Request for Proposals (RFP): Pedestrian Bridge to Orange Line Connection

Organization Name: Upstate Greenways and Trails Alliance

Contact Information:

Sam Davis
Trails Manager
sdavis@ugata.org
(205)-873-3853

Project Location: Northern City Limit of Greenville SC

RFP Issue Date: September 5th, 2024

Questions and Clarifications Deadline: September 18th, 2024

Proposal Submission Deadline: October 2nd, 2024

Project Start Date: October 9th, 2024

Project Completion Date: June 4nd, 2025

Introduction

Upstate Greenways and Trails Alliance (UGATA) is seeking qualified engineering firms to submit proposals for the design, engineering, and permitting of a shared use trail and bridge project in the City of Greenville. We invite experienced engineering firms to submit proposals outlining their expertise, approach, and understanding of the project's requirements.

Pedestrian Bridge to Orange Line Connection:

UGATA will plan, design, engineer, and permit a trail connectivity project on the Orange Line of the Prisma Health Swamp Rabbit Trail. This project will be called the **Pedestrian Bridge to Orange Line Connection.** This project will involve retrofitting a disused railroad trestle bridge to allow for bicycle and pedestrian use.

Scope of Work

The selected engineering firm will complete the following tasks:

1. Conduct a site assessment, topographical survey, wetlands survey, protected species surveys and any other required surveys of the project area.

2. Develop a comprehensive, ADA approved, trail design that meets or exceeds AASHTO standards and incorporates industry best practices.
3. Prepare detailed construction plans, specifications, and cost estimates.
4. Address environmental considerations and ensure compliance with relevant regulations.
5. Secure required permits for all portions of the projects.
6. Collaborate with UGATA, and relevant stakeholders (Duke Energy, City of Greenville, ReWa, Greenville County) throughout the project lifecycle to understand relevant limitations on trail design while maintaining a quality product.
7. Oversee construction bidding process with the City of Greenville. Including but not limited to: providing final bid package, coordination meetings with Greenville County and City stakeholders, pre bid meeting with contractors, responses to contractor questions, review of shop drawings, and consultation when opening bid responses.

Project Goals

1. Ensure the projects are feasible for both permitting and construction
2. Create a high quality trail experience for users
3. Limit construction cost
4. Align with the restrictions and desires of easement holders (expansion to follow)

Evaluation Criteria

Proposals will be evaluated based on the following criteria:

1. 20% Experience and Qualifications of the Firm and Key Personnel.
2. 15% Understanding of the Project Goals and Community Needs.
3. 25% Technical Approach and Methodology.
4. 15% Quality and Completeness of the Proposal.
5. 25% Cost Effectiveness and Value for Money.

Typical Trail Sections

Greenville County has provided typical trail cross sections for the asphalt portions of the trail which has been included in this packet. Because this is a City of Greenville Trail project, the minimum trail width is 15 feet. The bridge will have a minimum clear width of 12 feet. The bridge tread surface will be concrete, asphalt, or FRP.

Alignment Information

Because of project specific information that will be provided below, the route of this trail is firm. If respondents have suggestions for editing the alignment that will better achieve the goals of the project and work within the limitations, we welcome this input.

Project Deliverables

- Three (3) total submittals – 30%, 90%, and Final (100%)
- Cost estimates at each submittal
- Each submittal in PDF format with 11x17 paper format as requested
- Copy of all permits submitted for application and copies of all permits received
- Two (2) signed and sealed copies of final plans
- Digital Construction drawings to be used for bidding

Wetland Areas

This project will cross the Reedy River and will interact with wetlands typical of a small river.

River Crossings

As outlined in the Parcel Specific Information, there will be one crossing of the Reedy River. This will take place at the site of the disused railroad bridge on parcel #0141000200400. This bridge is within the floodplain and the floodway. Because this project will retrofit an existing structure, the regulations related to building inside the floodplain and floodway are expected to be more accommodating than building a new bridge. A goal of this design project is to recommend improvements to the structure that will not result in floodplain / floodway impacts to lessen the permitting burden. Firms who have a strong working relationship with the City of Greenville's engineering department and are familiar with the process of bridge maintenance approval should note this in their response.

Utilities Coordination

As outlined in the Project Specific Information, successful completion of this project will require extensive coordination with Duke energy and ReWa.

ReWa has a main sewer line that runs parallel to the Reedy River and perpendicular to the bridge. In order to increase capacity, ReWa will be replacing and repairing the line, including the portion under the bridge. At time of writing, ReWa is finalizing the design of this upgrade but has not made those plans available to UGATA or the City of Greenville. UGATA has coordinated with ReWa and has an agreement that the sewer line project and the bridge retrofitting project will not be in conflict but will require coordination as both projects are engineered. ReWa provided a letter summarizing this agreement which is included as an attachment. At the beginning of the project, the selected firm will meet with Dillon Thompson (dillont@re-wa.org) at

ReWa to review the most recent ReWa plans and outline the coordination process for both projects.

Duke Energy is the owner of this parcel and has agreed to the project. UGATA has signed a lease agreement with Duke which outlines this agreement. This agreement has a summary of the requirements to have a shared use path within their right of way which should be considered during the design. This agreement is included as an attachment.

Project Specific Information

Duke Power Company
0141000200400

This parcel will include designing and permitting the full construction drawings for converting a disused railroad bridge to a hard surface multi-use trail. It is preferred to use the existing supports and structure to the maximum extent possible. A feasibility study for this project was completed in 2021 (included as a PDF).

UGATA has worked with Duke to receive permission to retrofit the bridge. The agreement has been included and an attachment

The bridge is inside the Greenville City limits and will be approved through the City permitting process.

This bridge will be hard surfaced to meet the requirements of the City of Greenville. An example of an acceptable design is located 200 yards south of West Washington Street (Coordinates: 34°51'56.5"N 82°25'15.8"W). Any design that fits the requirements and constraints of the project are also acceptable. Existing bridges should serve as a reference point but should not constrain creativity.

This project will also include the design and permitting of the connections from the bridge to the existing Green Line of the Swamp Rabbit Trail. This connection will need to be designed to limit conflict between trail users. Innovative solutions like roundabouts, signage, and other traffic mitigation infrastructure are encouraged.

This bridge is within the floodplain and the floodway. Because this is a maintenance project, regulations are expected to be accommodating to the plans outlined. Firms who have a strong working relationship with the City of Greenville's engineering department and are familiar with the process of bridge maintenance approval should note this in their response.

Water Tower Apts LLC
0140000100100

This parcel includes a small portion of the disused railroad bridge and a connection to the existing Orange Line of the Swamp Rabbit Trail. There are no special considerations for this parcel as the owners are eager for an improved connection. As of writing, the easement is being formalized with the owner.

Submission Instructions

Submission Deadline: All proposals must be received by October 2nd at 5:00pm Eastern Time. Late submissions may not be considered.

Submission Method: Proposals must be submitted in PDF format electronically to sdavis@ugata.org or in hard copy to the following address. Electronic submissions are preferred.

701 Easley Bridge Rd
Ste 6070
Bldg 6000
Greenville SC
29611

Cover Page: Include a cover page with the following information:

- Project Name
- Company Name
- Contact Information (Name, Title, Phone Number, Email Address)
- Date of Submission

Table of Contents: Include a table of contents to help reviewers navigate through your proposal.

Executive Summary: Provide a concise summary of your proposal, highlighting key points and benefits.

Technical Proposal: Clearly outline your approach to the project, including:

- Understanding of the project requirements
- Methodology and work plan
- Technical solutions and innovations
- Project timeline and milestones
- Key personnel and their qualifications
- Subcontractors and their roles
- Any assumptions or constraints

Past Experience: Detail relevant projects your company has completed, showcasing your expertise and success in similar projects. Particular interest will be paid to previous experience that includes maintenance work inside the floodplain and floodway.

Qualifications: Provide information about your company's technical qualifications, relevant certifications, and memberships in professional organizations.

References: Include two (2) references from previous clients who can speak to your company's performance and capabilities.

Cost Proposal: Provide a detailed breakdown of costs associated with the design engineering phase. This should include:

Design and Engineering Services: Provide a detailed breakdown of costs associated with the design and engineering phase. This should include:

- **Personnel Costs:** Specify the hourly rates for engineers, designers, and other relevant staff involved in the design process.
- **Hours:** Estimate the number of hours each team member will spend on the project. Include in this estimate the time required to coordinate with utilities and stakeholders.
- **Subcontractor Fees:** If any specialized design tasks are subcontracted, detail the associated costs.

Permitting Services: Detail the costs related to obtaining the necessary permits for the project. This should include:

- **Permit Application Fees:** List the expected fees for each required permit.
- **Consultation Fees:** List any third-party consultations required for permit approvals, provide the associated costs.
- **Administrative Costs:** Include any administrative expenses associated with permit application and processing.

Bid Management Services: Detail the cost related to overseeing the bidding process with the relevant local government body. This should include:

- **Bid packaging:** List the hourly rate and expected number of hours to package the design for public bid
- **Pre-Bid meeting:** List the hourly rate and expected number of hours to plan and run a mandatory pre-bid meeting
- **Responses to Contractor Inquiries:** List the hourly rate and expected number of hours to respond to contractor inquiries
- **Construction Bid Opening:** Include any expenses associated with reviewing bid responses.

