | 594.7 |
| 14.0 | 594.8 |
| 15.4 | 594.7 |
| 16.5 | 594.7 |
| 17.4 | 594.7 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 594.68 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 593.44 |
| **LTOB Elevation:** | 594.68 |
| **LTOB Max Depth:** | 1.24 |
| **LTOB Cross Sectional Area:** | 6.1 |

| | |
|---|---|
| **Stream Type** | C |

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LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022

***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : I221-20024
DRAWING NAME: WITS END PSH AB-C80
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C80***

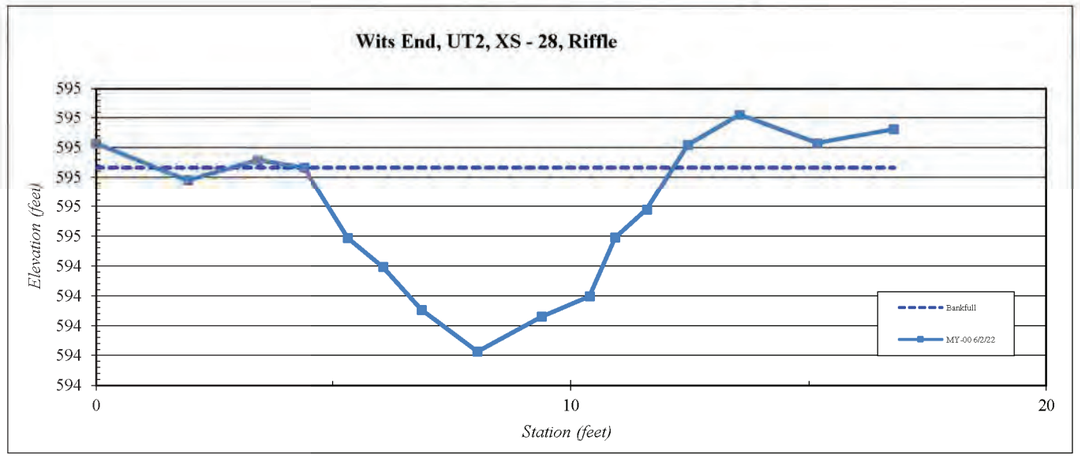
11/9/2022
Wits End_psh_AB-C80.dgn
jarvis

| | |
|---|---|
| **Site** | Wits End Site |
| **Watershed:** | Yadkin River Basin, 03040105 |
| **XS ID** | UT2, XS -28 |
| **Feature** | Riffle |
| **Date:** | 6/2/2022 |
| **Field Crew:** | Perkinson |

| Station | Elevation |
|---|---|
| 0.0 | 594.8 |
| 1.9 | 594.7 |
| 3.4 | 594.8 |
| 4.4 | 594.7 |
| 5.3 | 594.5 |
| 6.1 | 594.4 |
| 6.9 | 594.3 |
| 8.0 | 594.1 |
| 9.4 | 594.2 |
| 10.4 | 594.3 |
| 10.9 | 594.5 |
| 11.6 | 594.6 |
| 12.5 | 594.8 |
| 13.5 | 594.9 |
| 15.2 | 594.8 |
| 16.8 | 594.9 |

| SUMMARY DATA | |
|---|---|
| **Bankfull Elevation:** | 594.73 |
| **Bank Hieght Ratio:** | 1.00 |
| **Thalweg Elevation:** | 594.11 |
| **LTOB Elevation:** | 594.73 |
| **LTOB Max Depth:** | 0.62 |
| **LTOB Cross Sectional Area:** | 2.9 |

| | |
|---|---|
| **Stream Type** | C |

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L-4194
LAND SURVEYOR
JOHN ASHLEY RUDOLPH

11/9/2022
***DATE:***

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Axiom Environmental, Inc.

RS RESTORATION SYSTEMS LLC



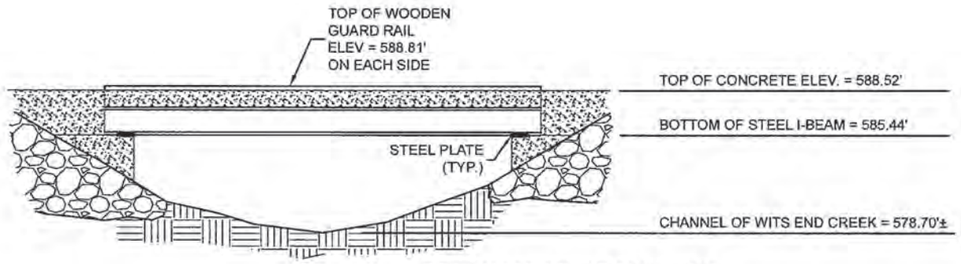
**WITS END**
**UNION COUNTY, NC**

**AS-BUILT CROSS SECTIONS**

PROJECT # : I22I-20024
DRAWING NAME: WITS END PSH AB-C81
DATE: 2022
DRAWN BY: JRH
REVIEWED BY: JGD
REVISIONS:

SHEET NO.
***AB–C81***

11/9/2022
Wits End_psh_AB-C81.dgn
jharvell

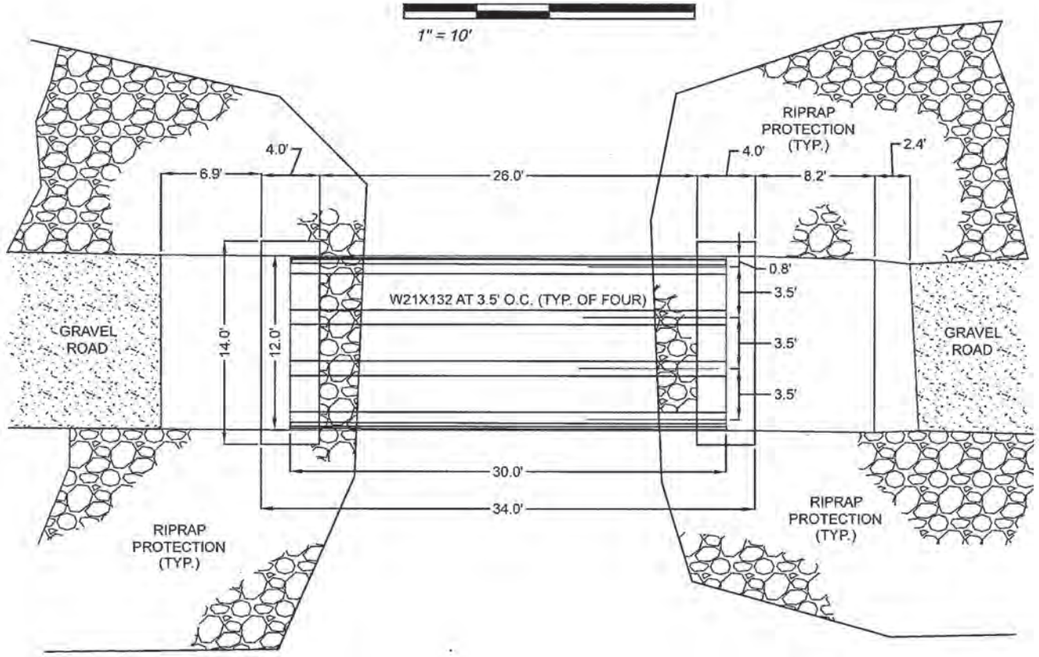



- ELEVATIONS REFERENCED TO NAVD 1988

## LONGITUDINAL SECTION

0 5 10 20

1" = 10'




## PLAN VIEW

0 5 10 20

1" = 10'

NORTH

NC GRID
NAD'83(2011)

## EXISTING BRIDGE

SEPTEMBER 2022

**ENGINEERS CERTIFICATION(S)**

Witness my original signature, registration number and seal this 26th day of September, A.D., 2022

Seal or Stamp

NORTH CAROLINA PROFESSIONAL SEAL 16835 GALARD CARTER MOORE, III ENGINEER

D. Carter Moore III

9/26/22

D. Carter Moore III

Professional Engineer

**SURVEYORS CERTIFICATION(S)**

Witness my original signature, registration number and seal this 26th day of September, A.D., 2022

Seal or Stamp

NORTH CAROLINA PROFESSIONAL SEAL L-4194 LAND SURVEYOR JOHN ASHLEY RUDOLPH

JOHN A RUDOLPH

Digitally signed by JOHN A RUDOLPH
Date: 2022.09.26 14:08:25 -04'00'

Professional Land Surveyor

774 S. Beston Road
La Grange, NC 28551
252.582.3097
www.k2designgroup.com
Firm license no.: C-2111

k2 design group

Client: RESTORATION SYSTEMS, LLC
1101 HAYNES STREET
SUITE 211
RALEIGH, NC 27604

Project: WITS END SITE
Union County,
North Carolina

Title: BRIDGE AS-BUILT
Plan View and
Longitudinal view

| | |
|---|---|
| DRAWN BY: | FGR |
| DATE: | 9/23/22 |
| SURVEYED BY: | J.A.R. |
| DWG. NO. | RSS580AB22 |
| SHEET | 1 OF 1 |