Miscellaneous Costs: Account for any other costs that may arise during the design engineering and permitting phases. This may include but is not limited to printing, document delivery, and communication expenses.

Payment Schedule: Propose a payment schedule that corresponds to project milestones and deliverables.

Schedule: Provide a detailed project schedule with milestones and anticipated completion dates.

Questions and Clarifications: If you have any questions or need clarifications regarding the RFP, submit them via email to Sam Davis (sdavis@ugata.org) by September 18th at 5:00pm Eastern Time.

Conflict of Interest: Declare any potential conflicts of interest that may arise during the project.

Important Dates

RFP Issue Date: September 5th, 2024

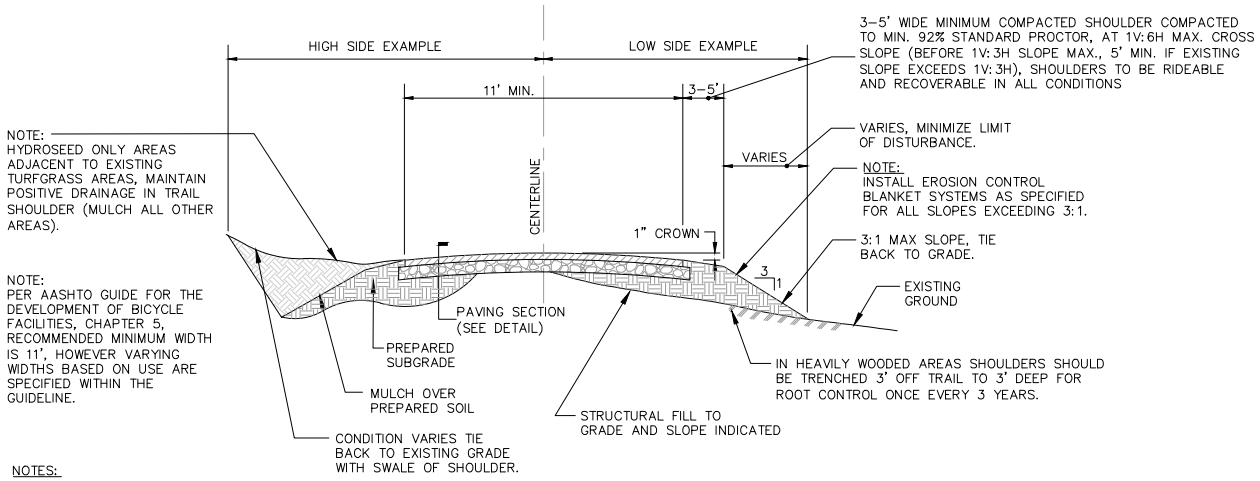
Questions and Clarifications Deadline: September 18th, 2024

Proposal Submission Deadline: October 2nd, 2024

Project Start Date: October 9th, 2024

Project Completion Date: June 4nd, 2025

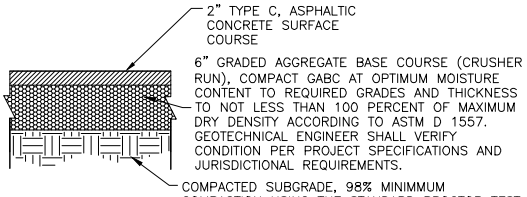
ASPHALT TRAIL SECTION



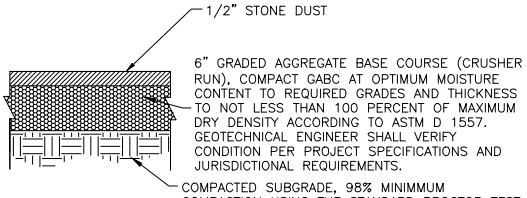
NOTES:

1. MINIMIZE TREE REMOVAL AND DISTURBANCE WHEN CLEARING FOR PATHWAYS.
2. PREPARE SOIL TO A DEPTH OF 3", CLEAN AND FREE OF ALL ORGANIC LAYER (LEAVES/DEBRIS REMOVED)
3. CROSS SLOPE OF TRAIL NOT TO EXCEED 2%.
4. CONTRACTOR TO CONTACT GEOTECHNICAL ENGINEER IF ANY UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED, WHICH MAY COMPROMISE STRUCTURAL INTEGRITY OF PATH.
5. ENSURE TRAIL AND SHOULDERS ARE CLEARED OF ALL TREES AND VEGETATION THAT COULD CAUSE ROOT GROWTH BELOW TRAIL BED.
6. 4" DASHED OR SOLID CENTERLINE (THERMOPLASTIC OR RETRO REFLECTIVE PAINT DEPENDING ON TRAIL CONDITIONS.
7. EVERY 1/10 OF A MILE PROVIDE ALPHA NUMERIC MILEAGE SYSTEM W/ 4" NUMBERING (THERMOPLASTIC OR RETRO REFLECTIVE PAINT) AND POSTS EVERY 1/2 MILE THAT ARE 2' MIN. FROM EDGE OF TRAIL.

PAVING SECTION



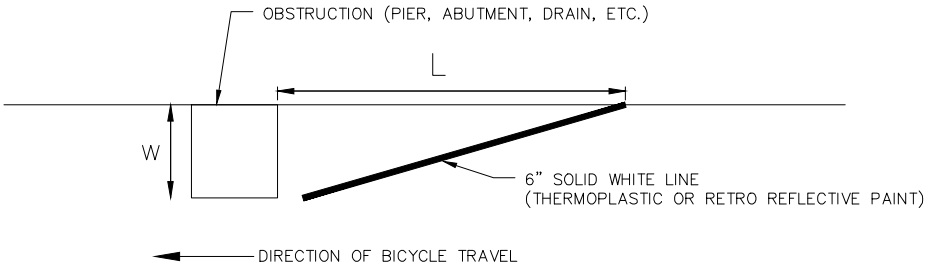
STONE DUST SECTION



PAVING NOTES

SUBGRADE, BASE COURSE AND PAVEMENT CONSTRUCTION METHODS SHALL MEET THE MINIMUM REQUIREMENTS OF THE SCDOT "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION", LATEST EDITION.

OBSTRUCTION MARKINGS



L=WS

FIGURE 4-30

L=TAPER LENGTH (FT)
W=OBSTRUCTION WIDTH
S= BICYCLE APPROACH SPEED (MPH)
(20 MPH FOR GHS SWAMP RABBIT TRAIL)

NOTE: ALL EFFORTS SHOULD BE TAKEN TO ROUTE TRAIL TO AVOID VERTICAL OBSTRUCTIONS

(SOURCE: GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES 2012-FOURTH EDITION-AASHTO)

SWA

TYPICAL BIKE TRAIL CROSS SECTION (1 of 2)

GREENVILLE COUNTY PARKS & RECREATION DEPT. &
SEAMON WHITESIDE & ASSOC., INC.

CONTACT: Ty Houck, (864)676-2180 ext. 141, thouck@greenvillecounty.org
CONTACT: Joe Bryant, (864)298-0534, jbryant@seamonwhiteside.com

SCALE: NTS

STATE OF SOUTH CAROLINA
COUNTY OF GREENVILLE

SITE:001272
LAND UNIT: 0042096
PROJECT: 001272-8644042

LICENSE AGREEMENT

THIS LICENSE AGREEMENT (this "Agreement") is made and entered into as of the 30th day of July 2024 (the "Effective Date"), by and between **DUKE ENERGY CAROLINAS, LLC**, a North Carolina limited liability company ("Licensor"), and the **UPSTATE GREENWAYS AND TRAILS ALLIANCE**, a State of South Carolina Nonprofit corporation ("Licensee").

A. Licensor is the owner of that certain real property located in Greenville County, South Carolina, as more particularly described in those instruments recorded in the Greenville County Public Registry in Book 960 at Page 363 and Book / at Page / (hereinafter collectively, the "Licensor's Property").

B. Licensee desires to use a portion of Licensor's Property for the construction and maintenance of a trail for recreational use by the public.

C. In order to permit Licensee to use certain portions of Licensor's Property for a trail, Licensor desires to grant to Licensee a nonexclusive license over the portions of Licensor's Property being those certain strips of land 10 feet in width, the approximate location of which are shown in yellow on the picture attached hereto as **Exhibit A** and incorporated by reference (the "Trailway"), subject to the terms and conditions set forth herein.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Licensor and Licensee hereby agree as follows:

1) **Grant of License**. Licensor hereby grants to Licensee, subject to the terms of this Agreement, a nonexclusive license to construct, maintain, and operate a trail over the Trailway for recreational walking, hiking, bike riding and jogging. No motorized vehicles shall be permitted on the Trailway other than emergency response vehicles and motorized vehicles used by law enforcement (and authorized by the City and County of Greenville) . The public shall be considered "Licensee's invitees" for purposes of this Agreement, and public use shall be in accordance with the laws and ordinances of the County of Greenville. Licensee shall have the right to keep 10 feet on either side of the centerline of the Trailway clear of vegetation as necessary for maintenance of the Trailway (the "Vegetation Clearance Area"). The Vegetation Clearance Area shall be considered part of the Trailway for purposes of Sections 6 and 7 herein. No other type of use of Licensor's Property is permitted and there shall be no access by the Licensee or the public granted by this Agreement to Licensor's Property other than that expressly described and conveyed herein within the Trailway and Vegetation Clearing Area. Except as otherwise permitted herein, Licensee's use of the Trailway shall comply at all times with Duke Energy's "Electric Transmission Right of Way Requirements for Shared-Use Paths/Trails," attached hereto as **Exhibit B** and incorporated herein by reference, as the same shall be amended from time to time. Licensor shall have the right to terminate this Agreement at any time with sixty (60) days prior written notice to Licensee for any or no reason.

2) **Construction and Maintenance of Trailway**. Licensee, at Licensee's sole cost and expense, shall construct the trail and maintain and repair the Trailway in a good and serviceable condition for the permitted use. Licensee shall ensure compliance with the following requirements:

a) Prior to beginning any work on the Trailway, Licensee shall (a) provide thirty (30) days written notice before any construction begins or construction equipment enters the Trailway; (b) provide a site plan for Licensor's review; (c) meet with Licensor's designated personnel for an on-site safety meeting; and (d) take appropriate measures to avoid violating the National Electric Safety Code.

b) No building, sign, fence or other structure shall be erected on the Trailway; provided, trail markers, litter receptacles, gates and other convenience facilities may be placed upon the Trailway by Licensee with the prior written consent of Licensor.

c) There shall be no dumping of ashes, garbage, waste, or other unsightly or offensive material on the Trailway.

d) There shall be no excavation, dredging, removal of loam, rock, sand, gravel or other material, or any building of roads or other change in the natural topography of the Trailway, except for the construction and maintenance of the trail permitted herein.

Upon termination of this Agreement, Licensee shall return the Trailway in as good a condition as the same is in at the Effective Date, reasonable wear and tear excepted.

3) **Insurance**. Licensee shall maintain and provide evidence to Licensor of the existence of commercial general liability insurance with limits on bodily injury and property damage of not less than $1,000,000.00 per occurrence. Licensee and their insurer agree to waive any right of subrogation against Licensor.

4) **Licensor's Right of Entry**. Licensor reserves the right to use the Trailway, in whole or in part, from time to time for any purposes within the scope of Licensor's current or future business enterprises and in any other manner that is not inconsistent with the rights granted to Licensee in this Agreement.

5) **Relocation of Trailway**. Licensor reserves the right to require Licensee to relocate the Trailway, at Licensee's expense, to another portion of Licensor's Property by giving at least thirty (30) days written notice of such relocation to Licensee. Licensor will use reasonable efforts to provide Licensee with another location where the trail may be at least ten (10) feet in width.

6) **Release**. Licensee, on behalf of itself and its invitees who use the Trailway from time to time, hereby releases Licensor and Licensor's employees, officers, directors, member(s), agents, successors and assigns from any liability associated with the use of Licensor's Property by Licensee and Licensee's invitees.

7) **Liabilities**. Licensee agrees to be responsible for and assume liability for its own acts and omissions, or those of its officers, agents or employees to the full extent required by law. Liability of Licensee is governed by the South Carolina Tort Claims Act, S.C. Code Ann. § 15-78-10 *et seq.*, as nor or hereafter amended. Nothing in this Agreement shall be construed as a waiver of any

provision of the Tort Claims Act. Furthermore, Licensor is allowing the limited use of its land to the public for recreational use in accordance with the South Carolina Recreational Use Statute, S.C. Code Ann. § 27-3-10 *et seq*., as now or hereafter amended, and as such Licensor is entitled to enjoy all of the protections of those statutes.

8) **Notice**. Wherever in this Agreement it shall be required or permitted that notice be given by any party to this Agreement, such notice must be in writing and must be given personally or forwarded by certified mail, addressed as follows:

Licensor:
Duke Energy Carolinas, LLC
Attn: Corporate Real Estate Services
525 S. Tryon Street, DEP-___
Charlotte, NC 28202

Licensee:
Upstate Greenways and Trails Alliance
Attn: Matthew Hudson-Flege
701 Easley Bridge Road
STE 6070
Greenville SC, 29611

9) **Miscellaneous**.

a) In no event shall this Agreement or any memorandum of or reference to this Agreement be recorded in any Public Registry. Violation of the provisions in the immediately preceding sentence shall entitle Licensor to terminate the license rights granted herein.

b) Licensee and Licensee's invitees shall not use the Trailway in any unlawful manner or in any manner that will constitute a nuisance.

c) Licensee agrees that Licensee does not and shall not claim at any time any interest or estate of any kind or extent whatsoever in the Trailway or Licensor's Property, by virtue of this Agreement or Licensee's occupancy or use hereunder, and Licensor conveys no interest in the Trailway or Licensor's Property to Licensee by this Agreement.

d) It is agreed between Licensor and Licensee that this Agreement and the license rights granted herein shall be transferable only to the City of Greenville, a body politic of the State of South Carolina.

e) The failure of any party to this Agreement in any one or more instances to insist upon compliance with any provision or covenant herein or to exercise any right or privilege herein shall not constitute or be construed as a waiver of such or any similar provision or covenant.

f) This Agreement shall be governed by the laws of the State of South Carolina without regard to principles of conflict of laws.

[Signatures Begin on Following Page]

IN WITNESS WHEREOF, the parties hereto have set their hands as of the day and year first set forth above.

Witness

Witness

LICENSOR:

DUKE ENERGY CAROLINAS, LLC,
a North Carolina limited liability company

By: Kevin L. Lee
Kevin L. Lee (Jul 30, 2024 09:07 EDT)
Name: Kevin L. Lee
Title: Manager, Land Services II

Witness

Witness

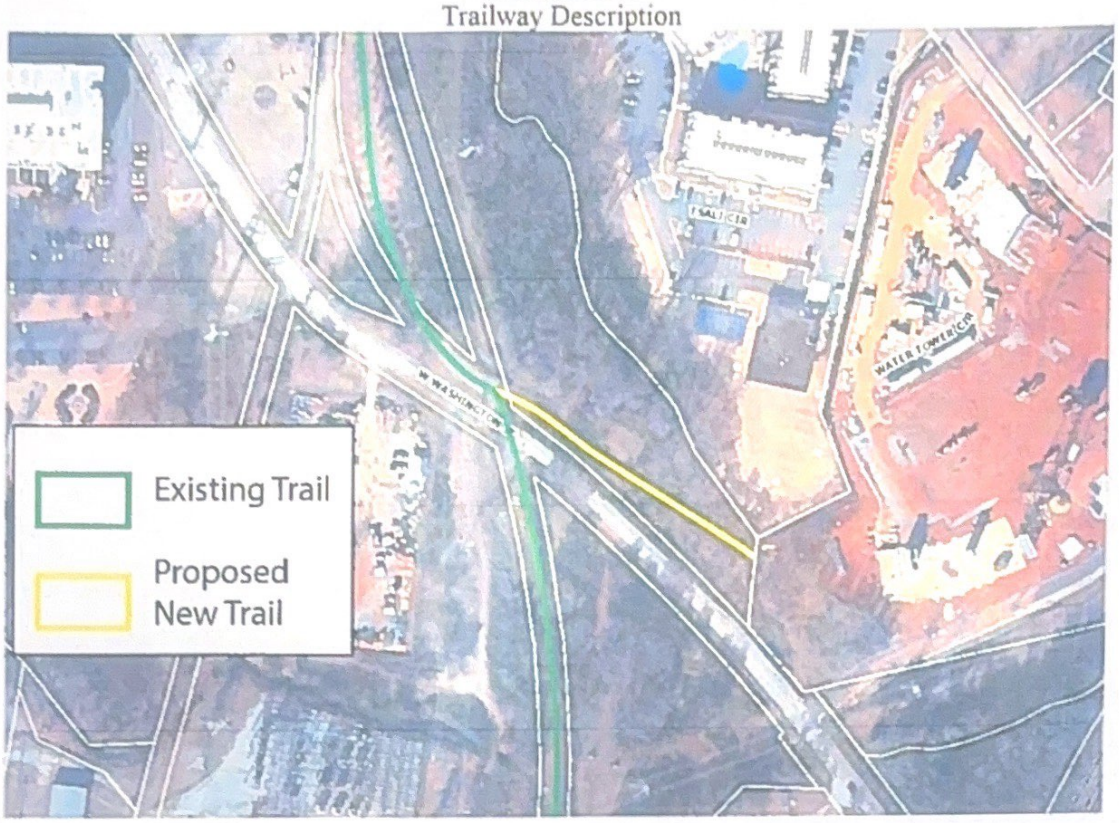
LICENSEE:

UPSTATE GREENWAYS AND TRAILS ALLIANCE,
a South Carolina nonprofit organization

By:
Name: Matthew Hudson-Flege
Title: Executive Director

EXHIBIT A

Trailway Description



Electric Transmission Right of Way Requirements for Shared-Use Paths/Trails

This list of Duke Energy's transmission right of way requirements for the co-location of shared-use paths/trails has been developed as a guideline to answer the most frequently asked questions. This should not be considered a comprehensive list of all requirements or factors that may need to be addressed. You should contact the Asset Protection Right of Way Specialist if you have additional questions or concerns. This list of requirements and guidelines is subject to change at any time and without notice. Duke Energy reserves all rights conveyed to it by the right of way agreement applicable to the subject property. An engineering drawing, including topographic grade changes, location of Duke Energy structures and paths/trails must be approved by an Asset Protection Specialist.

Compliance with these Duke Energy Shared-Use Path/Trails requirements, or approval of any such plans by Duke Energy, does not guarantee that other applicable requirements imposed by any local, county, state, federal or other applicable regulatory agency have been satisfied.

Definition: For purposes of this document the term "trail(s)" shall be used to refer to Multi-Use Paths or Shared-Use Paths as defined by the American Association of State Highway and Transportation Officials (ASSHTO).

1. The trails must not exceed a total of 10 feet in width, regardless of the surface construction material.
2. A minimum separation of 25 feet is required between the trail and its associated easement, to any Duke Energy electrical facility. This includes, but is not limited to, poles, towers, guy anchor(s), equipment, etc. If the owner of the trail is not the current owner of the fee simple title to the lands underlying Duke Energy's easement, the trail owner shall obtain a legally sufficient easement from the current fee simple title owner and produce said easement to Duke Energy prior to commencing activities within the Duke Energy easement. In the event a private easement is not required, no portion of the trail or shoulder, or associated grading, shall be located within 25 feet of any electrical facility.
3. The owner of the trail shall be responsible for safety and liability associated with its construction or use thereof.
4. Bollards shall be installed per Duke Energy specifications, with Duke Energy locks, where the trailheads connect with roads/ streets as to prevent vehicular traffic. Duke Energy may require reinforcement of the trail at specified access points along the corridor for Duke Energy heavy equipment crossings. These trail reinforcement areas shall consist of a 20-foot-long, 10-foot- wide paved area capable of supporting 80,000 pounds with pavement markings indicating "heavy equipment crossing."
5. Culverts shall be installed where the trails cross creeks, ditches, etc. These culverts shall be capable of supporting 80,000 pounds, and shall be a minimum of 20 feet wide. Signage must indicate the maximum load of the crossing at culvert approach.
6. No structures including, but not limited to, lights, signs, benches, exercise equipment, and irrigation systems shall be located within the Duke Energy easement.
7. Planting of vegetation shall adhere to the Right of Way (RW) Restrictions Guidelines for the specific Duke Energy territory. A copy of the RW Restrictions/Guidelines can be obtained from your Asset Protection Specialist.
8. Duke Energy reserves the right to close, without notice, all or a portion of the trail located within the transmission line easement, for any length of time, for construction, maintenance or emergency line operations.
9. Duke Energy will not be held responsible for any damages to the trails due to its operations or any liability based on the use of the trail. Prior to the installation of a shared-use trail, a "Trail Encroachment Agreement", which includes "hold harmless" language, shall be executed with Duke Energy. In addition, deed information of all property owners that the trail affects must be supplied to Duke Energy. Proof that the property owners have signed an easement agreement with the owner of the trail will be required, as applicable.
10. All other Duke Energy electric transmission right of way restrictions/guidelines shall apply to the installation of trails.

We hope this is useful information. If you have additional questions or plan any activity not mentioned above, please contact:

_____

Duke Energy Representative **Phone Number**

Form #XXXXXX 06/13

Rebecca Bowyer
Director of Engineering

(O) 864.299.4000

561 Mauldin Rd. • Greenville, SC 29607
www.ReWaonline.org

ReWa®
renewable water resources

June 27, 2024

To whom it may concern:

Re: PRJ-00003 Swamp Rabbit Gravity Upgrade and Bridge on parcel #0141000200400 Coordination, Greenville, SC

Renewable Water Resources is committed to working in tandem with the City of Greenville and Upstate Greenways & Trails Alliance for a solution where the bridge on the Duke property (#0141000200400) can remain for continued development and support of the Swamp Rabbit Trail. Design details will need to be worked out between the entities to avoid conflicts. Special provisions and additional guidelines will be required where the bridge crosses ReWa easement. These provisions and guidelines will be specified when routing of the gravity sewer main is finalized to be incorporated into the bridge design. ReWa will require submittal of bridge design drawings for review and comment at major design milestones. These submittals can be sent to dillont@re-wa.org and angelaa@re-wa.org for review.

Sincerely,

Rebecca Bowyer

Rebecca Bowyer, P.E.
Director of Engineering

Cc: Angela Allen, Renewable Water Resources
Cc: Steve Bryant, Duke Energy

SWAMP RABBIT TRAIL

ORANGE LINE BRIDGE FEASIBILITY STUDY

GREENVILLE, SOUTH CAROLINA

Prepared For:

SEAMON, WHITESIDE AND ASSOCIATES, INC.

Prepared By:

MICHAEL BAKER INTERNATIONAL, INC.

MARCH 19, 2021

Michael Baker
INTERNATIONAL

Table of Contents

SECTION 1 INTRODUCTION

Michael Baker International, Inc. was contracted by Seamon Whiteside to perform a feasibility study to include a visual inspection of an abandoned railroad bridge over the Reedy River, adjacent to W. Washington Street, in Greenville, South Carolina **(Figure 1)**. The purpose of this inspection was to assess whether portions of the existing bridge can be utilized for a new bicycle/pedestrian bridge on the Swamp Rabbit Trail. A new bridge crossing in this location would reroute the SRT Orange Line and prevent trail users from traveling along W. Washington St. and having to cross the two-lane road.

The on-site inspection entails assessing the current condition of the bridge components and providing recommendations for converting the bridge for pedestrian/bicycle use. This report contains the findings of the condition inspection, an evaluation of the existing bridge condition, recommendations for repair and a new deck system, and an estimated cost.

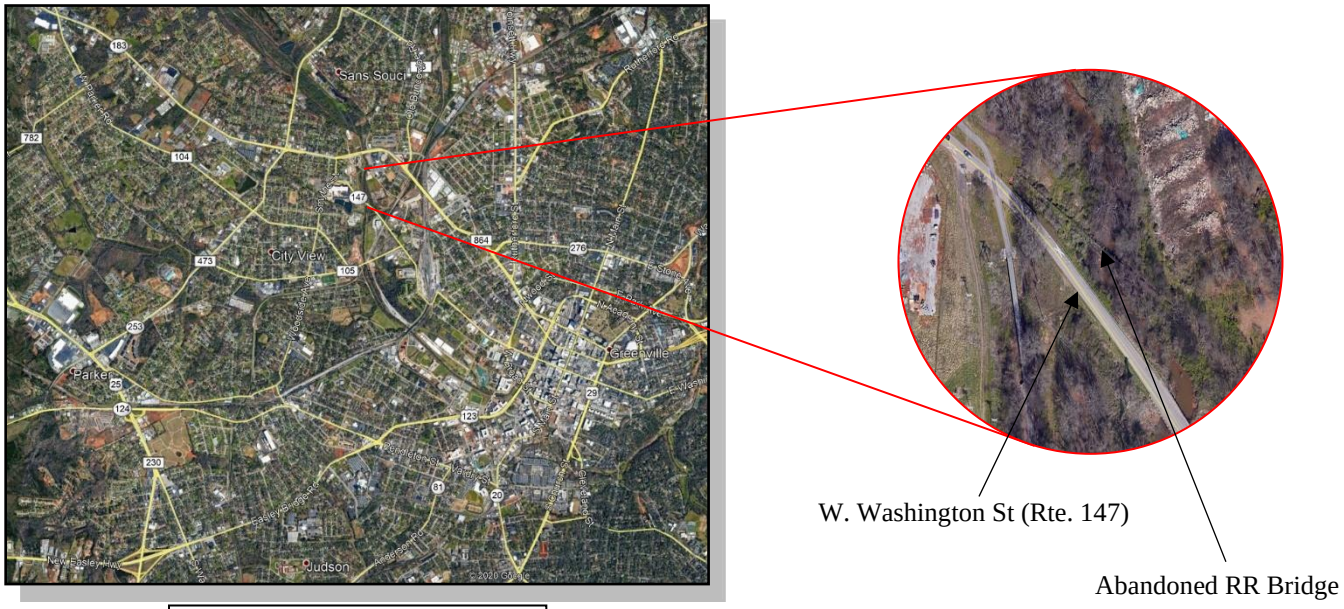


Figure 1: Project Location Map

The existing bridge adjacent to W. Washington Street is a 31-span structure about 380 feet in length. The decking has steel tracks and timber railroad ties, supported by two sets of continuous timber stringers. The abutments and interior bents are mostly timber frames supported on piles with several likely retrofitted concrete caps and steel H-piles. Span lengths vary from 6 to 18 feet.

SECTION 2 FINDINGS OF FIELD INSPECTION

Neither as-built plans nor inspection reports of the abandoned railroad bridge were available for review. Therefore, a documentation of the progression of the structure's deterioration throughout the life of the bridge is unknown. A qualitative inspection was performed to establish a snapshot of the structure's existing condition. This condition inspection was performed on December 18 & 29, 2020. The field work consisted of a visual, hands-on inspection that included non-destructive testing methods. Photographs of the existing condition were taken during the field work and documented in **Appendix A**.

The findings of this inspection generally revealed moderate deterioration of the stringers and substructure units. The following is a summary of the findings for each component.

Superstructure

The deck was inspected from the ground for signs of deterioration and damage. The railroad ties consistently showed signs of moderate to severe decay (**Figure 2**). The superstructure has two continuous built-up timber stringers. Each stringer has two 8x16s and one 7x16, bolted together in parallel and stagger connected. Both stringers sit directly on top of bent caps. There are no bearings to secure the stringers to the cap and effectively transfer loading to the substructure, other than occasional single short steel dowels. The superstructure slid off the south side of the caps in Spans 1-13, likely due to flooding **(Figure 3**). The stringers have minimal to minor decay, with only isolated areas of severe decay. See **Appendix B** for a plan view of the existing superstructure.

Figure 2: General Deck Condition

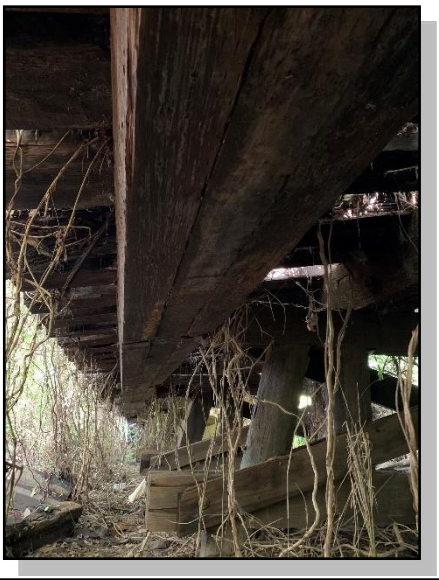


Figure 3: Portion of Superstructure Slid off Cap

Substructure

Abutments

The abutments (Bents 1 & 32) are frames made up of timber caps, posts, and mud sills supported by timber piles. A small portion of the abutments were buried and inaccessible for inspection. Both abutments exhibited minor to moderate decay and minor to severe crushing of the cap, in addition to erosion of the surrounding soil (**Figure 4**).

Figure 4: Typical Abutment

Interior Bents

Bents 5, 16, 17-2, and 19 are concrete caps with steel H-Piles (**Figure 5**). The remaining interior bents are timber frames with either a timber (**Figure 6**) or concrete mud sill (**Figure 7)** on timber piles.

Figure 5: Concrete Cap with Steel Piles

Figure 6: Timber Frame with Timber Mud Sill

Figure 7: Timber Frame with Concrete Mud Sill

Numerous timber bents exhibited various levels of decay or splitting of the cap, posts, and mud sill, from minor to severe. Many of the timber piles supporting the frames had severe deterioration at the mudline. Most of the diagonal bracing has moderate to severe decay.

There are several bents that have partially or fully collapsed, and it appears that new bents were installed in their place (**Figure 8**). In locations where a portion of the superstructure has slid off the caps, there are several bents that have been moderately forced out of alignment.

Figure 8: Replacement Bents

The bents with concrete caps and steel H-piles were in good condition, except for the steel H-piles located in the river. These piles had heavy rusting, pitting, and moderate section loss at the waterline and mudline.

See **Appendix C** for a profile view of the existing substructure. Deficiencies of each bent are summarized in **Appendix D**.

Waterway and Embankments

The bridge crosses the Reedy River and Brushy Creek. The entire area is prone to flooding with moderate to high stream flow, sitting in FEMA Flood Zone X, and is overgrown with heavy vegetation and trees. There is excessive debris scattered about and piled under many areas of the bridge, and the soil has minimal vegetation to reduce erosion and scour. The bridge is highly vulnerable to drift debris strikes, which will likely continue to cause severe damage if not adequately cleared.

Michael Baker recently completed a site assessment and load rating of the adjacent W. Washington Street roadway bridge over the Reedy River. As an indicator of the forces at play in this neck of the river, the timber bent located in the center of the waterway has settled and permanently swayed in the downstream direction.

Utilities

No utilities were found on site.

Summary & Conclusions

The bridge shows areas of minor to severe timber decay, steel pile deterioration, and flood damage. Considering the stark differential between the design loading (Cooper E80 Railroad) and the proposed pedestrian loading, there remains a significant amount of substantial sections capable of being practically restored.

Approximately 40% of the bents and most of the stringers were in good condition, requiring some minor repairs. Another roughly 35% of the structure will require moderate repairs, including replacement of significant sections of timber pieces. The remaining roughly 25% will require more extensive repairs, such as re-aligning the stringers and bents, replacing whole members, and building up piles.

SECTION 3 RECOMMENDATIONS

Substructure

The heavily decayed bents should be removed, and the remaining bents can be reused and restored. The abutments should be replaced with concrete spread footings with riprap armoring on the embankment, properly sloped, to resist erosion and protect the integrity of the structure. The riprap should be extended to adjacent ditches to prevent undermining of the planned asphalt approaches. Repairs should be made to deteriorated timber pile tops and steel piles at the waterline.

Superstructure

Stringers should be realigned. The railroad ties and steel tracks should be removed and replaced with a corrugated metal deck filled with flowable fill to match similar Swamp Rabbit Trail bridges nearby for ease of maintenance. According to the AASHTO Guide for the Development of Bicycle Facilities, a rail height of 48 inches and a trail width of 11 feet minimum is recommended in locations that are anticipated to serve high user volumes. For pathway widths greater than 10 feet, the LRFD Specifications for the Design of Pedestrian Vehicles specifies an H10 design vehicle loading. The additional loading of this design vehicle would incur a substantial increase in construction costs. Therefore, a clear width of 10 feet is recommended for this location. A typical section of the proposed bridge is shown in **Figure 9**.

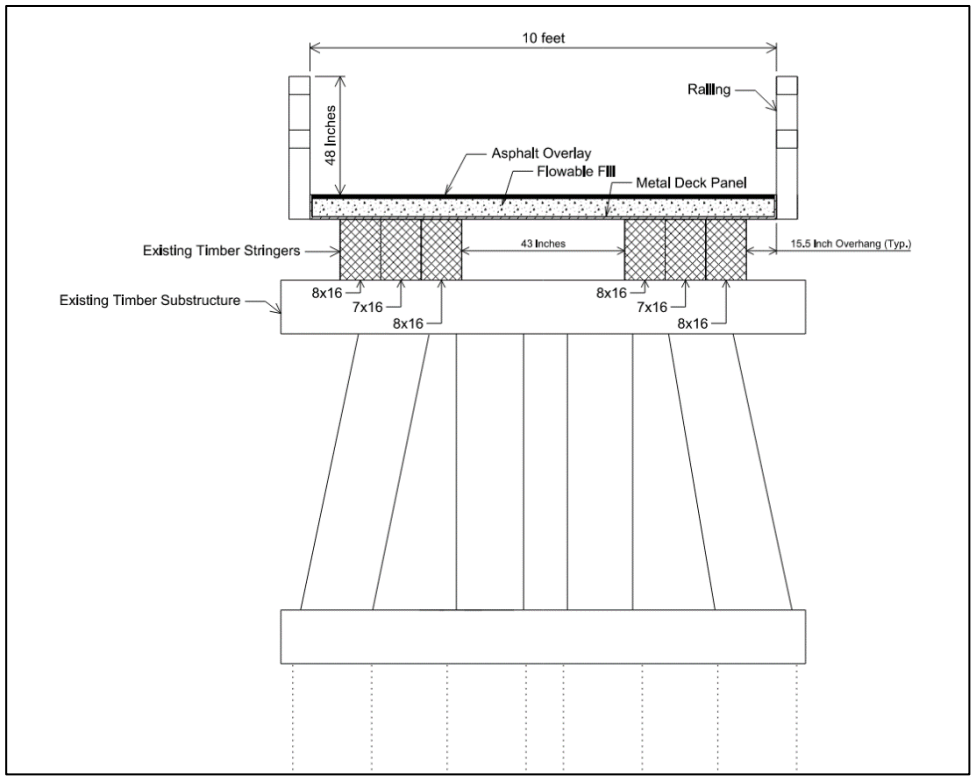


Figure 9: Proposed Typical Section

Preliminary Structural Analysis

Michael Baker performed a load rating in AASHTOWare BrR to determine the capacity of the stringers for various span lengths. The live load included the maximum reaction from either a pedestrian load of 90 psf or an H5 vehicle, as described in the LRFD Guide Specifications for the Design of Pedestrian Vehicles, 2009. Section 5 of the code also specifies the maximum allowable deflection at midspan as the span length divided 360, based on the unfactored dead loads and pedestrian load.

It was determined that a maximum span length of 25-feet will provide the required capacity while limiting the deflection to acceptable limits. Based on the condition of each bent and a maximum span length of 25 feet, a conceptual plan was developed to determine which bents will remain in place and which bents will be removed. In a few instances, bents in good condition will be moved to keep the length within the proposed limits. This resulted in the removal of 14 bents.

The proposed plan view is provided in **Appendix E,** and the proposed profile view is provided in **Appendix F**.

General Site Recommendations

The construction will likely be completed from the ground level with construction access provided on Duke's property on the north side and from the Swamp Rabbit Trail Orange Line and Water Dagger property on the south side.

The entire bridge site should be cleared and grubbed to the extent possible to minimize future damage from flooding. With the removal of 14 timber bent and debris clearing, it is estimated that approximately 1,000 cubic yards of material will be removed from the stream channel. According to Publication No. FWHA-HIF-12-004 (HEC 20: Stream Stability at Highway Structures, 4th Edition), the increased flow through the channel section by minimizing the numbers of piers provides the following improvements to the stream:

- Decrease in the bridge backwater;
- Reduction in the potential for local scour;
- Minimizes the opportunity for debris collection; and
- Lowers the risk of approach embankment failures.

All pieces should be firmly attached and anchored through the structural system to resist flooding and a recurrence of the shifting of the superstructure off the bents, along with bent misalignment or collapse. Riprap placed at the abutments would protect the banks from erosion.

SECTION 4 PRELIMINARY COST ESTIMATE

Based on the recommendations discussed in Section 3, our team prepared a rough order of magnitude preliminary estimated cost to convert the abandoned railroad bridge into a new pedestrian/bicycle bridge for the Swamp Rabbit Trail Orange Line in **Table 1**. Note that much of the estimated cost is composed of clearing and grubbing and the proposed superstructure, deck panels, flowable fill, and railing.

Table 1: Orange Line Bridge Estimated Cost

Item Description	Unit	Quantity	Unit Cost	Total Cost
MOBILIZATION	LS	1	$25,000	$25,000
CLEARING AND GRUBBING	LS	1	$50,000	$50,000
CONSTRUCTION SURVEYING	LS	1	$5,000	$5,000
REMOVAL AND DISPOSAL OF RR TIES AND TRACKS	LF	380	$50	$19,000
TIMBER BENT REMOVAL AND DISPOSAL	EA	14	$2,500	$35,000
RELOCATE TIMBER BENTS	EA	4	$2,000	$8,000
TIMBER BENT REPAIR	EA	9	$1,000	$9,000
TIMBER PILE REPAIR	EA	24	$600	$14,400
STEEL PILE REPAIR	EA	8	$1,200	$9,600
REALIGN TIMBER STRINGERS	LF	153	$100	$15,300
ATTACH STRINGERS TO CAPS	EA	18	$500	$9,000
CONCRETE FOR NEW ABUTMENTS	CY	23	$800	$18,667
REINFORCING STEEL FOR NEW ABUTMENTS	LB	3,500	$0.85	$2,975
RIPRAP FOR ABUTMENTS	TON	75	$50	$3,750
CORRUGATED BRIDGE DECK PANELS	EA	380	$265	$100,700
SIDE DAMS FOR DECK PANELS	EA	64	$84	$5,376
FLOWABLE FILL FOR BRIDGE DECK (4")	CY	47	$250	$11,728
METAL RAILING	LF	760	$150	$114,000
GROSS TOTAL				**$460,000**
CONTINGENCY				25%
TOTAL CONSTRUCTION ESTIMATE				**$580,000**
5% Assumed Project Management Costs				$29,000
12% Assumed Engineering Costs				$69,600
5% Assumed Survey, Geotech, and Permitting Costs				$29,000
10% Assumed Construction Inspection Costs				$58,000
			Total	**$765,600**

Approach work and the optional asphalt overlay are not included. An estimate of professional services such as surveying, geotechnical analysis, permitting, stream flow analysis, and structural design to complete the project were provided. It is anticipated that permitting efforts would be minimal due to the significant improvement to the bridge hydraulics by clearing the site and removal of bents.

APPENDIX A: FIELD INSPECTION PHOTOS

Bent 1

Bent 2

Bent 3

Bent 3 (Displaying Tilting and Torqueing)

Bent 3: Mud Sill Decay

Bent 4

Bent 5

Bent 6

Bent 7

Bent 8

Bent 8 (Stringer Decay)

Bent 9

Bent 9 (Cap Decay)

Bent 10

Bent 11

Bent 12

Bent 13

Bent 13 (Mud Sill Decay)

Bent 14

Bent 14 (Cap Decay)

Bent 15

Bent 15 (Cap Decay)

Bent 16

Bent 17-1, 17-2, & 17-3 (Left to Right) Looking Upstream

Bent 17-1, 17-2, & 17-3 (Right to Left) Looking Downstream

Bent 17-1

Bent 17-1 (Motor Grader Blade Repair for Timber Piles)

Bent 17-2 (Pile Decay at Mudline)

Bent 17-3

Bent 18

Bent 19

Bent 19 (Pile Deterioration)

Bent 20

Bent 21

Bent 21 (Timber Frame Decay)

Bent 21 (Timber Frame Decay)

Bent 22

Bent 23

Bent 23 (Cap Decay)

Bent 24

Bent 24 (Cap Splitting)

Bent 25

Bent 25 (Mud Sill Decay)

Bent 26

Bent 27

Bent 27 (Cap Decay)

Bent 28

Bent 28 (Timber Frame Decay)

Bent 28 (Cap Decay)

Bent 28 (Timber Frame Decay)

Bent 29

Bent 29 (Mud Sill Decay)

Bent 30

Bent 31

Bent 31 (Cap Decay)

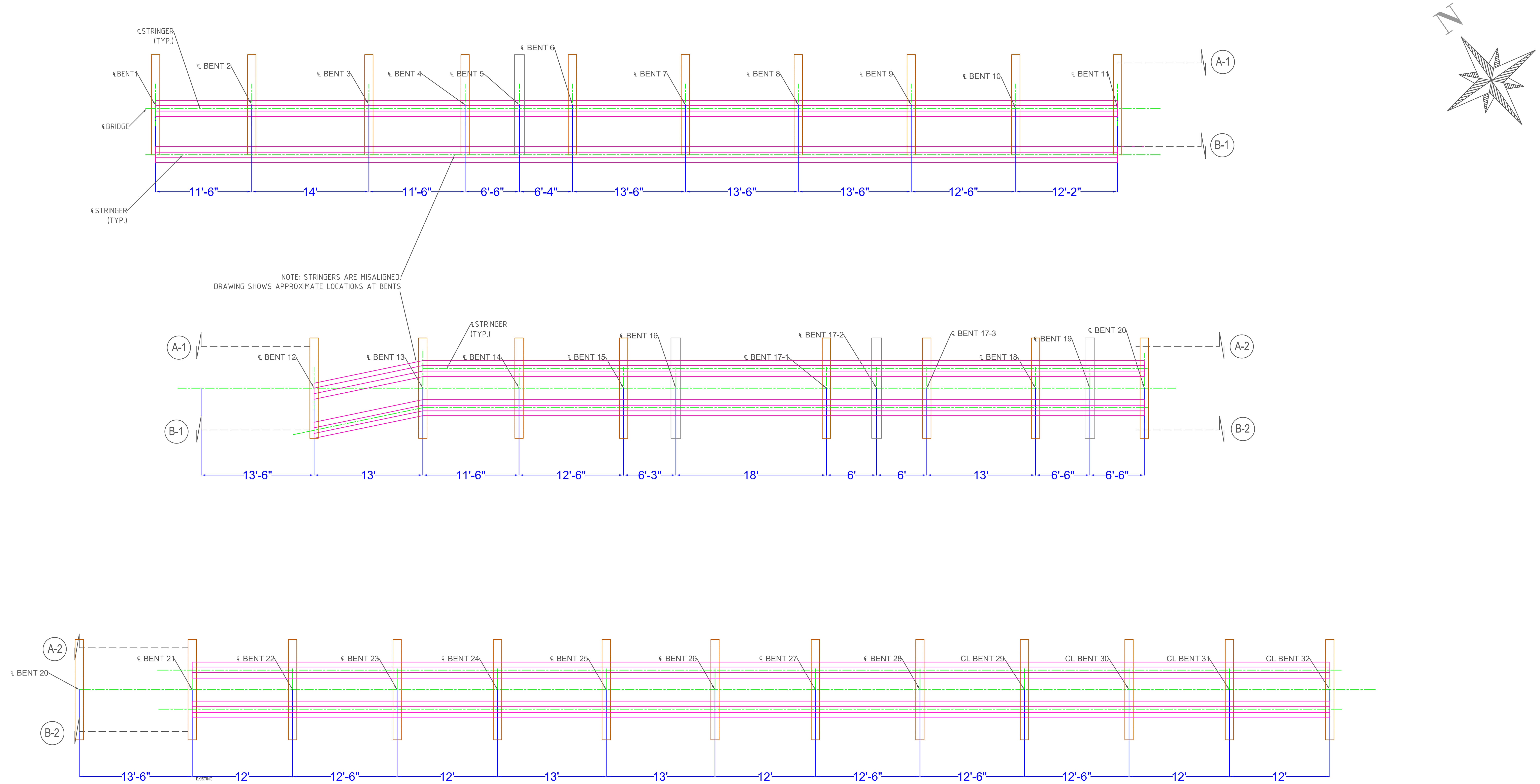
Bent 32

Bent 32 (Cap Decay)

APPENDIX B: EXISTING PLAN VIEW

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
	SC	GREENVILLE			

EXISTING



12"W X12"HX12'L WOODEN CAP

14" W X15"HX12'L CONCRETE CAP

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PRELIMINARY PLANS NOT FOR CONSTRUCTION

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GREENVILLE COUNTY

SWAMP RABBIT TRAIL
ORANGE LINE BRIDGE ASSESSMENT

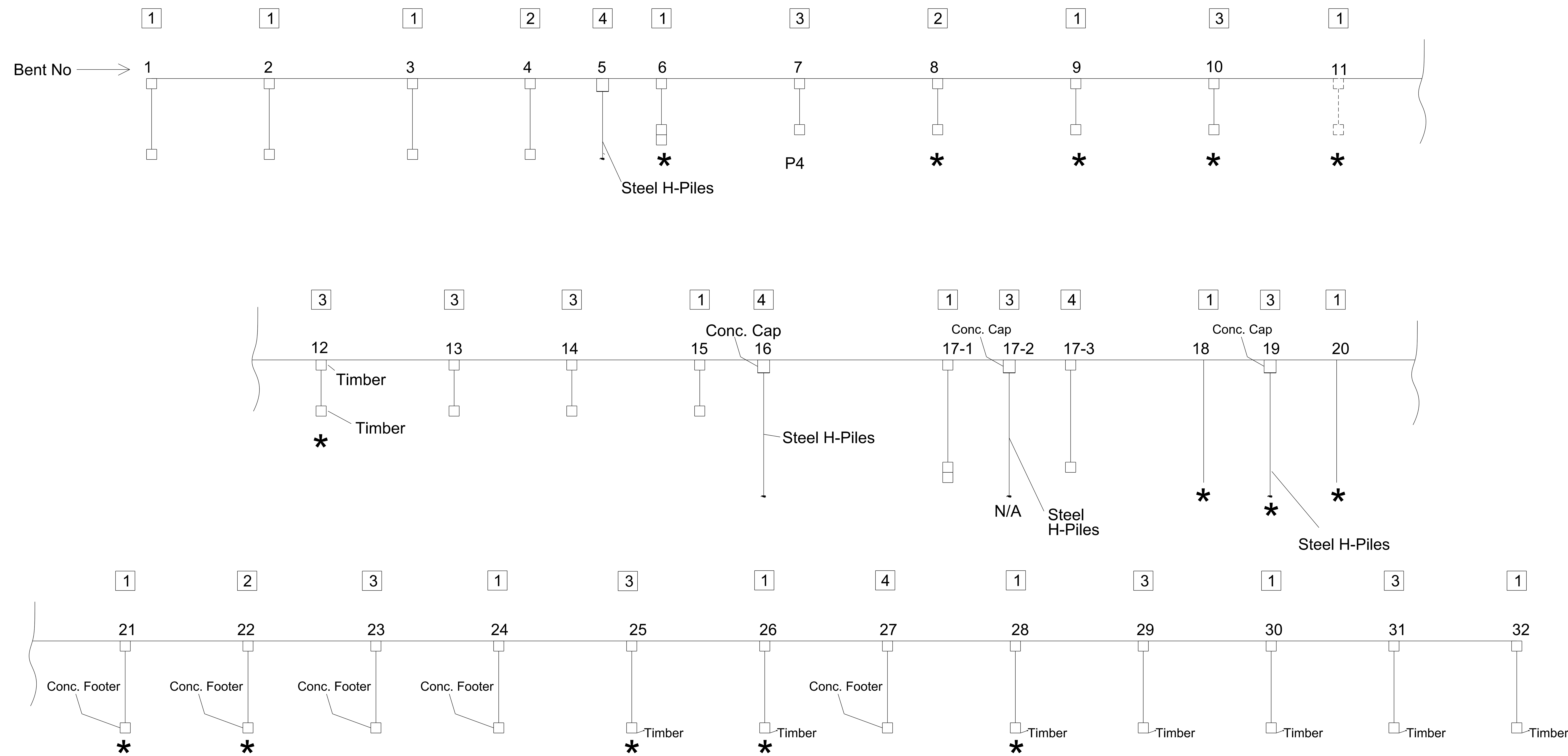
EXISTING PLAN VIEW

SHEET:### SCALE:

APPENDIX C: EXISTING SUBSTRUCTURE PROFILE

Bent Notes:

1 - Remove Bent
2 - Move Bent
3 - Repairs Needed
4 - Good/use as is
* Piles need repair
All Bents are timber unless noted otherwise



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	SC	GREENVILLE			

PRELIMINARY PLANS

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SWAMP RABBIT TRAIL
ORANGE LINE BRIDGE ASSESSMENT
EXISTING SUBSTRUCTURE PROFILE

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APPENDIX D: SUMMARY OF SUBSTRUCTURE DEFICIENCIES

Bent No.	Timber Bent Deficiencies/Decay						Concrete Cap w/ H-Piles Deficiencies		Replace	Remain	Remove	Move	Recommendations
	Tilted, Torqued, or Fallen	Stringer	Cap	Timber Frame	Mud Sill	Timber Piles	Concrete Cap	Steel H-Pile					
1 & 32	X		X						X				Both abutments will need to be removed and replaced with concrete abutments.
2	X		X	X							X		Bent 2 has been tilted and torqued out of alignment, in addition to deficiencies in the Cap and Timber Frame. Recommend removal.
3	X				X						X		Bent 3 has been slightly tilted and torqued out of alignment. The deficiencies discovered in the during the inspection are deemed moderate-severe. Replace with Bent 4.
4	X											X	Bent 4 has minimal tilting and therefore is a great candidate to stay with no other deficiencies noted. Move to Bent 3 location.
5										X			Bent 5 is a great candidate to remain with no other deficiencies noted.
6			X			X					X		Bent 6 deficiencies discovered in the Cap and Timber Piles supporting the Bent during the inspection lead to the conclusion that Bent 6 should be removed.
7	X					X				X			Bent 7 has tilted and has minor decay in the Timber Piles. Piles can be encased in concrete to prevent any further decay. This bent will need to be moved 1 ft to maintain maximum span length of 26 ft.
8		X				X						X	Bent 8 has a minor deficiency in the stringer. There is also minor decay in the Timber Piles that can be encased in concrete to prevent any further decay. Move to Bent 9 position.
9	X		X			X					X		Bent 9 has been tilted out of alignment. Moderate deficiencies in the Cap and Timber Piles. Recommend removal and replacement with Bent 8.
10						X				X			Bent 10 has minor deficiencies in the Timber Piles that can be encased in concrete to prevent any further decay. Move to Bent 11 approximate location, maintaining 26 ft span length.
11	X										X		Bent 11 has fallen over and should be removed. Replace with Bent 10.
12	X		X		X	X						X	Bent 12 is to be moved approximately 3' to control the span length of 25'. Bent 12 will be utilized and repairs will be made as needed to make sure Bent is adequate for carrying loads.
13					X					X			Bent 13 has minor deficiencies in the Timber Frame therefore Bent 13 is a great candidate to stay.
14			X							X			Bent 14 had minor deficiencies discovered in the Cap during the inspection. To keep span lengths from getting too long, keep in place.
15			X								X		Bent 15 had deficiencies discovered in the Cap during the inspection which lead to the conclusion that Bent 15 should be removed.
16										X			Bent 16 is a great candidate to remian with no deficiencies noted.

Bent No.	Timber Bent Deficiencies/Decay						Concrete Cap w/ H-Piles Deficiencies		Replace	Remain	Remove	Move	Recommendations
	Tilted, Torqued, or Fallen	Stringer	Cap	Timber Frame	Mud Sill	Timber Piles	Concrete Cap	Steel H-Pile					
17-1											X		Bent 17-1 is surrounding 17-2 which is a Concrete Cap with Steel H-Piles. It was determined that it was unnecessary to keep this additional Bent.
17-2								X		X			Bent 17-2 is a Concrete Cap with Steel H-Piles. Noted in the inspection report is some section loss and pitting at the mudline of the piles. Repairing these deficiencies is recommended.
17-3										X			Bent 17-3 will remain to be utilized in controlling the span length of 25'.
18	X					X					X		Bent 18 has fallen over and should be removed..
19								X		X			Bent 19 is a Concrete Cap with Steel H-Piles. Noted in the inspection report is section loss and pitting at the mudline of the piles. Repairing these deficiencies is recommended.
20	X										X		Bent 20 has fallen over and should be removed.
21				X		X					X		Bent 21 had deficiencies discovered in the Timber Frame and Timber Piles during the inspection leading to the conclusion that Bent 21 should be removed to be most cost effective. Move Bent 22 into this location to keep span lengths below 26 feet.
22						X						X	Bent 22 has little decay in the Timber Piles that can be encased in concrete to prevent any further decay. Move to Bent 21 position.
23			X							X			Bent 23 had deficiencies discovered in the Cap that needs repair, or Bent 24 can move into its place.
24											X		Bent 24 has no deficiencies noted. Either remove or reuse cap at Bent 23.
25	X				X					X			Bent 25 has been tilted out of alignment. The deficiencies discovered in the Mud Sill can be repaired, or Bent 26 can be moved into this location.
26						X					X		Bent 26 has minor decay in the Timber Piles. It can either be removed or reused at Bent 25.
27			X							X			Bent 27 has minor decay in the Cap therefore Bent 27 is a great candidate to remain.
28			X	X		X					X		Bent 28 had deficiencies in the Cap, Timber Frame, and Timber Piles during the inspection leading to the conclusion that Bent 28 should be removed.
29					X					X			Bent 29 had deficiencies in the Mud Sill during the inspection and will need minor repairs.
30											X		Bent 30 has no deficiencies noted and can be resued at Bent 31.
31			X							X			Bent 31 had deficiencies in the Cap that will require repair or Bent 30 can be used in its place.

APPENDIX E: PROPOSED PLAN VIEW

PROPOSED

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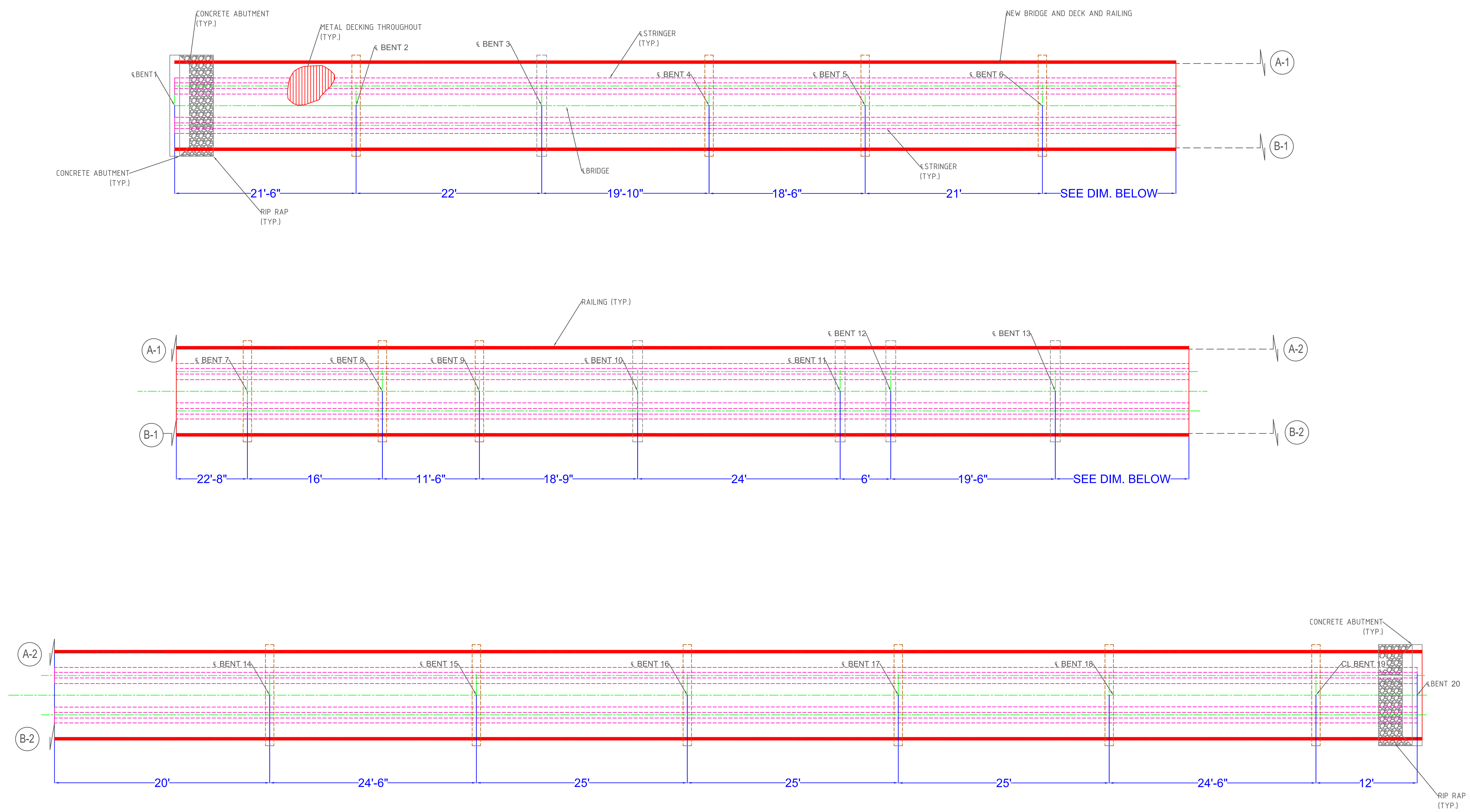

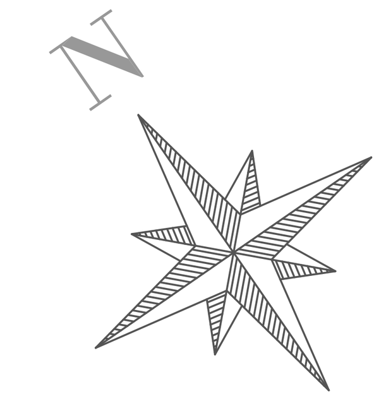

12"W X12"HX12'L WOODEN CAP

14" W X15"HX12'L CONCRETE CAP

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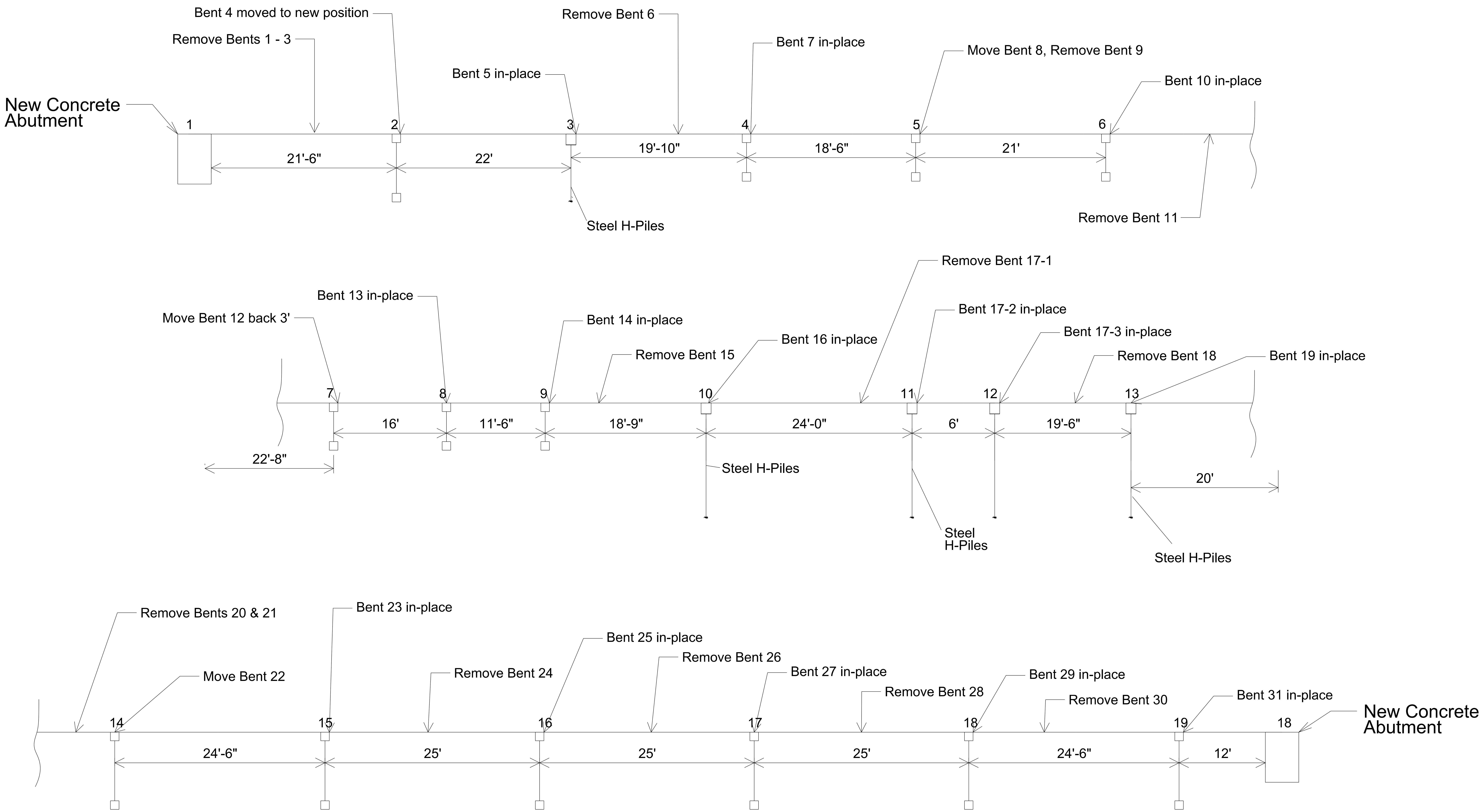
GREENVILLE COUNTY

SWAMP RABBIT TRAIL
ORANGE LINE BRIDGE ASSESSMENT
PROPOSED PLAN VIEW

SHEET:### SCALE:

APPENDIX F: PROPOSED SUBSTRUCTURE PROFILE

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
	SC	GREENVILLE			



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PRELIMINARY PLANS

NOT FOR CONSTRUCTION

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SCALE: