Calhoun County Stormwater Study

Final Report

South Carolina

Office of Resilience

March 2024

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1.0 Introduction

Calhoun County (County) is located in central South Carolina and is bordered by the Congaree River to the northeast and Lake Marion to the southeast. Calhoun has a recorded population of 14,119 according to the 2020 census. Over the years, flooding from relatively minor storm events has been a challenge to many areas of the County. Rain events can flood roadways – causing them to become impassable - and even damage homes and businesses.

In an effort to combat this challenge, the South Carolina Office of Resilience (SCOR) contracted with Kimley-Horn and Associates (KHA) in March 2023 to perform a Comprehensive Stormwater Study to identify flooding issues, conduct an assessment of the existing stormwater system, develop and prioritize projects, and establish an implementation strategy for the identified projects.

This report documents the details of the Final Comprehensive Stormwater Study for Calhoun County, SC which included the following tasks:

- Data Gathering and Historic Flooding Information,
- Field Data Collection
- Existing and Future Conditions Analysis,
- Alternatives Analysis, and
- Low-to-Moderate Income (LMI) Assessment and Project Recommendations.

2.0 Historic Flooding and Drainage Issues

2.1 FEMA Flood Risk Report (December 2017)

According to FEMA's Flood Risk Report (FRR) for the Congaree Watershed and Richland County, South Carolina (FRR 03050110), published in 2017, there have been eleven (11) past Federal Disaster Declarations for flooding in Calhoun County. The FRR identifies seven (7) at risk essential facilities and forty-seven (47) dams as areas of mitigation interest in Calhoun County within the Congaree Watershed. These areas of mitigation interest identify target areas and potential projects for flood hazard mitigation and are shown in **Figure 1**.

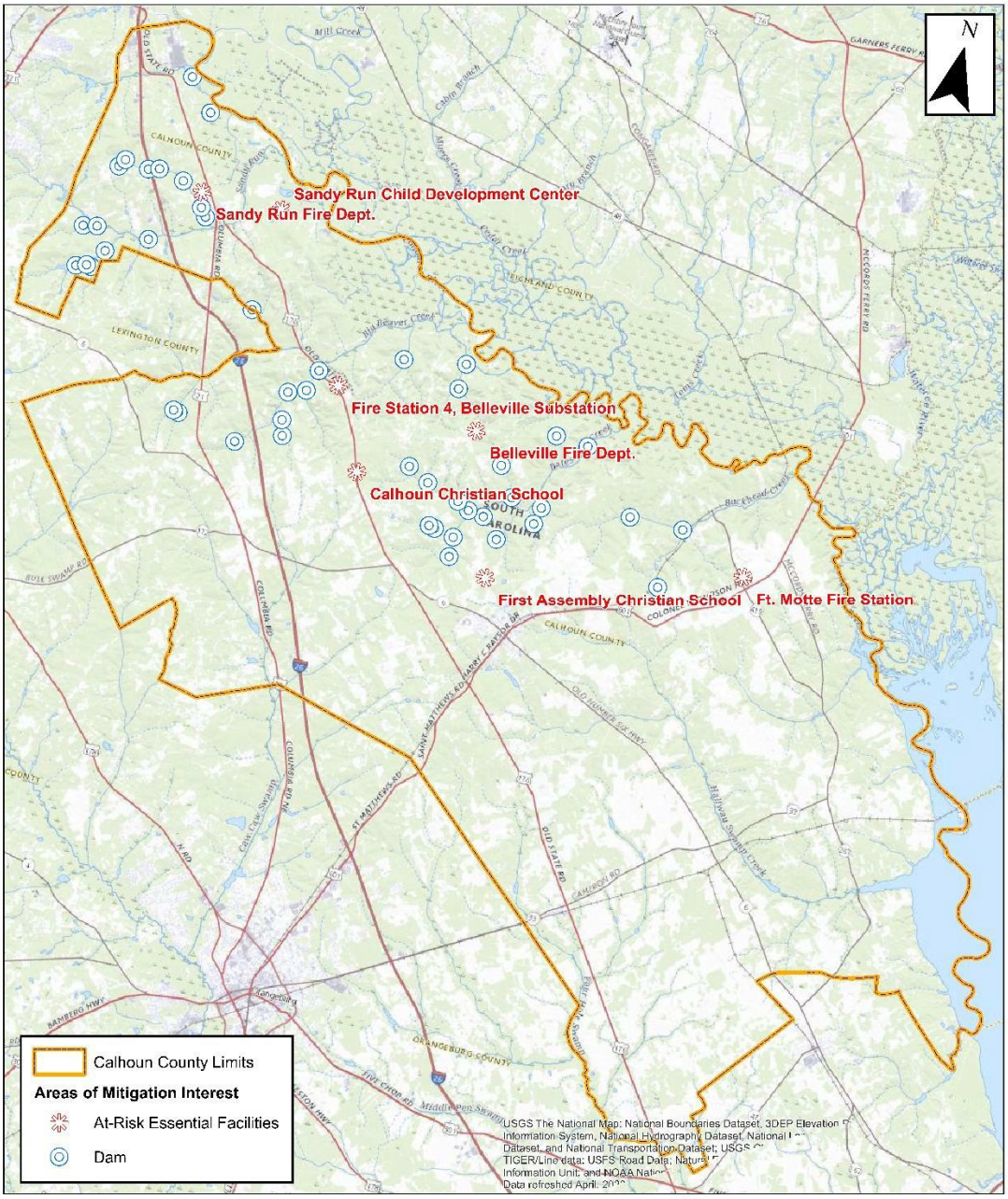


Figure 1: Calhoun County Areas of Mitigation Interest

2.2 Calhoun County Hazard Mitigation Plan (September 2020)

The Lower Savannah Council of Governments prepared the Calhoun County Hazard Mitigation Plan in 2020, as required in order for the county to remain eligible for FEMA mitigation grant funding.

This hazard mitigation plan identified thirteen (13) major flooding events in Calhoun County between 1950 and 2019, which equates to an 18.8% chance of a flood occurring each year within the county. **Table A** outlines these historic flooding occurrences. Of the major flooding events, three (3) occurred in the Town of St. Matthews and two (2) occurred in the Town of

Cameron, equating to a 4.3% and 2.8% chance of a flood occurring in the towns each year, respectively. The remaining eight (8) flooding events occurred in unincorporated areas of the county, yielding an 8.6% chance of a flood occurring.

No repetitive losses of property have been recorded for Calhoun County through the National Flood Insurance Program (NFIP). Repetitive loss properties are defined as having two or more losses of at least $1,000 each within any 10-year period.

Table A: Historic Occurrences of Flooding in Calhoun County

Date	Location	Type	Description
October 8, 2016	Unincorporated Area of County	Flash Flooding	- Heavy rainfall due to Hurricane Matthew. - SCHP reported portion of Old State Rd. washed out.
October 8, 2016	Unincorporated Area of County	Flash Flooding	- Heavy rainfall due to Hurricane Matthew. - SCHP reported roadway washed out on Good Hope Rd and Stump Hole Rd. flooded.
June 5, 2016	Unincorporated Area of County	Flooding	- Heavy rainfall due to stalled cold front. Reported flooding along Hwy 21 and Burke Rd.
October 4, 2015	Unincorporated Area of County	Flash Flooding	- Heavy rainfall in the Midlands and Pee Dee. - Numerous Dams breached with bridge and roadways flooded. - SCHP reported flooding on I-26 at mile marker 124.
October 3, 2015	St. Matthews	Flash Flooding	- Heavy rainfall in the Midlands and Pee Dee. - Numerous Dams breached with bridge and roadways flooded. - Several roads closed on portions of Hwy 6 between St. Matthews and Elloree.
June 25, 2014	Cameron	Flash Flooding	- Heavy rainfall was not able to drain due to I-26 road construction sediment - Significantly slowed traffic - Urban and small stream flood advisory issued by the NWS in Columbia
August 21, 2013	Cameron	Flooding	- 3 feet of water reported at the intersection of S.C. Highway 6 and S.C. 33 - Several homes flooded and vehicles stranded in various locations - Some roads blocked, rerouting vehicles
May 6, 2013	Unincorporated Area of County	Flooding	- Several gage points along rivers in SC went above flood stage due to 2-4 inches of rainfall - Most flooding was confined to low lying areas, but some areas have

Date	Location	Type	Description
			some minor flooding issues with recreation and other areas - The Congaree River at Carolina Eastman was over 5.7 feet over flood stage - Minor flooding along the river at the plant occurred - Total property damage for Calhoun County: $2K
September 7, 2004	Unincorporated Area of County	Flash Flooding	- Secondary roads flooded with some closures reported by the Sheriff's Department
June 16, 2001	St. Matthews	Flash Flooding	- SCDOT reported SC Highways 24 and 25 flooded north of St. Matthews
October 5, 1995	St. Matthews	Flooding	- Flooding reported in St. Matthews, no further details or damages were given
January 7, 1995	Unincorporated Area of County	Flooding	- Low lying areas of Calhoun County affected by excessive amounts of rainfall - Many flooded streets and roads reported - Estimated damage for Calhoun County: $1K
October 13, 1994	Statewide	Flash Flooding	- All Counties within SC were given flash flood warnings - Total property Damage for state: $2M - Total crop damage for state: $8K

Source: Calhoun County Natural Hazard Mitigation Plan (Lower Savannah Council of Government

2.3 Town of Cameron - Stormwater Drainage Study (Florence & Hutcheson, May 2013)

In 2013, Florence and Hutcheson performed an existing conditions analysis of flooding issues within the Town of Cameron. Five (5) areas of primary concern were identified for the purposes of the analysis and are outlined in **Table B**.

Table B: Areas of Primary Concern within the Town of Cameron

Location	Issue	Description
Old Orangeburg Road (S-53)	Storm Sewer System	- Existing drainage system is in poor condition with multiple pipes placed on insufficient slope - Backwater along Tributary No. 1 impacts the capacity of the system
Intersection of Old State Road (US-176) and Cameron Road (SC-33)	Storm Sewer System	- Existing drainage system is in poor condition with multiple pipes placed on insufficient slope - Backwater along Tributary No. 1 impacts the capacity of the system
Boyce Lawton Drive (S-8)	Culvert Crossing	- Crossings of N. Boyce Lawton Drive and CSX Railroad with Tributary No. 1 are undersized with heavy sedimentation resulting in backwater along the roadway

Location	Issue	Description
Third Street (S-321)	Storm Sewer System	- Existing drainage system is in poor condition and at minimum, requires maintenance and cleaning - An existing pipe inlet has been damaged, reducing the capacity of the system
Orange Street (S-115)	Backwater	- Flooding attributed to the backwater produced along Tributary No. 1 from the N. Boyce Lawton Drive and CSX Railroad crossings

Source: Stormwater Drainage Study for the Town of Cameron, South Carolina in Calhoun County, South Carolina

2.4 Public Reported Drainage Issues

Public involvement was one of the primary focuses of the project. A detailed public involvement and outreach plan was developed that included an online questionnaire/survey, mailers, and two public meetings, one in St. Matthews and one in Sandy Run. The public meetings were organized as drop-in sessions located at Sandy Run Community Center on June 12th, 2023 and at St. Matthews Municipal Court House on June 20th, 2023. The questionnaire/survey asked for information regarding history, frequency, location, and severity of flooding and erosion that has occurred on their property, within the neighborhood on neighboring properties, and roads. Fifteen issues were reported via the questionnaire, and 25 total areas were identified as having issues either by a recorded survey, mentioned as an accompaniment with a recorded survey, or discussed at the public meeting. A summary of drainage issues collected from the public meetings and surveys are listed in **Table C**.

Table C: Public Reported Drainage Issues

Label	Location	Reported By	Issue
1			Soil Erosion, Flooded Property, Sink Holes, Drains in Need of Repair
2			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage
3			Soil Erosion, Flooded Property, Flooded Streets
4			Flooded Crossing
5			Soil Erosion, Pipe Blockage, Drains in Need of Repair
6			Soil Erosion, Pipe Blockage
7			Flooded Crossing
8			Soil Erosion, Flooded Property, Pipe Blockage, Stream/Ditch Blockage
9			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage, Drains in Need of Repair
10			Flooded Property
11			Flooded Ditch

Label	Location	Reported By	Issue
12			Flooded Ditches
13			Flooded Property, Pipe Blockage, Drains in Need of Repair
14			Soil Erosion, Flooded Streets, Pipe Blockage, Stream/Ditch Blockage, Drains in Need of Repair
15			Flooded Street
16			Flooded Property
17			Soil Erosion, Flooded Property, Flooded Streets, Stream/Ditch Blockage
18			Soil Erosion, Flooded Property, Stream/Ditch Blockage
19			Soil Erosion, Flooded Property, Flooded Streets, Grate Blockage
20			Washout Behind House
21			Soil Erosion, Flooded Property, Flooded Streets
22			Minor Flooding
23			Flooded Crossing
24			Flooded Property, Flooded Streets, Drainage from Neighboring Property
25			Flooded Crossing, Road Closure during Flood

2.5 SCDOT Transportation Improvement Projects

The South Carolina Department of Transportation (SCDOT) has implemented a 10-year plan to repair and rebuild South Carolina's transportation system. This plan is expected to include replacing half of SCDOT's 750 structurally deficient bridges, resurfacing or rebuilding half of SCDOT's 42,000 miles of state highways, and begin 11 or 12 interstate widening projects. Projects that have been identified within Calhoun County so far are outlined in **Table D**.

Table D: Current and Planned SCDOT Transportation Improvement Projects

Route	Project Name	Construction Year	Category	Project Status
SC172	SC 172 (Bull Swamp Rd) Bridge Replacement over Caw Caw Swamp	2026	Bridge Replacement	Design/ Development
S-158	S-158 (Community Club Rd) Bridge over Hungerpiller Pond (DR-4241)	2018	Eliminate Closed & Load Restricted Bridges	N/A
US 601	US 601 from near SC 267 (McCords Ferry Rd.) to Calhoun/Richland County Line	TBD	Improve Rural Road Safety	N/A

Route	Project Name	Construction Year	Category	Project Status
SC6	SC 6 from near SC 33 (Cameron Rd.) to Calhoun/Orangeburg County Line	TBD	Improve Rural Road Safety	N/A
SC6, US21, SC172	Intersection Improvement US 21 (Columbia Rd) / SC 172 (Bull Swamp Rd)/SC 6 (Caw Caw Hwy)	2025	Safety Improvement	Design/ Development
I-26	I-26 Corridor Improvement from Exit 125 Old Sandy Run Road to Exit 136	2023	Corridor Improvement	Design/ Development
I-26	I-26 Corridor Improvement from near Exit 136 to Exit 145 (Phase 2)	2024	Corridor Improvement	Design/ Development
S-41	Calhoun CTC-contribution to future COG Safety Project realignment of Sonntag Dr. & Valley Ridge Rd. Inter.	2021	Intersection Improvement	Design/ Development
S-233	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-15	2023 FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-176	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-126	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-90	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
US176	2023 Primary Pavement Improvement Program	2022	Rehabilitation	Construction
S-245	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-52	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-101	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-129	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-402	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-326	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-206	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-229	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-66	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-67	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-165	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction
S-210	2023 Non-FA Secondary Pavement Improvement Program	2022	Rehabilitation	Construction

Route	Project Name	Construction Year	Category	Project Status
S-408	2022 Non-FA Secondary Pavement Improvement Program (Add'l 2022 NFA Funding)	2022	Rehabilitation	Design/ Development
S-407	2022 Non-FA Secondary Pavement Improvement Program (Add'l 2022 NFA Funding)	2022	Rehabilitation	Design/ Development
S-280	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
SC6	2023 Primary Pavement Improvement Program	2022	Rehabilitation	Construction
S-451	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
US21	2023 Primary Pavement Improvement Program	2022	Rehabilitation	Construction
S-449	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-16	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-190	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-191	2022 Non-FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
S-29	2022 FA Secondary Pavement Improvement Program	2021	Rehabilitation	Construction
SC172	2022 Primary Pavement Improvement Program	2021	Rehabilitation	Construction

Source: SCDOT 10 Year Plan Project Information Resource and SCDOT Interactive Programmed Projects Viewer

3.0 Field Survey, Methodology, and Assumptions

3.1 Sub-Watershed Delineation

Based on established areas of interest, public input, and 2018 USGS LiDAR of Calhoun County, the County was divided into fourteen (14) sub-watersheds and each terminate at a unique outfall. **Figure 2** displays the locations of the sub-watersheds. Thirteen (13) individual 2D hydraulic models were created based on the sub-watershed delineations and County boundary. **Figure 3** displays the boundaries for the 2D hydraulic models. Additional sub-basins were delineated as necessary for hydrologic and hydraulic calculations performed in certain priority areas.

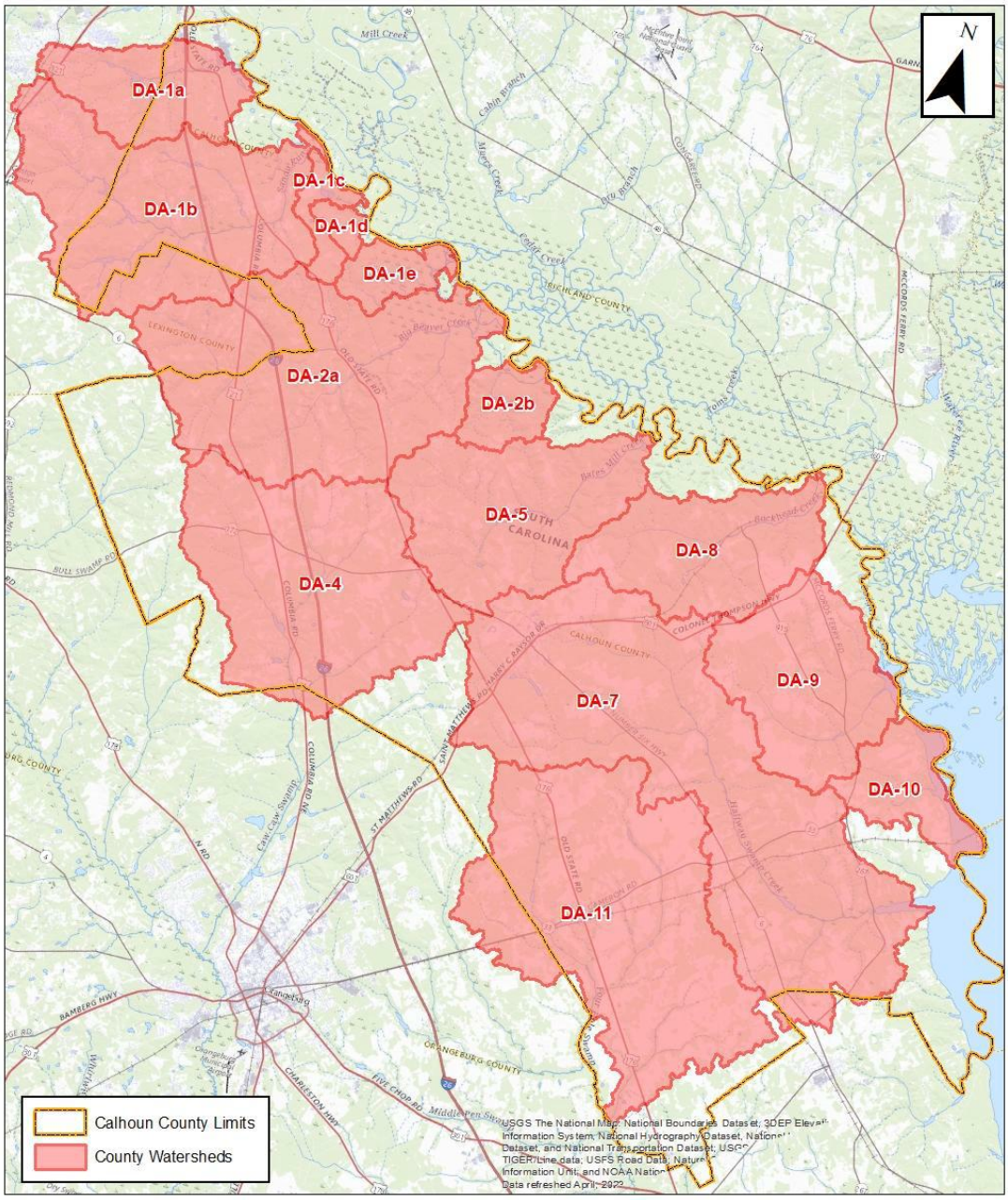


Figure 2: Calhoun County Watersheds

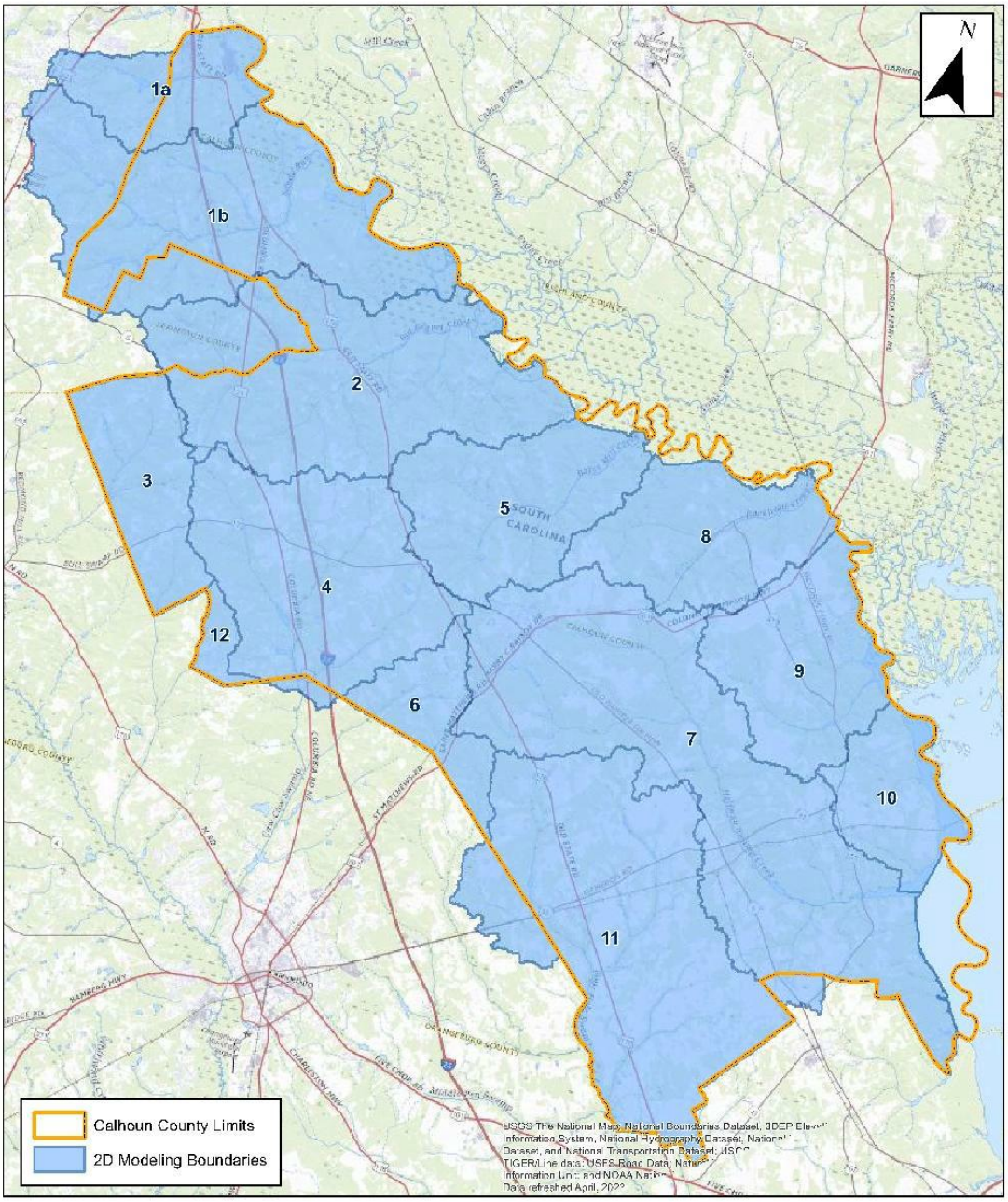


Figure 3: 2D Modeling Boundaries

3.2 Hydrology/Hydraulic Calculations

Provided Calhoun County does not currently provide stormwater design guidance, a methodology for hydrologic computations was created from Richland County and SCDOT guidelines.

The following guidelines were followed for the hydrologic analysis of the sub-basins delineated in select priority areas:

- Runoff calculated by Rational Method for drainage areas up to 100 acres

    - SCDOT Requirements for Hydraulic Design Studies states the Rational Method may be used for drainage areas up to 100 acres.
    - Rainfall intensity-duration-frequency (IDF) curves from SCDOT, specifically the 2019 updated values cited in Hydraulic Design Bulletin No. 2019-2,
        - SCDOT rainfall intensity values are more current than NOAA Atlas 14 data and were used in accordance with the SCDOT Requirements for Hydraulic Design Studies. On average, these values differed by less than 1% from NOAA Atlas 14 rainfall values.
        - The existing conditions analysis utilized the SCS rainfall depth as shown and the future conditions analysis factored in a 20% increase to existing conditions rainfall depth per guidance from other coastal watershed studies.
    - Runoff coefficients from Table 4 of the SCDOT Requirements for Hydraulic Design Studies,
    - Time of Concentration (Tc) based on TR-55 methods.
- Drainage Areas (DA) and Tc based on 2018 USGS LiDAR and supplemented with field reconnaissance and Google Maps-street view feature.
    - DA and Tc remained the same for existing and future conditions.
- Composite rational method runoff factors were based on land cover information from the national land cover database published in 2019 by the Multi-Resolution Land Characteristics (MRLC) Consortium.
- No detention in system is assumed (e.g., no significant storage behind culverts or in pipe systems).

Existing infrastructure consists of crossings, closed systems, and open channels. Priority areas within the Towns of Cameron and Saint Matthews were surveyed between the months of June and July 2023 by SAM, LLC. The existing survey can be found in **Appendix F.** Inverts were captured for pipes along with the size and descriptions of their visual condition such as level of sediment, rust, or cracking. Rim elevations were documented for each node within known closed systems and elevation shots were taken to render a typical section of the open channels. Ditch typical sections were supplemented with survey in areas where 2018 LiDAR did not provide enough resolution. The surveyed information is compiled in an Existing Infrastructure geodatabase per SCOR guidelines and is provided with this final report.

The hydraulic modeling methodology used in this analysis is as follows:

- Closed systems were modeled in StormCAD.
- Open channels (roadside ditches) were modeled in FlowMaster.
- Pipe crossings were modeled in GeoHEC-RAS 2D v. 4.1.0.2674 (using HEC-RAS v. 6.3.1)
    - Calhoun County contains only FEMA Zone A floodplain, thus, no effective FEMA modeling was able to be used in this study.
    - 2D rain on grid methodology was used to model floodplain within Calhoun County.
        - More detail and a smaller mesh size was used in priority areas to better understand and model the extents of flooding.

        - A starting cell size of 100 ft was used in overbank areas of less detail and a starting cell size of 20 ft was used in areas of more detail and along stream centerlines.
        - Stream centerlines and roadway crossings were added as breaklines to the 2D mesh to refine cell geometry in these areas.
        - The Manning's n value layer was based on land cover information from the national land cover database published in 2019 by the Multi-Resolution Land Characteristics (MRLC) Consortium. Standard "n" values based on land cover were based off of the "n" value ranges for various NLCD Land Cover Types described in the HEC-RAS 2D User's Manual.
        - Precipitation data was entered as a hyetograph, obtained from HEC-HMS, and applied as incremental precipitation.
    - Culvert crossings were added to the 2D model as 2D Flow Area Connections.
        - Select crossings throughout the county were surveyed and added to the model in priority areas of concern.
    - Due to the size of the Congaree River watershed and the lack of previous detailed modeling adjacent to Calhoun County, backwater from the Congaree River was not accounted for in the 2D model.

The results of the hydrologic analysis and surveyed information were then used to model the existing infrastructure and determine hydraulic sufficiency based on the Level of Service (LOS) guidelines specified below. Inventory and sufficiency tables for the existing infrastructure are provided in the attached tables and displayed graphically on Exhibits 3-5 in **Appendix B**.

3.3 Level of Service

A design Level of Service (LOS) was developed to determine the sufficiency of existing infrastructure within the priority areas of concern. The design (LOS) for existing conditions utilized criteria found in a neighboring county (Richland) and SCDOT guidelines. The following assumptions are made in defining the design LOS for existing conditions:

- Culverts under arterial and multi-lane collector roadways shall convey the 50-year storm event without overtopping the crown of the roadway.
- Culverts under all other roadways and driveways shall convey the 25-year event without overtopping the crown of the roadway.
    - Calhoun County is a minimally sloping area with driveways primarily matching grade with the connected roadway. Therefore, driveway pipes share the 25-year LOS guideline with local roadways provided the overtopped driveway would result in roadway flooding.
- Open channel systems shall convey the 25-year design storm event without overtopping the banks.
- Road subgrades should be 1.0 foot above the design high-water level.
- For drainage areas of 0 to 40 acres, storm drain systems and roadside ditches shall convey the 10-year storm.
- For drainage areas of 40 to 500 acres, storm drain systems and roadside ditches shall convey the 25-year storm.
- For drainage areas of 500 or more acres, storm drain systems and roadside ditches shall convey the 50-year storm.

Infrastructure was labeled sufficient if it met or exceeded LOS and insufficient if it did not meet LOS. A summary of sufficiency for the analyzed infrastructure along with a summary of crossings impacted by 100-year and 500-year flood events are shown below in **Table E** and **Table F**, respectively.

Table E: Sufficiency Summary for Analyzed Infrastructure[1]

Type	Total Length Analyzed (LF)	Total Sufficient Length (LF)	Total Analyzed Structures	Total Sufficient Structures	Sufficiency Percentage
Closed-System Pipe	5928	814	-	-	14%
Ditch	3104	3104	-	-	100%
Culvert Crossing	-	-	16	7	44%
Node[2]	-	-	53	8	15%

- [1]Survey inventory of all analyzed infrastructure was completed by SAM, LLC between the months of June and July, 2023.
- [2]Nodes include all closed system structures (excluding pipes) such as catch basins, inlets, junction boxes, and open ended pipes that act as transition points in the closed system.

Table F: 2D Riverine Modeling Results

Total Structures Impacted by 100-year Flood	Total Structures Impacted by 500-year Flood
5173	6043

According to OpenStreetMap (OSM) data, there are 50,174 buildings, or structures, within the limits of Calhoun County. Of those 50,174 structures, 5173 are impacted by the 100-year flooding extents mapped in this analysis and 6043 are impacted by the 500-year flooding extents mapped in this analysis. Project alternatives focused on addressing the structures impacted by these floodplains that were also reported as having flooding issues during the public outreach portion of this study.

4.0 Project Alternative Scoring

4.1 Summary of Alternatives

Table G below summarizes the potential alternatives developed to improve the insufficient infrastructure identified in the existing conditions hydrologic and hydraulic analysis. Potential projects and alternatives are shown on Exhibits 8-15 in **Appendix C**. Potential alternatives include:

- Improving drainage infrastructure to fully meet design standards as set out by the level of service requirements above,
- improving drainage infrastructure to meet some but not all design standards to improve the level of service,
- removing flooded infrastructure from the problem area by means of potential buyouts, and
- identification of low-impact/green infrastructure projects.

Table G: Potential Project Alternatives Summary

Project ID	Project Location	Alternative Description	
1	Town of Cameron	ALT 1	Upsize 4 out of 5 culvert crossings to meet and/or exceed LOS. Upsize C-3 and grade defined channel to better convey flow and improve LOS.
		ALT 2	Upsize C-1 and C-2 to pass larger storm events. Grade swale on north side of N Boyce Lawton Dr to redirect flow from C-3 to C-4.
2	Town of Saint Matthews	ALT 1	Upsize all culvert crossings to meet LOS.
		ALT 2	Upsize all crossings to bridges to pass larger storm events.
3	Town of Saint Matthews	ALT 1	Upsize all culvert crossings to meet and/or exceed LOS. Grade out swale between Magnolia St and Mill St to increase capacity.
		ALT 2	Upsize all crossings to bridges to pass larger storm events.
		ALT 3	Restore approximately 1640 LF of stream between Mill St and F R Huff Dr to increase channel capacity.
4	Sandy Run	ALT 1	Upsize all pipe crossings along Old Swamp Rd to meet LOS.
		ALT 2	Upsize all crossings to larger boxes to pass larger storm events.
5	Sandy Run	ALT 1	Upsize Valley Ridge Rd culvert crossing to meet LOS.
		ALT 2	Upsize crossing to bridge to pass larger storm events.
6	Town of Cameron	ALT 1	Upsize Church Camp Rd culvert crossing to meet LOS.
		ALT 2	Upsize crossing to bridge to pass 100-year storm.
7	Calhoun County	ALT 1	Upsize St John Rd culvert crossing to pass 100-year storm.
8	Calhoun County	ALT 1	Upsize Nate Store Rd culvert crossing to meet LOS.
		ALT 2	Upsize crossing to bridge to pass larger storm events.
9	Town of Cameron	ALT 1	Install approximately 1800 LF of closed-system pipe to divert flow from Cameron's closed-system.
		ALT 2	Upsize approximately 1240 LF of closed-system pipe to meet LOS.
10	Town of Saint Matthews/Calhoun County	ALT 1	Stormwater park on 57.6 ac lot outside of Saint Matthews
		ALT 2	Stormwater park on 5.7 ac lot in Saint Matthews
		ALT 3	Stormwater park on 1 ac lot in Saint Matthews
		ALT 4	Stormwater park on 6 ac lot in Saint Matthews
11	Town of Saint Matthews	ALT 1	Additional watershed storage on 5 ac lot in Saint Matthews
		ALT 2	Cistern for storage of runoff to be reused onsite at Calhoun County Public Schools Administrative Office
12	Calhoun County	ALT 1	Potential buyouts in Congaree River floodplain

In addition to the riverine and closed-system infrastructure alternatives detailed above in Projects 1-9, Projects 10 and 11 consider low-impact/green infrastructure alternatives to alleviate flooding. Only publicly owned parcels were identified as opportunities. Five parcels were identified within the town limits of Saint Matthews that show potential for cisterns, dry detention, or stormwater parks. One parcel identified just outside the town limits of Saint Matthews shows potential for additional watershed storage by means of dry detention, a stormwater park, or potential reroute of area draining to Antley Spring Branch. Parcels identified

as “Low Impact Development Opportunities” are shown on Exhibit 16 in **Appendix C**.

The “Potential Buyout” alternatives considered for Project 12 involve purchasing properties subject to high levels of flooding from the Congaree River to remove flooded infrastructure from the floodplain. Properties identified as Potential Buyouts are shown on Exhibits 17 and 18 in **Appendix C**.

4.2 Opinions of Probable Construction Cost (OPCC)

For each alternative, Kimley-Horn developed an Opinion of Probable Cost (OPCC) which included construction, planning, design, and construction management costs. Easement cost was based on 10% of the construction costs subtotal. These estimates are based on conceptual designs, with limited to no survey or geotechnical information. Cost estimates are shown in 2023 dollars and adjustment for inflation should be accounted for based on implementation of projects. Detailed OPCC calculations for each project alternative can be found in **Appendix D.**

4.3 Low to Moderate Income (LMI) Communities Assessment

Communities, as defined by the Department of Housing and Urban Development (HUD), are smaller zones within a county determined by the Census Bureau and commonly referred to as tracts. Tracts are typically made up of about 1,200 to 8,000 people. The boundaries are set and can be found on many government maps. The Community Reinvestment Act (CRA) establishes a “low-income community” to be a tract where the median family income is of less than 50% of the area median income. A moderate-income community means that the median family income is at least 50% and less than 80% of the area median income.

Four tracts make up Calhoun County within the Columbia, SC Metropolitan Statistical Area (MSA). The Federal Financial Institutions Examination Council (FFIEC) estimated 2023 median family income for this MSA is $83,300. Sandy Run is located in tract 17900-45-017-9501.00 (MSA Code-State Code-County Code-Tract Code) which has an estimated 2023 median family income of $98,694. This classifies the tract as “middle-income,” meaning the median family income is at least 80% and less than 120% of the median area income. The Town of Saint Matthews is split between tracts 17900-45-017-9502.01 and 17900-45-017-9502.02, where 2023 estimated median family incomes are $72,263 and $69,830, respectively, classifying these tracts as middle-income as well. The Town of Cameron is located within tract 17900-45-017-9504.00, where the 2023 estimated median family income is $60,717, classifying it as “moderate-income”. With this metric, projects implemented within the Town of Cameron could be eligible to receive other sources of funding such as from the Community Development Block Grant (CDBG) program.

Tracts can further be broken down into block groups which according to the US Census, generally contain between 600 and 3,000 people. **Figure 4** displays the different tracts and block groups that make up Calhoun County. The Department of Housing and Urban Development has published data for “Low to Moderate Income Population by Block Group” that provides the percentage of Low- and Moderate-income persons for each area. **Table H** below summarizes the percentage of the population that are identified as LMI in block groups containing potential projects. This value was used in the scoring process further detailed below to rank projects based on their positive impacts within LMI groups.

Table H: LMI Percent Served by Project

Project	Location	Block Group	Tract	LMI % Served
1	Town of Cameron	4	9504	52%
2	Saint Matthews	2 and 4	9502	58%
3	Saint Matthews	3	9502	39%
4	Sandy Run	1	9501	41%
5	Sandy Run	1	9501	41%
6	Calhoun County	4	9504	52%
7	Calhoun County	4	9504	52%
8	Calhoun County	3	9504	45%
9	Town of Cameron	4	9504	52%

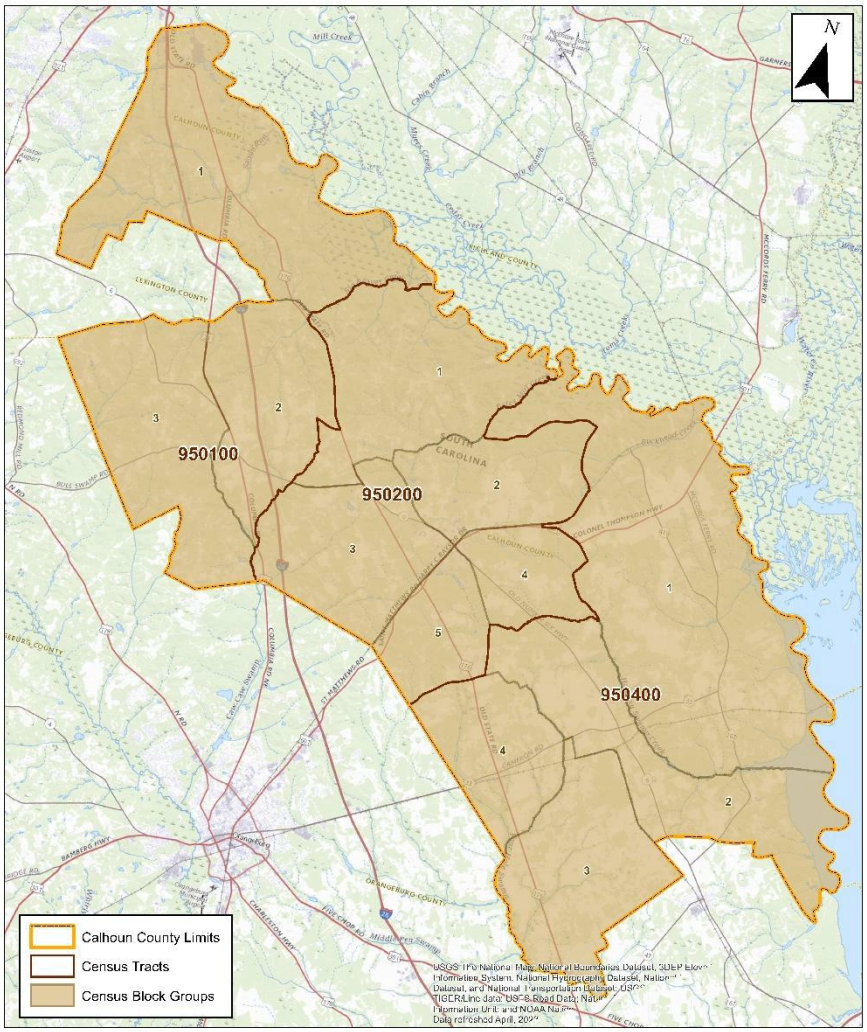


Figure 4: Calhoun County Census Divides

4.4 Scoring Matrix

A scoring matrix was created to evaluate alternatives beyond their associated cost such as community impact and flood mitigation. Descriptions of the scoring methodology are provided below along with an example of the scoring matrix. Scoring matrices for each project alternative are provided in **Appendix D.**

- Permitting, Scheduling, and Easements
  - **Definition:** The extent of state or federal regulatory approvals that will be required along with the extent of land that will need to be acquired for the implementation of the alternative. Land acquisitions could include public or private property and require standard easements for infrastructure or entire parcels.
  - **Measurement:** Qualitative
  - **Scoring:** More points were awarded to alternatives not expected to require permits or extensive easements, fewer points were awarded to alternatives that require complex and extensive permitting or that require land acquisition from private landowners
- Low-to-Moderate Income (LMI) Percent Served
  - **Definition:** Percent of Low- and Moderate-Income census block groups served by the alternative
  - **Measurement:** Quantitative
  - **Scoring:** Alternatives were ranked based on their level of positive impacts within LMI groups
- Level of Flood Risk Reduction
  - **Definition:** The extent to which a project alternative improved, met, or exceeded the required level of service
  - **Measurement:** Qualitative
  - **Scoring:** Highest scores were given to alternatives that exceeded level of service requirements
- Quantity of Flood Risk Reduction
  - **Definition:** A measure of structures removed from the 100-year floodplain as a result of the project alternative
  - **Measurement:** Quantitative
  - **Scoring:** Highest scores were given to alternatives that removed over 25 structures from the floodplain, lowest scores were given to the alternatives that removed less than 10 structures from the floodplain
- Mobility Improvement
  - **Definition:** The extent of improved access to roads as exit routes during large storm events
  - **Measurement:** Qualitative
  - **Scoring:** Highest scores were given to alternatives that fully cleared one or more roads during a 100-year storm, lowest scores were given to alternatives that did not accomplish the clearing of any roads
- Operation and Maintenance (O&M)
  - **Definition:** O&M requirements of the alterative to maintain successful operation and extend longevity of the proposed infrastructure
  - **Measurement:** Qualitative

    - **Scoring:** More points were awarded to alternatives with typical maintenance procedures and sufficient access, fewer points were awarded to alternatives with significant maintenance burdens and/or difficult access
- Project Synergies
    - **Definition:** The extent of interaction or mutual benefit from two or more projects in proximity
    - **Measurement:** Qualitative
    - **Scoring:** More points were given to projects with high mutual benefits or shared costs of implementation, fewer points were given to projects with no mutual benefit or interaction with other projects

4.5 Summary of Scoring

Table I below summarizes the scores determined using the scoring matrix along with probable costs associated with Projects 1-9. Given the parameters of the scoring matrix, Projects 10-12, which were identified as low-impact/green infrastructure or potential buyout alternatives, were not scored. The costs associated with potential buyout alternatives can be estimated by their most recent appraisal value, adjusted for inflation. Low-impact/green infrastructure alternatives were identified based on publicly owned parcels in proximity to the floodplain. Benefits and costs associated with low-impact/green infrastructure alternatives should be determined based on more detailed design and feasibility study.

Table I: Summary of Scoring and Project Costs

Project	Alternative	Project Score (out of 100)	OPCC
1	1	60	$ 1,382,800.00
	2	66	$ 1,123,600.00
2	1	60	$ 1,088,800.00
	2	66	$ 510,000.00
3	1	60	$ 1,238,000.00
	2	66	$ 575,000.00
	3	65	$ 330,700.00
4	1	62	$ 455,800.00
	2	72	$ 731,500.00
5	1	58	$ 263,600.00
	2	65	$ 141,800.00
6	1	57	$ 354,800.00
	2	64	$ 158,300.00
7	1	72	$ 556,900.00
8	1	64	$ 228,000.00
	2	65	$ 155,900.00
9	1	52	$ 864,400.00
	2	68	$ 1,065,800.00

A risk assessment was conducted for each project alternative based on anticipated permitting or project difficulties, cost of implementation, and potential for public scrutiny. It was assumed that

project alternatives with an OPCC over $500,000 were considered “High Cost”. **Table J** below summarizes the level of risk associated with each project alternative.

Table J: Potential Project Alternatives Summary

Project	Project Location	Alternative	Significant Permitting Requirements	High Cost or Large Scale	High Level of Public Scrutiny	Risk Level
1	Town of Cameron	1	X	X		Moderate
		2	X	X		Moderate
2	Town of Saint Matthews	1		X	X	Moderate
		2		X	X	Moderate
3	Town of Saint Matthews	1	X	X	X	High
		2	X	X	X	High
		3	X			Moderate
4	Sandy Run	1	X			Moderate
		2	X	X		Moderate
5	Sandy Run	1				Low
		2				Low
6	Town of Cameron	1	X			Moderate
		2	X			Moderate
7	Calhoun County	1				Low
8	Calhoun County	1				Low
		2				Low
9	Town of Cameron	1	X	X		Moderate
		2	X	X		Moderate
10	Town of Saint Matthews/Calhoun County	1	X	X		Moderate
		2	X	X		Moderate
		3	X			Low
		4	X	X		Moderate
11	Town of Saint Matthews	1	X	X		Moderate
		2				Low
12	Calhoun County	1				Low

5.0 Recommended Projects and Benefit-Cost Analysis (BCA)

5.1 Recommended Projects

Kimley-Horn identified 5 alternatives to recommend as projects based on the priority areas outlined in the scope, public reported issues, and their proximity to potential problem areas from modeling output. Alternatives were selected for Projects 1, 2, 3, 4, and 9. Projects 1 and 9 address flooding issues in the Town of Cameron, where there were many publicly reported flooding issues. Project 7 produced a high score and low risk but was not chosen as a recommended project alternative due to its lack of project synergy and potential to address multiple infrastructure issues as one project. Summaries of the recommended projects are

included in **Table K** below. Concept plans for the recommended projects are included in **Appendix C.**

Table K: BCA Summary

Project	Location	Alt.	Project Score (out of 100)	Benefits	Costs	BCR	
						7% Discount Rate	3% Discount Rate
1	Town of Cameron	1	60	$ 9,179,381.00	$ 1,410,401.00	6.51	11.83
2	Town of Saint Matthews	2	66	$ 9,320,402.00	$ 523,801.00	17.79	30.61
3	Town of Saint Matthews	1	60	$ 5,106,189.00	$ 1,596,301.00	3.2	5.66
		3	65				
4	Sandy Run	2	72	$ 14,181,613.00	$ 745,301.00	19.03	34.53
9	Town of Cameron	2	68	$ 481,287.00	$ 1,093,401.00	1.63	2.97

Project 1 addresses flooding issues previously identified in the May 2013 Stormwater Drainage Study prepared by Florence & Hutcheson for the Town of Cameron. Project 9 specifically address the flooding at the intersection of Old State Rd and Cameron Rd, which was one of the two locations requested by the County to be an area of focus in the study.

Projects 2 and 3 address flooding issues in the Town of Saint Matthews identified both from public input and potential risks identified from modeling like restricted access to Calhoun from the east via Colonel Thompson Highway.

Project 4 addresses potential flooding issues along Old Swamp Road where Sandy Run K-8 school is located. The intersection of Banks Lane and Old Swamp Road was the other of the two locations requested by the County to be an area of focus in the study. After visually assessing this intersection, there were no apparent infrastructure issues that would lead to flooding apart from the intersection being in a low-lying area directly adjacent to the Congaree River floodplain. Since the Congaree is the primary source of flooding in this area and there are no feasible alternatives to alleviate flooding at intersection of Banks Lane and Old Swamp Road, the improvements associated with Project 4 will improve the level of service of Old Swamp Road and provide a more reliable path of exit from the area during floods.

5.2 Benefit-Cost Analysis (BCA)

A Benefit-Cost Analysis (BCA) was performed on the 5 recommended projects to determine their cost effectiveness using FEMA's Benefit-Cost Calculator v6.0.0. The FEMA BCA Toolkit utilizes discount rates to demonstrate the loss of benefits over time. Benefit-Cost Ratios (BCR) were calculated for each recommended project using discount rates of 7% and 3%. According to FEMA, most federally funded mitigation projects require a discount rate of 7% except for the Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) grants. For these grants, FEMA considers a project cost-effective if it scores a BCR of 0.75 or higher using a discount rate of 7% or 1.0 or higher using a discount rate of 3%. Projects

must also benefit disadvantaged communities and address climate change in order to receive funding from either grant.

5.2.1 Benefits

The benefits were calculated as the avoided future costs due to the completion of the recommended project. A benefit that was shared between all 5 recommended projects was the avoided road impacts cost per day during various recurrence storms (10-year, 25-year, 50-year, and 100-year). Calculations for Project 9 assumed a complete infrastructure failure in all events due to the system surcharging in as low as the 10-year event. Recommended Projects 1, 2, 3, and 4 assumed complete infrastructure failure and washout during the 100-year event and therefore included the cost to implement the recommended project as a future cost. Project 4 benefits included avoided future costs associated with the potential closure of a critical facility building (Sandy Run K-8) due to failure of the surrounding road. Standard ecosystem benefits and additional social benefits were quantified for Projects 1, 2, 3, and 4. The ecosystem benefits stemmed from the expected benefit of reduced riverine flooding in the areas as a result of project improvements. Additional social benefits were applied that incorporated the number of affected residents and employed residents. Complete BCA reports of each recommended project are provided in **Appendix E.**

5.2.2 Costs

A large portion of the total costs associated with recommended projects was the construction cost. Other costs included maintenance costs and costs per day for road impacts after the implementation of the recommended projects. Projects 1, 2, and 9 do not provide a level of service beyond the 25-year storm, therefor, road flooding can still be expected during larger events. However, it is assumed that the implementation of the project will improve conditions and not result in complete infrastructure failure or washout during any storm event.

5.3 Recommended Project Considerations

Consideration should be taken regarding the impact of these recommended projects on their downstream systems during the detailed design phase. With the upsizing of roadway crossings, there is an increased potential for flooding downstream of the crossings. Particularly, Project 3 proposes the upsizing of roadway crossings upstream of a residential area in the Town of Saint Matthews. The upsizing of these crossings has the potential to increase flooding downstream, however, the addition of stream restoration upstream of the crossings could increase stream capacity and attenuation, thus potentially offsetting the increased flooding that would occur downstream.

6.0 “What-If” Analysis

Kimley-Horn identified 5 hypothetical situations— “what-if” scenarios—as potential impacts from major catastrophic events such as hurricanes or other major meteorological events. These hypothetical scenarios are purely qualitative, and no modeling was done to support this portion of the analysis. Potential impacts include but are not limited to the following scenarios:

1. There are multiple crossings along I-26 with a system of dams upstream. In the event of a catastrophic storm, the interstate crossings with Sandy Run, Kraker Branch, and Little Beaver Creek could potentially be at risk of failure.

2. There are 5 ponds along Kraker Branch upstream of Old Sandy Run Road in Sandy Run that are controlled by dams. A dam breach, or series of dam breaches, along this stream system could cause severe flooding to Old Sandy Run Road and cut off access from the Sandy Run Fire Department to surrounding areas.
3. There are 6 dams along Little Beaver Creek and its tributaries upstream of Old State Road. If any of these dams were to fail and create a cascade effect, a large stretch of Old State Road would be cutoff, limiting access from the Belleville Fire Station to surrounding areas.
4. High Hill Creek and Bates Mill Creek each have 4 dams along them upstream of their confluence at Calhoun Road. If either of these systems were to experience dam failures either separately or at the same time, both Calhoun Road and Old Belleville Road are at risk of failure.
5. In the event of a severe storm, such as Hurricane Matthew, the Congaree could flood immensely and impact important facilities in its proximity such as Sandy Run K-8 School and large manufacturing developments such as Columbia Energy Center, Dak Americas, and Devro Inc..

Locations of these scenarios along with the modeled 500-year flood depth boundary is shown in **Figures 5** and **6** below.

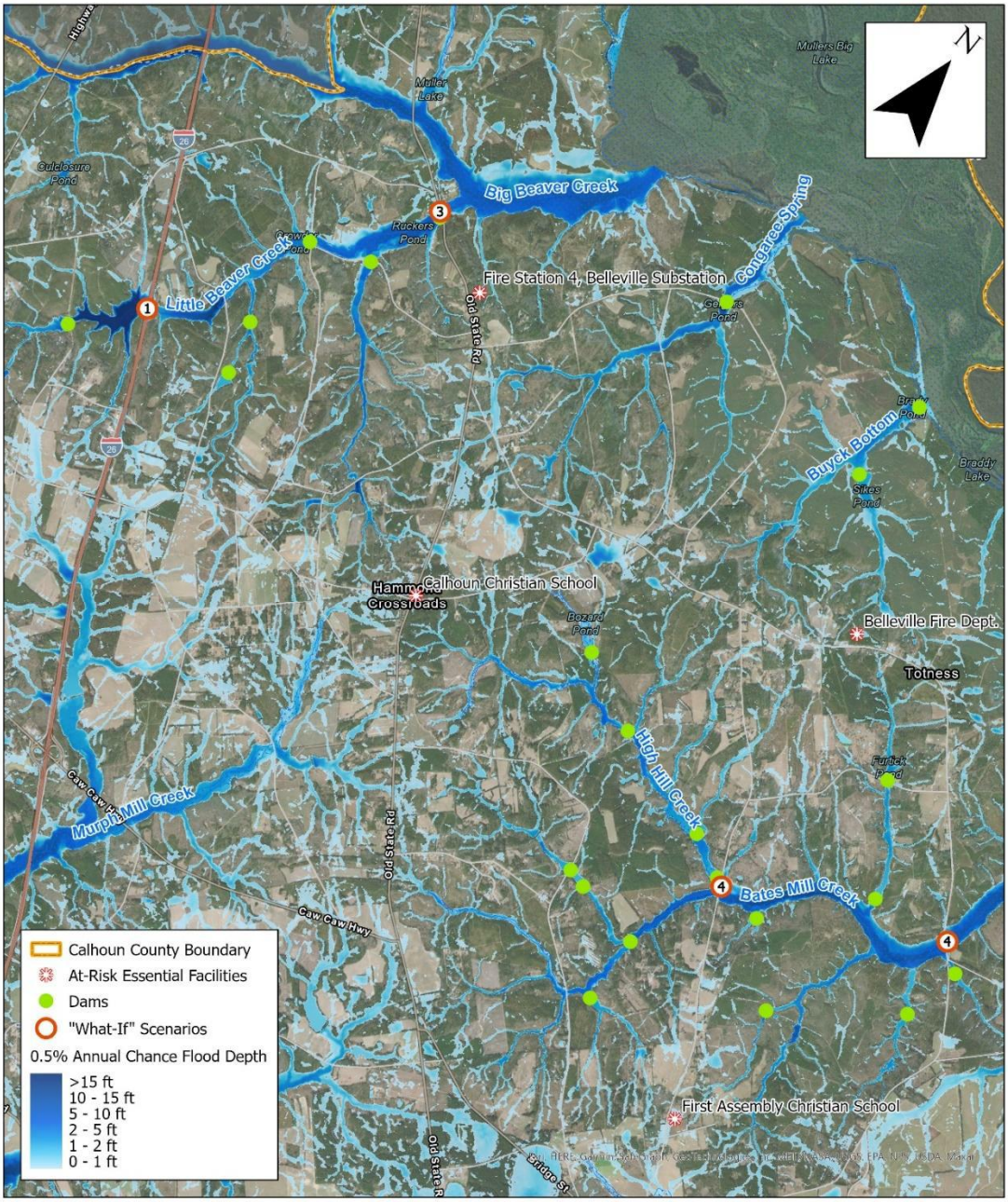


Figure 5: "What-If" Scenarios 1 of 2

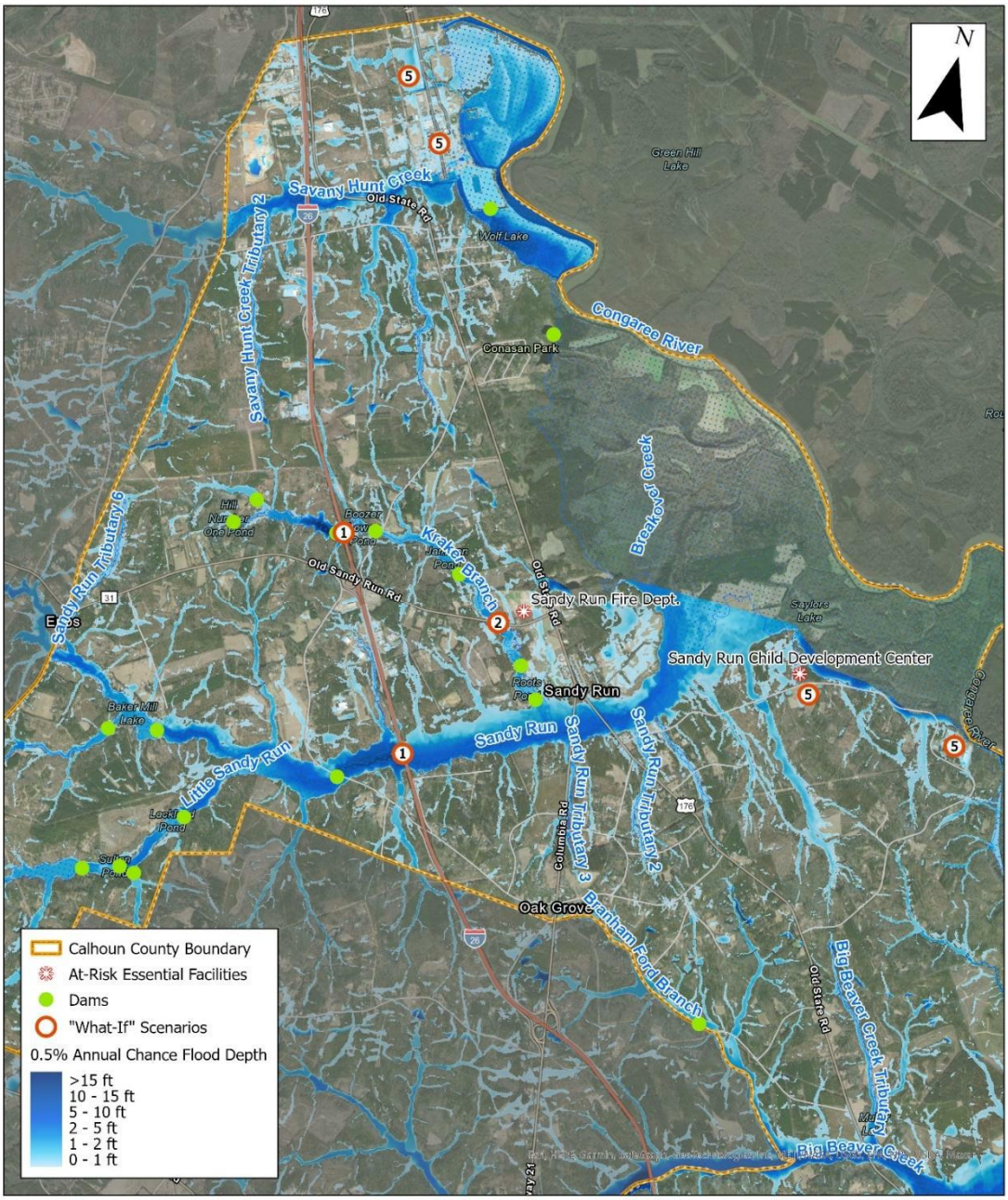
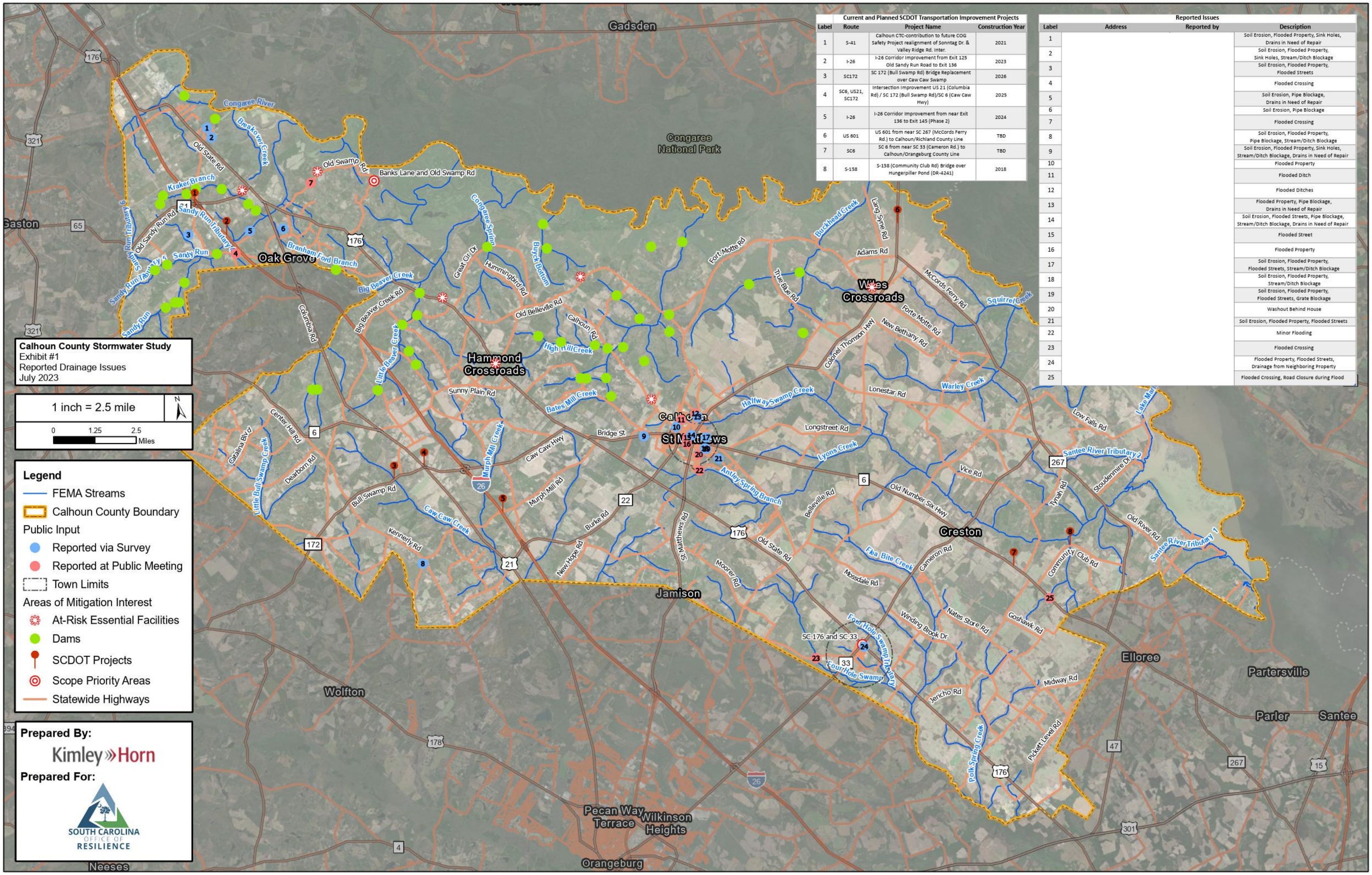


Figure 6: "What-If" Scenarios 2 of 2

APPENDIX A

GENERAL EXHIBITS



Calhoun County Stormwater Study
Exhibit #1
Reported Drainage Issues
July 2023

1 inch = 2.5 mile

0 1.25 2.5 Miles

Legend

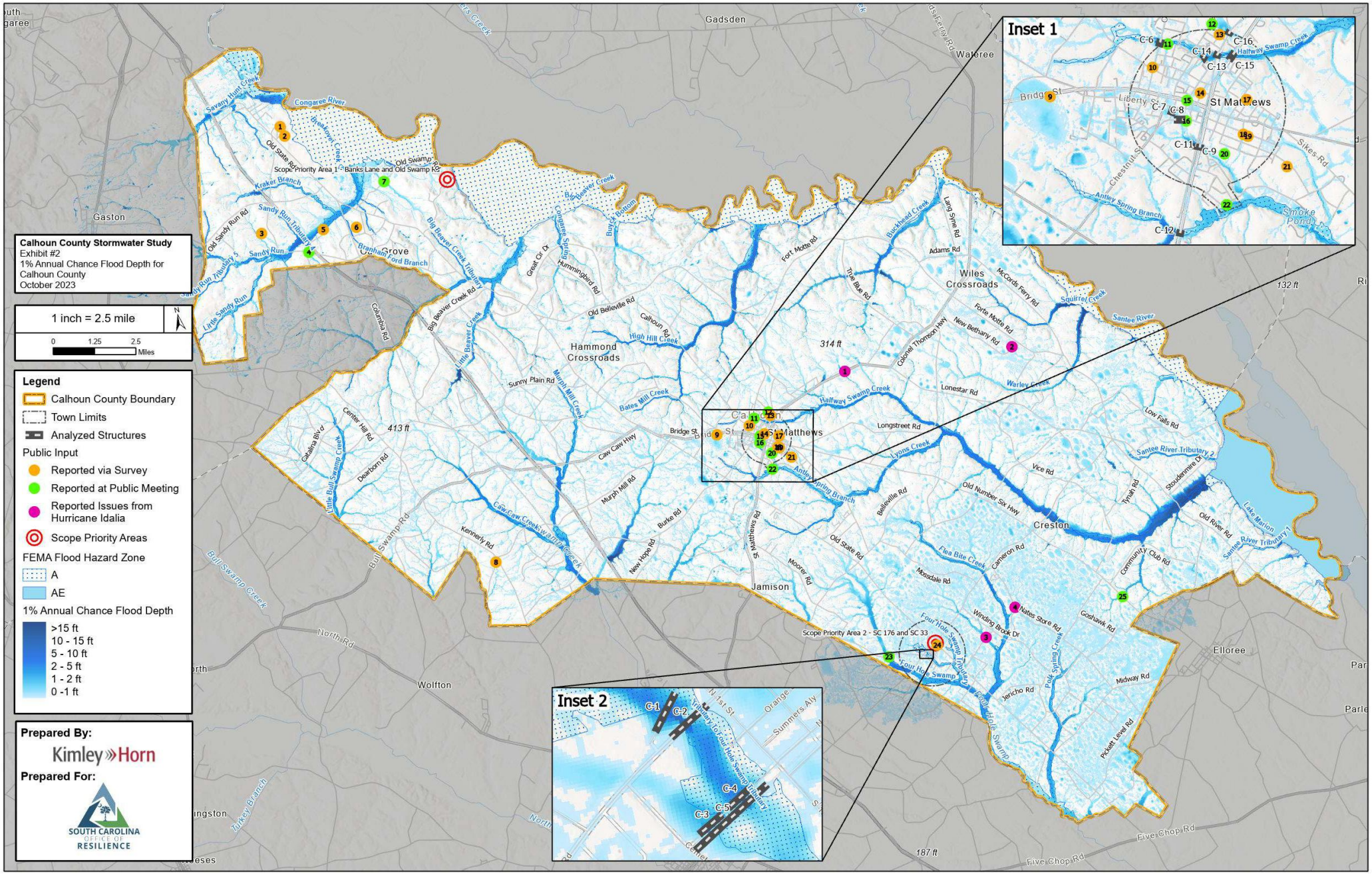
- FEMA Streams
- Calhoun County Boundary
- Public Input
  - Reported via Survey
  - Reported at Public Meeting
- Town Limits
- Areas of Mitigation Interest
  - At-Risk Essential Facilities
  - Dams
- SCDOT Projects
- Scope Priority Areas
- Statewide Highways

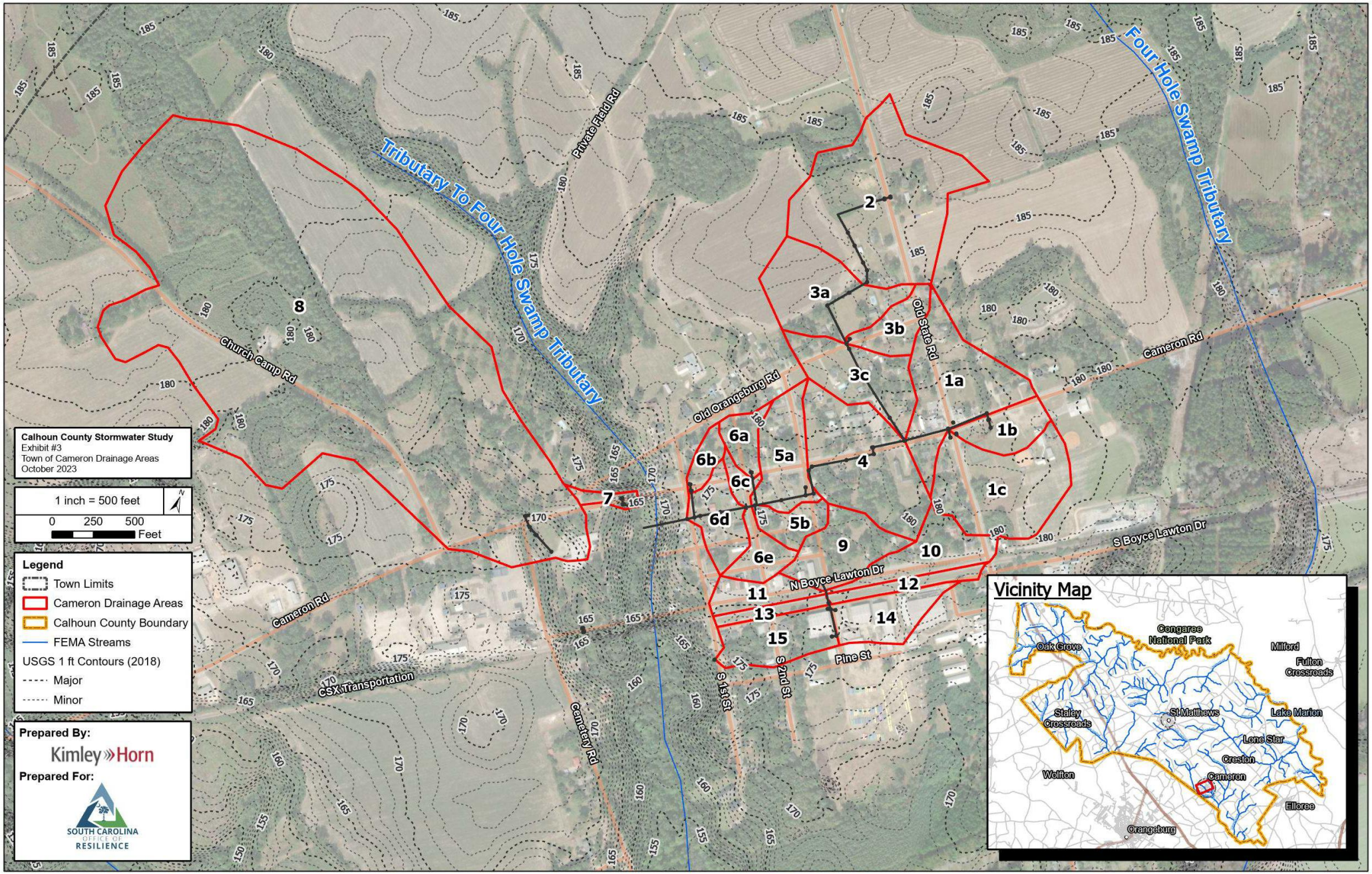
Prepared By:
Kimley»Horn

Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE

	Current and Planned SCDOT Transportation Improvement Projects		
Label	Route	Project Name	Construction Year
1	S-41	Calhoun CTC-contribution to future COG Safety Project realignment of Sonntag Dr. & Valley Ridge Rd. Inter.	2021
2	I-26	I-26 Corridor Improvement from Exit 125 Old Sandy Run Road to Exit 136	2023
3	SC172	SC 172 (Bull Swamp Rd) Bridge Replacement over Caw Caw Swamp	2026
4	SC6, US21, SC172	Intersection Improvement US 21 (Columbia Rd) / SC 172 (Bull Swamp Rd)/SC 6 (Caw Caw Hwy)	2025
5	I-26	I-26 Corridor Improvement from near Exit 136 to Exit 145 (Phase 2)	2024
6	US 601	US 601 from near SC 267 (McCords Ferry Rd.) to Calhoun/Richland County Line	TBD
7	SC6	SC 6 from near SC 33 (Cameron Rd.) to Calhoun/Orangeburg County Line	TBD
8	S-158	S-158 (Community Club Rd) Bridge over Hungerpiller Pond (DR-4241)	2018

Reported Issues			
Label	Address	Reported by	Description
1			Soil Erosion, Flooded Property, Sink Holes, Drains in Need of Repair
2			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage
3			Soil Erosion, Flooded Property, Flooded Streets
4			Flooded Crossing
5			Soil Erosion, Pipe Blockage, Drains in Need of Repair
6			Soil Erosion, Pipe Blockage
7			Flooded Crossing
8			Soil Erosion, Flooded Property, Pipe Blockage, Stream/Ditch Blockage
9			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage, Drains in Need of Repair
10			Flooded Property
11			Flooded Ditch
12			Flooded Ditches
13			Flooded Property, Pipe Blockage, Drains in Need of Repair
14			Soil Erosion, Flooded Streets, Pipe Blockage, Stream/Ditch Blockage, Drains in Need of Repair
15			Flooded Street
16			Flooded Property
17			Soil Erosion, Flooded Property, Flooded Streets, Stream/Ditch Blockage
18			Soil Erosion, Flooded Property, Stream/Ditch Blockage
19			Soil Erosion, Flooded Property, Flooded Streets, Grate Blockage
20			Washout Behind House
21			Soil Erosion, Flooded Property, Flooded Streets
22			Minor Flooding
23			Flooded Crossing
24			Flooded Property, Flooded Streets, Drainage from Neighboring Property
25			Flooded Crossing, Road Closure during Flood


Calhoun County Stormwater Study
Exhibit #2
1% Annual Chance Flood Depth for Calhoun County
October 2023
1 inch = 2.5 mile
0 1.25 2.5 Miles
N
Legend
Calhoun County Boundary
Town Limits
Analyzed Structures
Public Input
Reported via Survey
Reported at Public Meeting
Reported Issues from Hurricane Idalia
Scope Priority Areas
FEMA Flood Hazard Zone
A
AE
1% Annual Chance Flood Depth
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Inset 1
Inset 2
Scope Priority Area 1 - Banks Lane and Old Swamp Rd
Scope Priority Area 2 - SC 176 and SC 33
Gadsden
Wateree
Gaston
Wolfton
Elloree
Jamison
Creston
Wiles Crossroads
Hammond Crossroads
St Matthews
Congaree River
Savannah Hunt Creek
Old Swamp Rd
Kraker Branch
Sandy Run
Sandy Run Tributary 4
Sandy Run Tributary 5
Little Sandy Run
Old Sandy Run Rd
Brannan Ford Branch
Big Beaver Creek
Big Beaver Creek Tributary
Big Beaver Creek Rd
Columbia Rd
Great Cir Dr
Congaree Springs
Hummingbird Rd
Buck's Bottom
Old Belleville Rd
Calhoun Rd
High Hill Creek
Sunny Plain Rd
Murph Mill Creek
Bates Mill Creek
Caw Caw Hwy
Caw Caw Creek Swamp
Kennerly Rd
Center Hill Rd
Catalina Blvd
Little Bull Swamp Creek
Dearborn Rd
Bull Swamp Rd
Bull Swamp Creek
North Rd
Turkey Branch
Burke Rd
New Hope Rd
St Matthews Rd
Bridge St
Liberty St
Chestnut St
Sikes Rd
Antley Spring Branch
Smoke Pond
Halfway Swamp Creek
Fort Motte Rd
Buckhead Creek
Lang Syne Rd
Adams Rd
Tree Blue Rd
McCords Ferry Rd
Squirrel Creek
Santee River
Colonel Thomson Hwy
New Bethany Rd
Forte Motte Rd
Lonestar Rd
Warley Creek
Longstreet Rd
Lyons Creek
Low Falls Rd
Santee River Tributary 2
Stoudenmire Dr
Vice Rd
Tyndall Rd
Old Number Six Hwy
Belleville Rd
Old State Rd
Flea Bite Creek
Cameron Rd
Community Club Rd
Old River Rd
Lake Marion
Santee River Tributary
Moorer Rd
Mossdale Rd
Four Hole Swamp
Four Hole Swamp Tributary
Winding Brook Dr
Nates Store Rd
Goshawk Rd
Jericho Rd
Poof Spring Creek
Midway Rd
Pickett Level Rd
Five Chop Rd
Orange St
Summers Aly
C-1
C-2
C-3
C-4
C-5
C-6
C-7
C-8
C-9
C-11
C-12
C-13
C-14
C-15
C-16
314 ft
413 ft
187 ft
132 ft

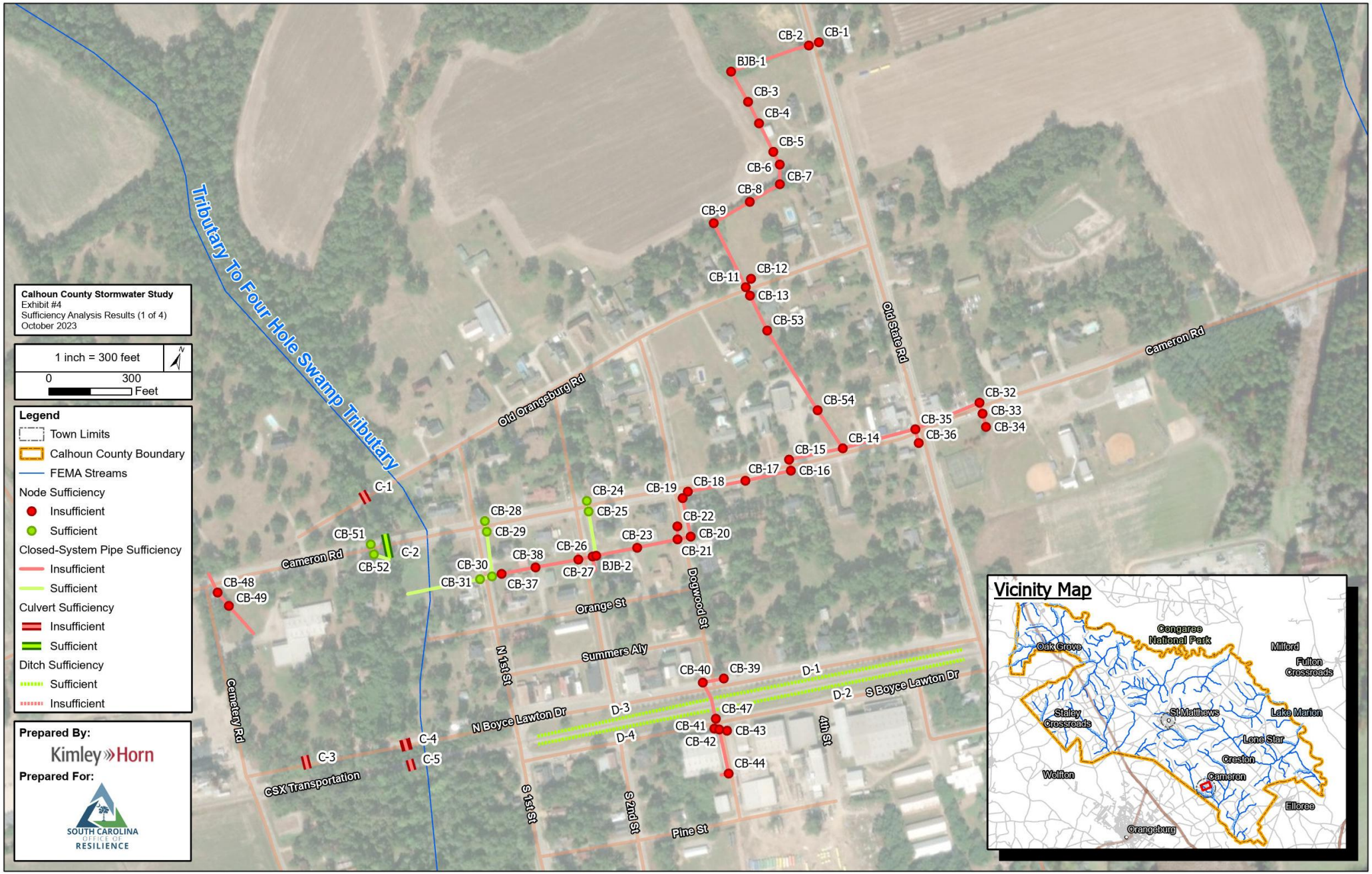

Calhoun County Stormwater Study
Exhibit #3
Town of Cameron Drainage Areas
October 2023
1 inch = 500 feet
0 250 500
Feet
Legend
Town Limits
Cameron Drainage Areas
Calhoun County Boundary
FEMA Streams
USGS 1 ft Contours (2018)
Major
Minor
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Tributary To Four Hole Swamp Tributary
Four Hole Swamp Tributary
Private Field Rd
Church Camp Rd
Old Orangeburg Rd
Old State Rd
Cameron Rd
S Boyce Lawton Dr
N Boyce Lawton Dr
Pine St
S 1st St
S 2nd St
CSX Transportation
Cemetery Rd
1a
1b
1c
2
3a
3b
3c
4
5a
5b
6a
6b
6c
6d
6e
7
8
9
10
11
12
13
14
15
Vicinity Map
Congaree National Park
Oak Grove
Milford
Fulton Crossroads
Sialey Crossroads
St Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree
Orangeburg

APPENDIX B

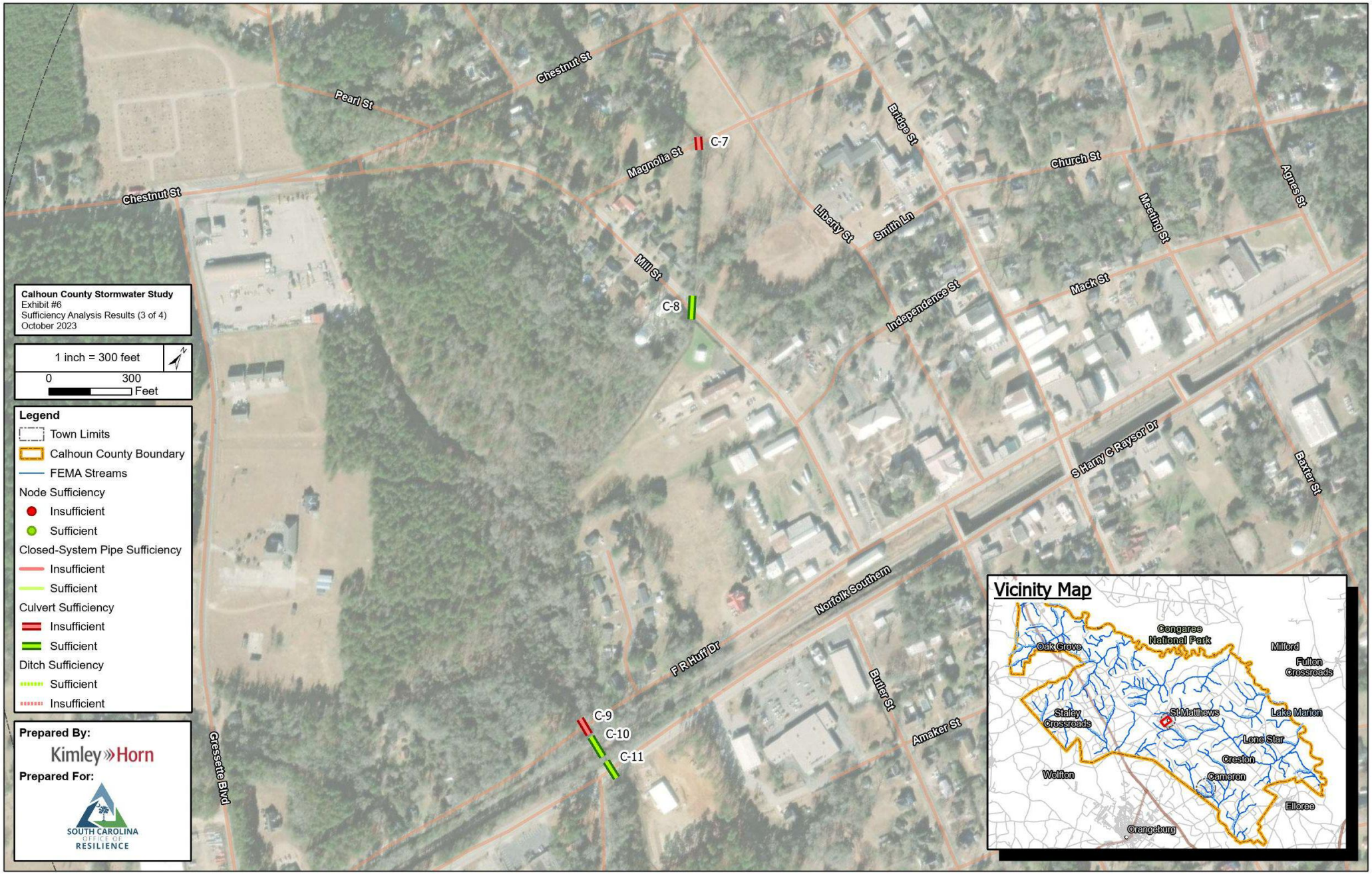
INVENTORY AND SUFFICIENCY RESULTS

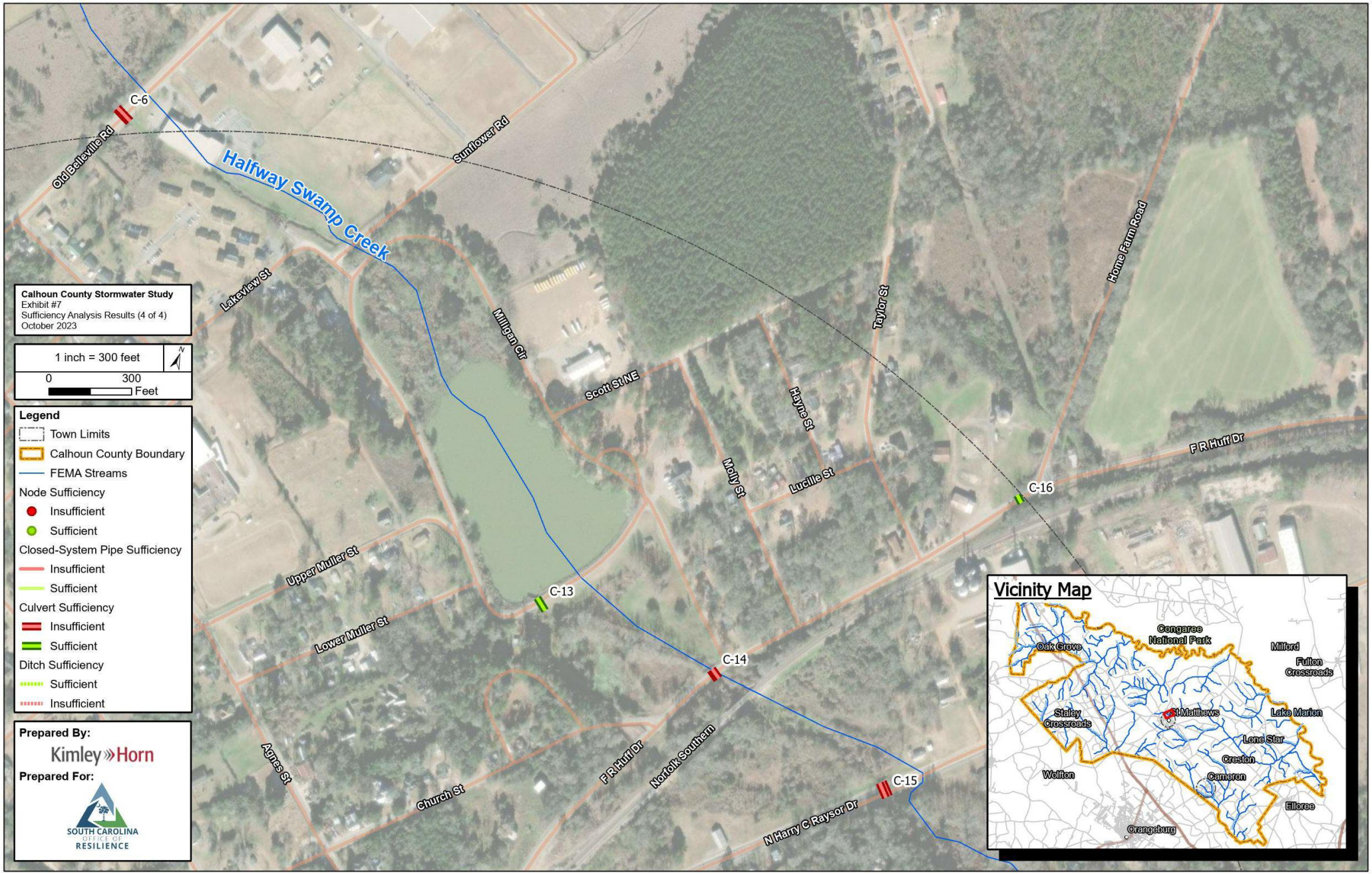
Kimley»Horn

SOUTH CAROLINA OFFICE OF RESILIENCE


Calhoun County Stormwater Study
Exhibit #4
Sufficiency Analysis Results (1 of 4)
October 2023
1 inch = 300 feet
0
300
Feet
Legend
Town Limits
Calhoun County Boundary
FEMA Streams
Node Sufficiency
Insufficient
Sufficient
Closed-System Pipe Sufficiency
Insufficient
Sufficient
Culvert Sufficiency
Insufficient
Sufficient
Ditch Sufficiency
Sufficient
Insufficient
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Tributary To Four Hole Swamp Tributary
Old Orangeburg Rd
Old State Rd
Cameron Rd
Cameron Rd
Orange St
Summers Aly
Dogwood St
N 1st St
S 1st St
S 2nd St
4th St
Cemetery Rd
N Boyce Lawton Dr
S Boyce Lawton Dr
Pine St
CSX Transportation
CB-1
CB-2
BJB-1
CB-3
CB-4
CB-5
CB-6
CB-7
CB-8
CB-9
CB-11
CB-12
CB-13
CB-53
CB-54
CB-14
CB-15
CB-16
CB-17
CB-18
CB-19
CB-20
CB-21
CB-22
CB-23
BJB-2
CB-24
CB-25
CB-26
CB-27
CB-28
CB-29
CB-30
CB-31
CB-37
CB-38
CB-32
CB-33
CB-34
CB-35
CB-36
CB-39
CB-40
CB-41
CB-42
CB-43
CB-44
CB-47
D-1
D-2
D-3
D-4
C-1
C-2
C-3
C-4
C-5
CB-48
CB-49
CB-51
CB-52
Vicinity Map
Congaree National Park
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St Matthews
Lake Marion
Lone Star
Creston
Cameron
Wolfton
Elloree
Orangeburg


Calhoun County Stormwater Study
Exhibit #5
Sufficiency Analysis Results (2 of 4)
October 2023
1 inch = 300 feet
0
300
Feet
Legend
Town Limits
Calhoun County Boundary
FEMA Streams
Node Sufficiency
Insufficient
Sufficient
Closed-System Pipe Sufficiency
Insufficient
Sufficient
Culvert Sufficiency
Insufficient
Sufficient
Ditch Sufficiency
Sufficient
Insufficient
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
C-9
C-10
C-11
C-12
Gressette Blvd
Mitchel Cir
F R Huff Dr
N Rucker Dr
Forest Dr
Brock Dr
S Rucker Dr
Saint Matthews Rd
Norfolk Southern
Antley Spring Branch
Vicinity Map
Congaree National Park
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St Matthews
Lake Marion
Lone Star
Creston
Cameron
Wolfton
Elloree
Orangeburg


Calhoun County Stormwater Study
Exhibit #6
Sufficiency Analysis Results (3 of 4)
October 2023
1 inch = 300 feet
0
300
Feet
Legend
Town Limits
Calhoun County Boundary
FEMA Streams
Node Sufficiency
Insufficient
Sufficient
Closed-System Pipe Sufficiency
Insufficient
Sufficient
Culvert Sufficiency
Insufficient
Sufficient
Ditch Sufficiency
Sufficient
Insufficient
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA
OFFICE OF
RESILIENCE
Chestnut St
Pearl St
Chestnut St
Magnolia St
C-7
Bridge St
Church St
Agnes St
Liberty St
Smith Ln
Meeting St
Mill St
C-8
Mack St
Independence St
S Harry C Raysor Dr
Baxter St
Norfolk Southern
F R Huff Dr
Butler St
Amaker St
C-9
C-10
C-11
Gressette Blvd
Vicinity Map
Congaree
National Park
Oak Grove
Milford
Fulton
Crossroads
Stilley
Crossroads
St Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree
Orangeburg


Calhoun County Stormwater Study
Exhibit #7
Sufficiency Analysis Results (4 of 4)
October 2023
1 inch = 300 feet
0
300
Feet
Legend
Town Limits
Calhoun County Boundary
FEMA Streams
Node Sufficiency
Insufficient
Sufficient
Closed-System Pipe Sufficiency
Insufficient
Sufficient
Culvert Sufficiency
Insufficient
Sufficient
Ditch Sufficiency
Sufficient
Insufficient
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA
OFFICE OF
RESILIENCE
C-6
C-13
C-14
C-15
C-16
Halfway Swamp Creek
Old Belleville Rd
Sunflower Rd
Lakeview St
Milligan Cir
Scott St NE
Hayne St
Molly St
Lucille St
Taylor St
Home Farm Road
F R Huff Dr
Upper Muller St
Lower Muller St
Agnes St
Church St
F R Huff Dr
Norfolk Southern
N Harry C Raysor Dr
Vicinity Map
Congaree
National Park
Oak Grove
Milford
Fulton
Crossroads
Sialey
Crossroads
St Matthews
Lake Marion
Lone Star
Creston
Cameron
Elloree
Wolfton
Orangeburg

INVENTORY TABLES

Table 1: Inventory of Existing Nodes

NAME	TYPE	SIZE	SOURCE	SURVEY BOX NO.	INVERT ELEVATION (FT)	RIM/GROUND ELEVATION (FT)	DEPTH	KNOWN ISSUES	ISSUES SOURCE	NOTES
BJB-1	Blind Junction Box	3' x 3' Box (Assumed)	Survey	1002.0	179.6	182.6	3.0	Not found in survey	Survey	Inverts assumed using constant slope
BJB-2	Blind Junction Box	6' Diameter Circle (Assumed)	Survey	--	168.6	174.9	6.3	Assumed location	Survey	Lid elev. assumed from CB-23 and CB-26 lid slope, NE invert assumed from pipe slope , SW invert assumed constant through box
CB-1	Catch Basin	3'x2.5' Box	Survey	1000.0	180.8	183.5	2.7	--	--	
CB-2	Catch Basin	3'x2.5' Box	Survey	1001.0	180.5	183.5	3.0	--	--	
CB-3	Catch Basin	3'x3' Box	Survey	1003.0	179.4	182.7	3.3	--	--	
CB-4	Catch Basin	3'x3' Box	Survey	1004.0	178.9	182.7	3.8	--	--	
CB-5	Catch Basin	3'x3' Box	Survey	1005.0	178.7	182.5	3.8	--	--	
CB-6	Catch Basin	3'x3.3' Box	Survey	1006.0	178.6	182.5	3.8	SE RCP recessed	Survey	Inverts assumed based on slope from lids
CB-7	Catch Basin	3'x3' Box	Survey	1007.0	177.9	181.7	3.8	SW RCP recessed	Survey	Inverts assumed based on slope from lids
CB-8	Catch Basin	3'x3' Box	Survey	1008.0	177.4	180.8	3.5	SW RCP recessed	Survey	Inverts assumed based on slope from lids
CB-9	Catch Basin	4'x3.4' Box	Survey	1009.0	177.4	180.8	3.5	SE RCP recessed	Survey	Inverts assumed based on slope from lids
CB-11	Catch Basin	4'x3.4' Box	Survey	1010.0	175.9	180.0	4.1	--	--	
CB-12	Catch Basin	3'x2' Box	Survey	1011.0	178.1	179.4	1.3	Unable to obtain inverts	Survey	Invert assumed from lid elev. - pipe diameter
CB-13	Catch Basin	5'x5' Box	Survey	1012.0	175.8	179.8	4.1	Unable to obtain inverts	Survey	Invert assumed using constant slope from lid elevation
CB-14	Catch Basin	3'x2.5' Box	Survey	1022.0	173.6	176.7	3.1	Rocks blocking inverts	Survey	NE invert assumed using constant slope from CB-14 and lids, NW invert assumed same as NE
CB-15	Catch Basin	3'x2.5' Box	Survey	1023.0	173.2	176.3	3.1	--	--	
CB-16	Catch Basin	4'x4' Box	Survey	1024.0	172.4	177.4	5.0	Pipes recessed	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-17	Catch Basin	4'x4' Box	Survey	1025.0	172.1	177.9	5.8	Unable to obtain inverts	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-18	Catch Basin	6' Diameter Circle	Survey	1026.0	171.4	178.2	6.8	Unable to obtain inverts	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-19	Catch Basin	6' Diameter Circle	Survey	1027.0	171.4	178.3	6.9	Unable to obtain inverts	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-20	Catch Basin	6'x6' Box	Survey	1030.0	170.4	178.9	8.4	Pipes recessed	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-21	Catch Basin	6' Diameter Circle	Survey	1031.0	170.1	178.5	8.4	Unable to obtain NW invert	Survey	Invert assumed to be bottom of box
CB-22	Catch Basin	2'x2' Box	Survey	1032.0	172.3	178.0	5.7	--	--	
CB-23	Catch Basin	6' Diameter Circle	Survey	1033.0	168.6	177.7	9.1	--	--	
CB-24	Catch Basin	3'x2.5' Box	Survey	1034.0	173.1	176.2	3.1	Filled with water, unable to obtain inverts	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-25	Catch Basin	3'x2.5' Box	Survey	1035.0	172.9	176.1	3.3	Filled with water, unable to obtain inverts	Survey	Inverts assumed to be bottom of box in order to maintain decreasing inverts going DS
CB-26	Catch Basin	6' Diameter Circle	Survey	1036.0	167.5	174.7	7.3	--	--	
CB-27	Catch Basin	6' Diameter Circle	Survey	1037.0	166.6	174.5	7.9	--	--	
CB-28	Catch Basin	3'x2.5' Box	Survey	1040.0	171.7	175.0	3.3	--	--	
CB-29	Catch Basin	3'x2.5' Box	Survey	1041.0	171.3	174.9	3.6	--	--	
CB-30	Catch Basin	6' Diameter Circle	Survey	1042.0	163.6	176.3	12.7	--	--	
CB-31	Catch Basin	6' Diameter Circle	Survey	1043.0	163.1	175.9	12.8	--	--	
CB-32	Catch Basin	3.8'x5.7' Box	Survey	1015.0	175.8	179.2	3.4	Filled with debris, unable to obtain inverts	Survey	Invert assumed using constant slope from CB-32 and CB-35 lid elevation
CB-33	Catch Basin	3'x2.5' Box	Survey	1016.0	175.9	178.7	2.9	Filled with debris, unable to obtain inverts	Survey	Invert assumed to be bottom of box
CB-34	Catch Basin	2'x2' Box	Survey	1017.0	175.7	178.0	2.3	--	--	
CB-35	Catch Basin	3'x2.5' Box	Survey	1019.0	175.1	178.1	2.9	Unable to obtain NE invert	Survey	Invert assumed using constant slope from surrounding lid elevation
CB-36	Catch Basin	3'x2' Box	Survey	1020.0	175.4	177.6	2.1	--	--	
CB-37	Catch Basin	6' Diameter Circle	Survey	1038.0	163.8	175.7	11.9	--	--	
CB-38	Catch Basin	6' Diameter Circle	Survey	1039.0	164.8	172.6	7.8	--	--	
CB-39	Catch Basin	3'x2.5' Box	Survey	1061.0	172.5	174.8	2.3	--	--	
CB-40	Catch Basin	3'x2.5' Box	Survey	1060.0	172.2	174.7	2.5	--	--	
CB-41	Catch Basin	2.5'x2' Box	Survey	1058.0	171.3	173.6	2.3	--	--	
CB-42	Catch Basin	3.5'x3' Box	Survey	1057.0	170.3	174.1	3.8	--	--	
CB-43	Catch Basin	3'x2' Box	Survey	1056.0	171.3	173.9	2.5	--	--	
CB-44	Catch Basin	3'x2' Box	Survey	1055.0	168.5	173.9	5.4	--	--	
CB-47	Catch Basin	2.5'x3' Box	Survey	1059.0	171.7	174.3	2.6	--	--	
CB-48	Catch Basin	3'x2.5' Box	Survey	1046.0	165.5	170.2	4.7	--	--	
CB-49	Catch Basin	3'x2' Box	Survey	1047.0	165.1	168.4	3.3	--	--	
CB-50	Catch Basin	3'x2' Box	Survey	1048.0	163.8	167.5	3.7	--	--	
CB-51	Catch Basin	3'x2.5' Box	Survey	1044.0	170.3	173.3	3.0	--	--	
CB-52	Catch Basin	3'x2.5' Box	Survey	1045.0	168.4	173.0	4.5	--	--	
CB-53	Catch Basin	3.2'x3.35' Box	Survey	1013.0	175.3	180.4	5.1	Unable to obtain inverts	Survey	
CB-54	Catch Basin	3'x3' Box	Survey	1014.0	174.3	179.4	5.1	Unable to obtain inverts	Survey	
OEP-1	Open-Ended Pipe	12"	Survey	--	172.6	173.6	1.0	--	--	
OEP-2	Open-Ended Pipe	15"	Survey	--	171.0	172.3	1.3	--	--	
OEP-3	Open-Ended Pipe	15"	Survey	--	172.7	174.0	1.3	--	--	
OEP-4	Open-Ended Pipe	24"	Survey	--	165.7	167.7	2.0	--	--	
OEP-5	Open-Ended Pipe	15"	Survey	--	165.9	167.1	1.3	--	--	
OEP-6	Open-Ended Pipe	48"	Survey	--	160.5	164.5	4.0	--	--	
T-1	Transition	24"	--	--	171.5	173.5	2.0	--	--	
T-2	Transition	24"	--	--	171.7	173.7	2.0	--	--	

Table 2: Inventory of Existing Closed-System Pipes

NAME	SOURCE	PIPE SHAPE	DIAMETER (IN)	RISE (IN)	SPAN (FT)	MATERIAL	US INVERT (FT)	DS INVERT (FT)	LENGTH (FT)	ISSUES DESCRIPTION	ISSUES SOURCE	NOTES
P-1	Survey	Circle	24.0	--	--	RCP	180.8	180.6	37.8	--	--	
P-2	Survey	Circle	24.0	--	--	RCP	180.5	179.6	296.8	--	--	
P-3	Survey	Circle	24.0	--	--	RCP	179.6	179.4	126.3	--	--	
P-4	Survey	Circle	24.0	--	--	RCP	179.4	179.2	87.6	--	--	
P-5	Survey	Circle	24.0	--	--	RCP	178.9	178.7	115.8	--	--	
P-6	Survey	Circle	24.0	--	--	RCP	178.7	178.9	51.3	--	--	
P-7	Survey	Circle	24.0	--	--	RCP	178.6	178.1	71.6	--	--	
P-8	Survey	Circle	24.0	--	--	RCP	177.9	177.8	126.6	--	--	
P-9	Survey	Circle	24.0	--	--	RCP	177.4	177.4	151.9	--	--	
P-10	Survey	Circle	24.0	--	--	RCP	177.4	176.1	260.2	--	--	
P-11	Survey	Circle	15.0	--	--	RCP	178.1	176.9	36.1	--	--	
P-12	Survey	Ellipse	--	1.5	2.7	RCP	175.9	175.8	33.9	--	--	
P-13	Survey	Circle	15.0	--	--	RCP	176.0	175.3	141.6	--	--	Assumed to be 15" from downstream system
P-14	Survey	Circle	15.0	--	--	RCP	175.3	174.3	342	--	--	Assumed to be 15" from surrounding system, invert assumed to be same as downstream box
P-15	Survey	Circle	15.0	--	--	RCP	174.3	173.7	165.6	--	--	invert assumed to be same as downstream box
P-16	Survey	Circle	15.0	--	--	RCP	175.7	175.9	49.3	--	--	
P-17	Survey	Circle	15.0	--	--	RCP	175.9	175.8	41.3	--	--	
P-18	Survey	Circle	24.0	--	--	RCP	175.8	175.3	251.8	--	--	
P-19	Survey	Circle	15.0	--	--	RCP	175.1	173.6	272.3	--	--	
P-20	Survey	Circle	18.0	--	--	RCP	175.4	175.1	52.1	--	--	
P-21	Survey	Circle	24.0	--	--	RCP	173.6	173.2	199.2	--	--	
P-22	Survey	Circle	24.0	--	--	RCP	173.1	172.4	40.7	--	--	
P-23	Survey	Circle	36.0	--	--	RCP	172.4	172.1	169.9	Collapsed pipe	Survey	
P-24	Survey	Circle	36.0	--	--	RCP	172.1	171.4	212.7	--	--	
P-25	Survey	Circle	48.0	--	--	RCP	171.4	171.4	30.1	--	--	
P-26	Survey	Circle	48.0	--	--	RCP	171.4	170.4	142.8	--	--	
P-27	Survey	Circle	48.0	--	--	RCP	170.4	170.2	49.2	--	--	
P-28	Survey	Circle	48.0	--	--	RCP	170.1	168.7	149.6	--	--	
P-29	Survey	Circle	48.0	--	--	RCP	167.5	166.8	53.2	--	--	
P-30	Survey	Circle	18.0	--	--	RCP	173.1	172.9	37.9	Unable to obtain pipe size	Survey	Assumed to be 18" from surrounding system
P-31	Survey	Circle	48.0	--	--	RCP	168.6	168.6	151.5	--	--	
P-32	Survey	Circle	48.0	--	--	RCP	168.6	167.5	13.1	--	--	
P-33	Survey	Circle	18.0	--	--	RCP	172.9	171.6	163.5	Unable to obtain pipe size	Survey	Assumed to be 18" from surrounding system
P-34	Survey	Circle	15.0	--	--	RCP	172.3	170.3	47.5	--	--	
P-35	Survey	Circle	48.0	--	--	RCP	163.8	163.8	35.8	--	--	
P-36	Survey	Circle	48.0	--	--	RCP	163.6	163.1	45.4	--	--	
P-37	Survey	Circle	48.0	--	--	RCP	163.1	160.5	267.9	--	--	
P-38	Survey	Circle	18.0	--	--	RCP	171.7	171.4	38.2	--	--	
P-39	Survey	Circle	18.0	--	--	RCP	171.3	169.6	164	--	--	
P-40	Survey	Circle	48.0	--	--	RCP	166.6	164.8	158	--	--	
P-41	Survey	Circle	48.0	--	--	RCP	164.8	164.2	124.7	--	--	
P-42	Survey	Circle	15.0	--	--	RCP	172.5	172.3	76.6	--	--	
P-43	Survey	Circle	15.0	--	--	RCP	172.2	171.7	62.2	--	--	
P-44	Survey	Circle	24.0	--	--	RCP	171.7	171.5	38.6	--	--	
P-45	Survey	Circle	24.0	--	--	RCP	171.5	171.6	33.4	--	--	
P-46	Survey	Circle	24.0	--	--	RCP	171.7	171.5	40.3	--	--	
P-47	Survey	Circle	24.0	--	--	RCP	170.3	168.6	163.1	--	--	
P-48	Survey	Circle	30.0	--	--	RCP	168.5	168.3	27.4	--	--	
P-49	Survey	Circle	18.0	--	--	RCP	171.3	171.2	18.1	--	--	

NAME	SOURCE	PIPE SHAPE	DIAMETER (IN)	RISE (IN)	SPAN (FT)	MATERIAL	US INVERT (FT)	DS INVERT (FT)	LENGTH (FT)	ISSUES DESCRIPTION	ISSUES SOURCE	NOTES
P-50	Survey	Circle	18.0	--	--	RCP	171.3	171.2	28.8	--	--	
P-51	Survey	Circle	15.0	--	--	RCP	172.6	169.2	18.8	--	--	
P-52	Survey	Circle	15.0	--	--	RCP	171.0	169.2	10.4	--	--	
P-53	Survey	Circle	15.0	--	--	RCP	172.7	170.2	50.4	--	--	
P-54	Survey	Circle	24.0	--	--	RCP	165.7	165.5	58.2	--	--	
P-55	Survey	Circle	24.0	--	--	RCP	165.5	165.1	63.1	--	--	
P-56	Survey	Circle	24.0	--	--	CMP	165.1	163.8	134.8	--	--	
P-57	Survey	Circle	12.0	--	--	RCP	170.3	169.9	38.1	--	--	
P-58	Survey	Circle	15.0	--	--	RCP	168.4	165.9	58.5	--	--	

Table 3: Inventory of Existing Culverts

NAME	DESCRIPTION	BARREL NO.	SOURCE	DIAMETER (IN)	DIAMETER (FT)	RISE (FT)	SPAN (FT)	LENGTH (FT)	UPSTREAM INVERT (FT)	DOWNSTREAM INVERT (FT)	SLOPE (FT/FT)	APPROX. % BLOCKED	NOTES
C-1	Old Orangeburg Rd over Tributary to Four Hole Creek Tributary	1	Survey	66	5.5	--	--	46.4	160.00	159.58	0.009	15%	
C-2	Cameron Rd over over Tributary to Four Hole Creek Tributary	1	Survey	--	--	8.0	8.0	91.5	160.09	159.91	0.002	0%	DS invert higher than US, assumed slope based off of top of culvert elevations
C-3	State Rd S-9-8 over Tributary to Tributary to Four Hole Creek Tributary	1	Survey	24	2.0	--	--	49.6	161.78	161.28	0.010	80%	
C-4	State Rd S-9-8 over Tributary to Four Hole Creek Tributary	1	Survey	42	3.5	--	--	43.1	156.26	155.54	0.017	50%	
		2	Survey	36	3.0	--	--	41.1	156.16	155.47	0.017	50%	DS invert higher than US, assumed slope based off Culvert #1
		3	Survey	36	3.0	--	--	42.3	155.27	154.56	0.017	70%	DS invert higher than US, assumed slope based off Culvert #1
C-5	Railroad crossing over Tributary to Four Hole Creek Tributary	1	Survey	--	--	4.0	5.0	50.0	156.16	156.16	0.000	50%	Length assumed from topo and aerial imagery, assumed constant slope
C-6	Old Belleville Rd	1	Survey	36	3.0	--	--	66.9	243.22	242.15	0.016	0%	
		2	Survey	36	3.0	--	--	65.1	243.02	241.19	0.028	0%	
C-7	Magnolia St	1	Survey	54	4.5	--	--	47.9	269.30	268.87	0.009	0%	
C-8	Mill St	1	Survey	54	4.5	--	--	89.9	267.09	267.09	0.000	0%	DS invert higher than US, assumed constant slope
C-9	F R Huff Dr	1	Survey	54	4.5	--	--	65.3	243.89	242.66	0.019	0%	
C-10	Railroad between F R Huff Rd and Harry C Raysor Dr	1	Survey	90	7.5	--	--	85.5	242.79	241.39	0.016	0%	
C-11	Harry C Raysor Dr	1	Survey	--	--	9.0	8.0	72.2	240.90	240.47	0.006	0%	
C-12	Saint Matthews Rd/Harry C Raysor Dr over Antley Spring Branch	1	Survey	--	--	8	10.5	74.8	216.38	215.8	0.008	20%	
		2	Survey	--	--	8	10.5	74.8	216.38	215.8	0.008	0%	
C-13	Milligan Circle	1	Survey	--	--	6.0	14.0	54.5	222.92	222.00	0.017	0%	
C-14	F R Huff Dr at Capital Tax Project Park	1	Survey	--	--	5	6.5	40.8	212.21	211.63	0.014	0%	
		2	Survey	--	--	5	6.5	40.8	212.21	211.63	0.014	0%	
C-15	Harry C Raysor Dr near Bin Site Rd	1	Survey	--	--	8.5	10.5	56.0	206.25	206.10	0.003	20%	
		2	Survey	--	--	8.5	10.5	56.0	206.25	206.10	0.003	0%	
C-16	F R Huff Dr near Home Farm Rd	1	Survey	--	--	7.5	8.0	33.7	236.23	236.23	0.000	0%	DS invert higher than US, assumed constant slope

Table 4: Inventory of Existing Ditches

NAME	SOURCE	DESCRIPTION	LENGTH (FT)
D-1	Survey	Boyce Lawton Dr and Old State Rd (North)	917
D-2	Survey	Boyce Lawton Dr and Old State Rd (South)	919
D-3	Survey	Boyce Lawton Dr and 1st St (North)	635
D-4	Survey	Boyce Lawton Dr and 1st St (South)	633

SUFFICIENCY TABLES

Table 5: Sufficiency of Existing Nodes

NAME	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
BJB-1	N	Surcharges in 10-year	N	Surcharges in 10-year
BJB-2	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-1	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-2	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-3	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-4	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-5	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-6	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-7	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-8	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-9	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-11	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-12	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-13	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-14	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-15	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-16	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-17	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-18	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-19	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-20	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-21	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-22	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-23	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-24	Y	Passing	N	Surcharges in 10-year
CB-25	Y	Passing	N	Surcharges in 10-year
CB-26	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-27	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-28	Y	Passing	Y	Passing
CB-29	Y	Passing	Y	Passing

NAME	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
CB-30	Y	Passing	N	Surcharges in 25-year
CB-31	Y	Passing	N	Surcharges in 25-year
CB-32	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-33	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-34	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-35	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-36	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-37	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-38	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-39	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-40	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-41	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-42	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-43	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-44	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-47	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-48	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-49	N	Surcharges in 25-year	N	Surcharges in 25-year
CB-51	Y	Passing	Y	Passing
CB-52	Y	Passing	Y	Passing
CB-53	N	Surcharges in 10-year	N	Surcharges in 10-year
CB-54	N	Surcharges in 10-year	N	Surcharges in 10-year

Table 6: Sufficiency of Existing Closed-System Pipes

NAME	UPSTREAM NODE	DOWNSTREAM NODE	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
P-1	CB-1	CB-2	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-2	CB-2	BJB-1	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-3	BJB-1	CB-3	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-4	CB-3	CB-4	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-5	CB-4	CB-5	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-6	CB-5	CB-6	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-7	CB-6	CB-7	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-8	CB-7	CB-8	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-9	CB-8	CB-9	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-10	CB-9	CB-11	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-11	CB-12	CB-11	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-12	CB-11	CB-13	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-13	CB-13	CB-53	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-14	CB-53	CB-54	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-15	CB-54	CB-14	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-16	CB-34	CB-33	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-17	CB-33	CB-32	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-18	CB-32	CB-35	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-19	CB-35	CB-14	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-20	CB-36	CB-35	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-21	CB-14	CB-15	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-22	CB-15	CB-16	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-23	CB-16	CB-17	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-24	CB-17	CB-18	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-25	CB-18	CB-19	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-26	CB-19	CB-20	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-27	CB-20	CB-21	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-28	CB-21	CB-23	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-29	CB-26	CB-27	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-30	CB-24	CB-25	Y	Passing 10-year	N	Both nodes surcharge in 10-year
P-31	CB-23	BJB-2	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-32	BJB-2	CB-26	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-33	CB-25	BJB-2	Y	Passing 10-year	N	Both nodes surcharge in 10-year
P-34	CB-22	CB-21	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-35	CB-37	CB-30	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-36	CB-30	CB-31	Y	Passing 25-year	N	Both nodes surcharge in 25-year
P-37	CB-31	OEP-8	Y	Passing 25-year	N	Both nodes surcharge in 25-year
P-38	CB-28	CB-29	Y	Passing 10-year	Y	Passing 10-year
P-39	CB-29	CB-30	Y	Passing 10-year	Y	Passing 10-year
P-40	CB-27	CB-38	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-41	CB-38	CB-37	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-42	CB-39	CB-40	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-43	CB-40	T-2	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-44	T-2	T-1	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-45	T-1	CB-47	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-46	CB-47	CB-42	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-47	CB-42	CB-44	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year

NAME	UPSTREAM NODE	DOWNSTREAM NODE	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
P-48	CB-44	CB-45	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-49	CB-41	CB-42	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-50	CB-43	CB-42	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-51	OEP-1	CB-27	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-52	OEP-2	CB-27	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-53	OEP-3	CB-26	N	Both nodes surcharge in 10-year	N	Both nodes surcharge in 10-year
P-54	OEP-6	CB-48	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-55	CB-48	CB-49	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-56	CB-49	CB-50	N	Both nodes surcharge in 25-year	N	Both nodes surcharge in 25-year
P-57	CB-51	CB-52	Y	Passing 10-year	Y	Passing 10-year
P-58	CB-52	OEP-5	Y	Passing 10-year	Y	Passing 10-year

Table 7: Sufficiency of Existing Ditches

NAME	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
D-1	Y	0.28' of freeboard to top of ditch in 10-year	Y	0.19' of freeboard to top of ditch in 10-year
D-2	Y	0.43' of freeboard to top of ditch in 10-year	Y	0.38' of freeboard to top of ditch in 10-year
D-3	Y	0.35' of freeboard to top of ditch in 10-year	Y	0.27' of freeboard to top of ditch in 10-year
D-4	Y	0.07' of freeboard to top of ditch in 10-year	N	Ditch overtops

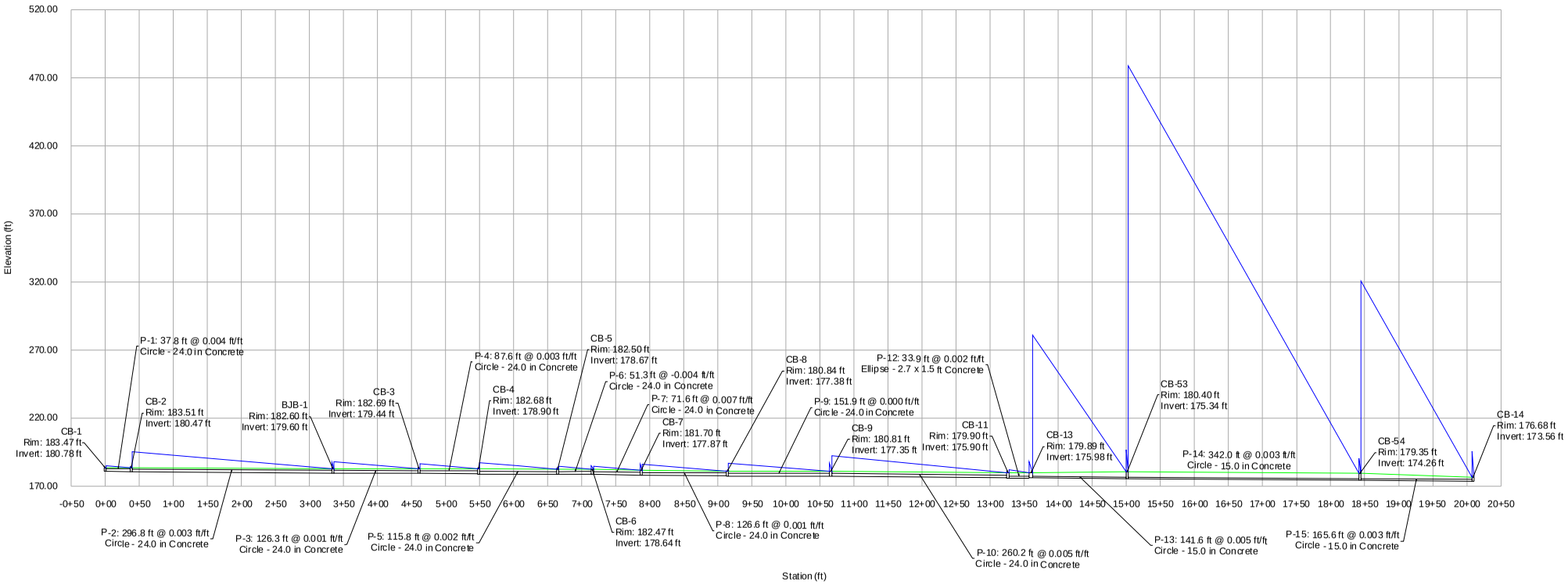
Table 8: Sufficiency of Existing Culvert Crossings

NAME	EXISTING SUFFICIENCY (Y/N)	EXISTING SUFFICIENCY NOTE	FUTURE SUFFICIENCY (Y/N)	FUTURE SUFFICIENCY NOTE
C-1	N	Crossing overtops by 2.4' in 25-year	N	Crossing overtops by 3.9' in 25-year
C-2	Y	1.7' of freeboard to road in 25-year	N	Insufficient freeboard in 25-year
C-3	N	Crossing overtops by 3.4' in 25-year	N	Crossing overtops by 3.5' in 25-year
C-4	N	Crossing overtops by 5.9' in 25-year	N	Crossing overtops by 6.2' in 25-year
C-5	N	Crossing overtops by 1' in 25-year	N	Crossing overtops by 1.1' in 25-year
C-6	N	Crossing overtops by 1.1' in 25-year	N	Crossing overtops by 1.5' in 25-year
C-7	N	Crossing overtops by 0.6' in 25-year	N	Crossing overtops by 0.8' in 25-year
C-8	Y	1.9' of freeboard to road in 25-year	N	Crossing overtops by 0.7' in 25-year
C-9	N	Crossing overtops by 1.1' in 25-year	N	Crossing overtops by 1.9' in 25-year
C-10	Y	3.4' of freeboard to road in 25-year	Y	1.7' of freeboard to road in 25-year
C-11	Y	3.7' of freeboard to road in 25-year	N	Insufficient freeboard in 25-year
C-12	Y	6.4' of freeboard to road in 25-year	Y	3.2' of freeboard to road in 25-year
C-13	Y	2.6' of freeboard to road in 25-year	Y	2.3' of freeboard to road in 25-year
C-14	N	Crossing overtops by 2.2' in 25-year	N	Crossing overtops by 2.7' in 25-year
C-15	N	Crossing overtops by 0.6' in 25-year	N	Crossing overtops by 1.3' in 25-year
C-16	Y	3.2' of freeboard to road in 25-year	Y	2.1' of freeboard to road in 25-year

HY-8 OUTPUT

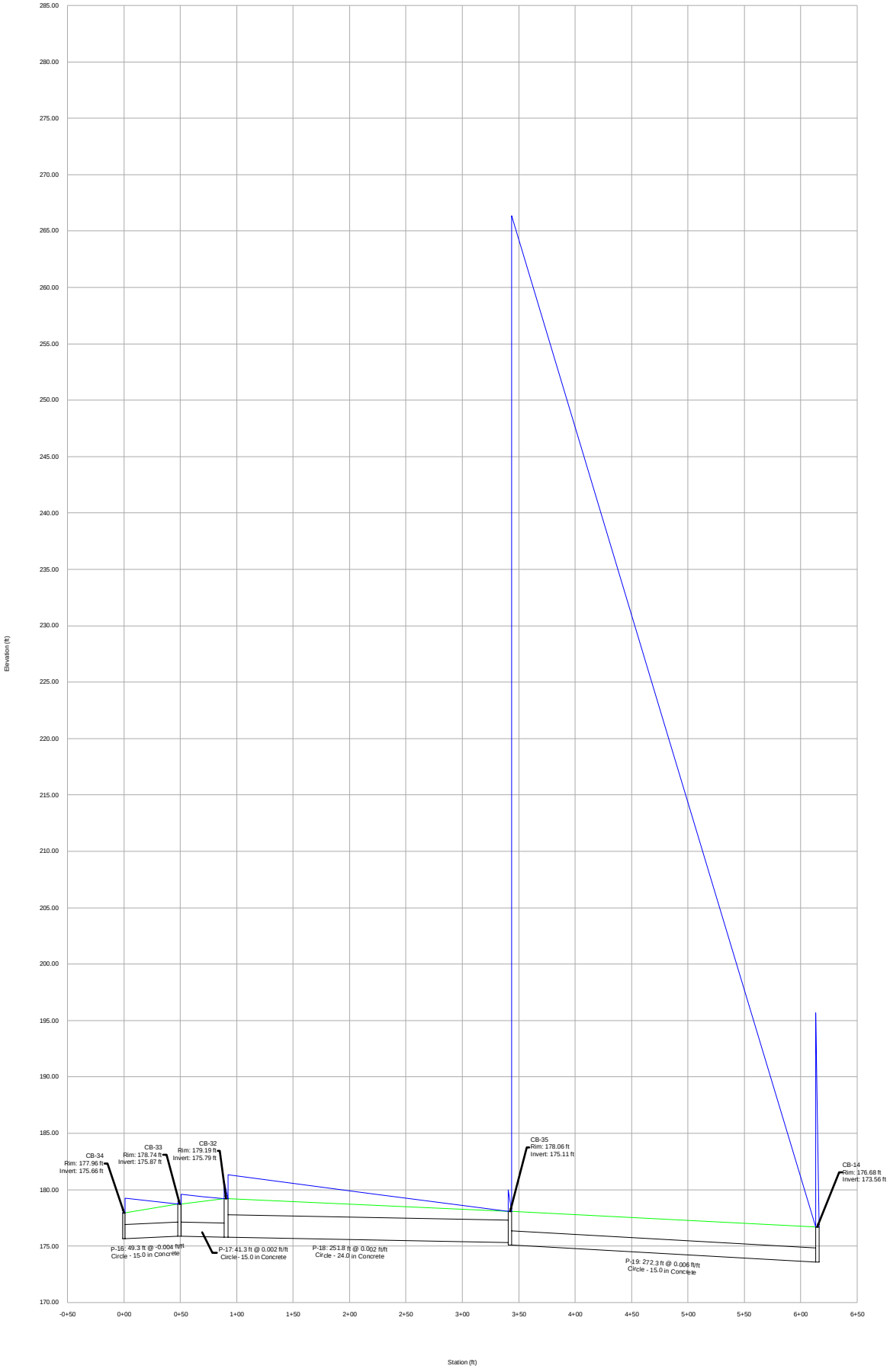
Profile Report

Engineering Profile - CB-1 to CB-14 10-Year (TownOfCameron.stsw)



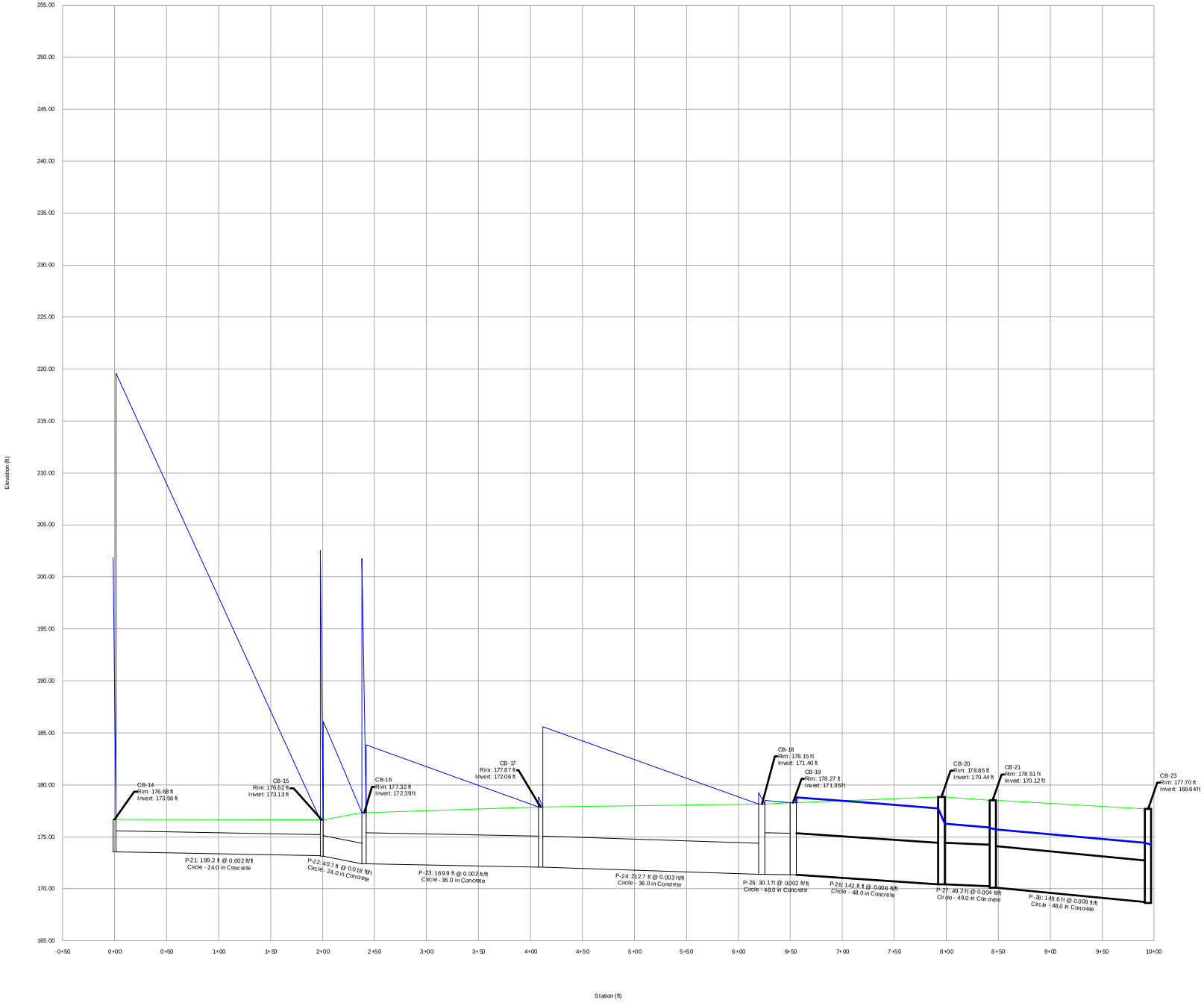
Profile Report

Engineering Profile - CB-34 to CB-14 10-Year (TownOfCameron.stsw)

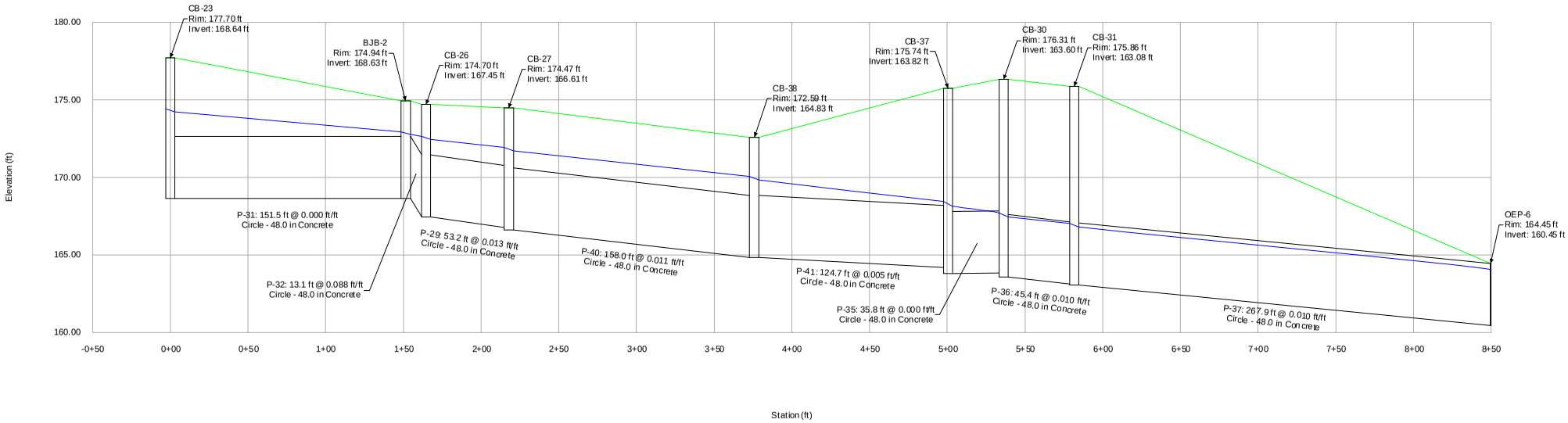


Profile Report

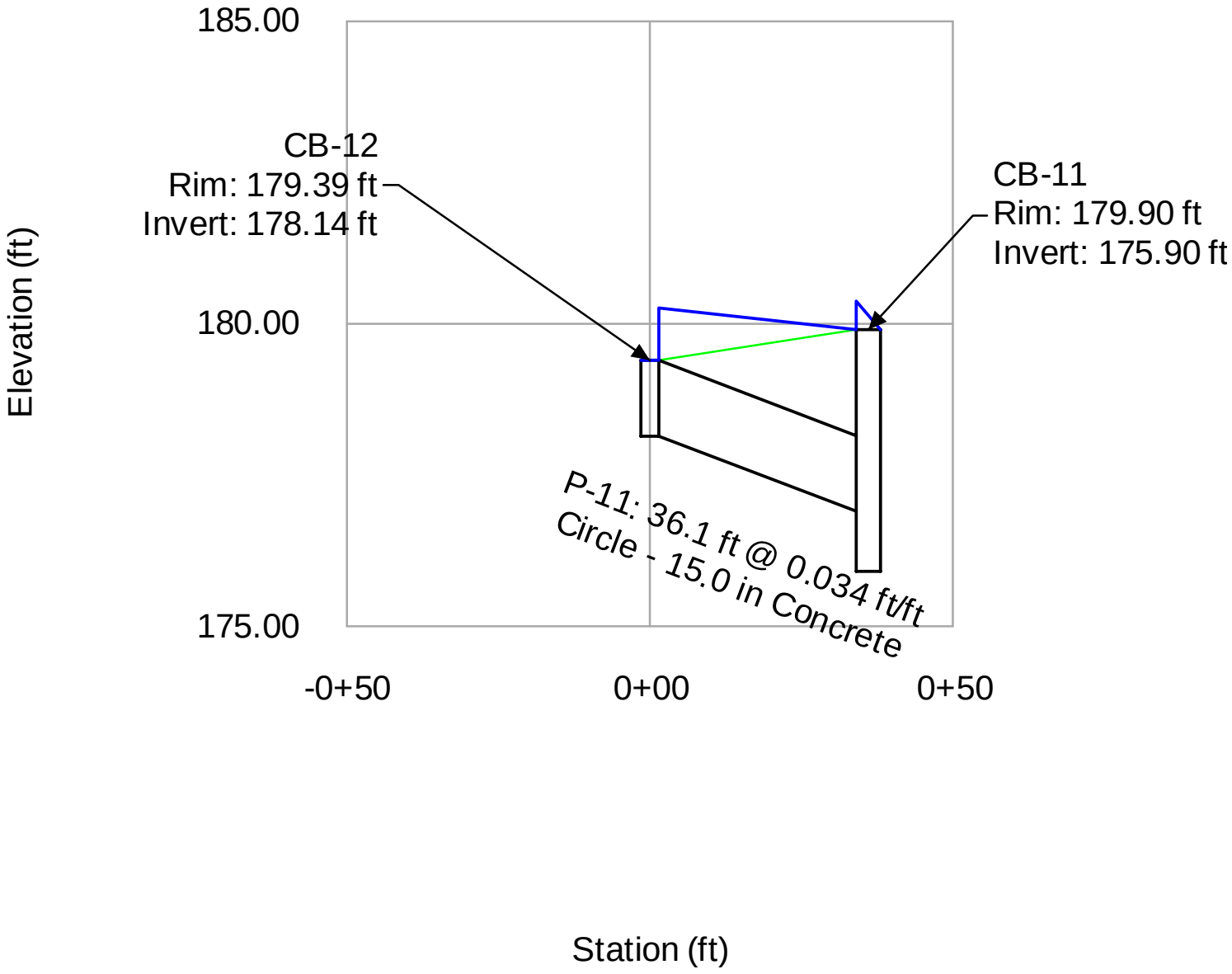
Engineering Profile - CB-14 to CB-23 25-Year (TownOfCameron.stsw)



Profile Report
Engineering Profile - CB-23 to OEP-6 25-Year (TownOfCameron.stsw)

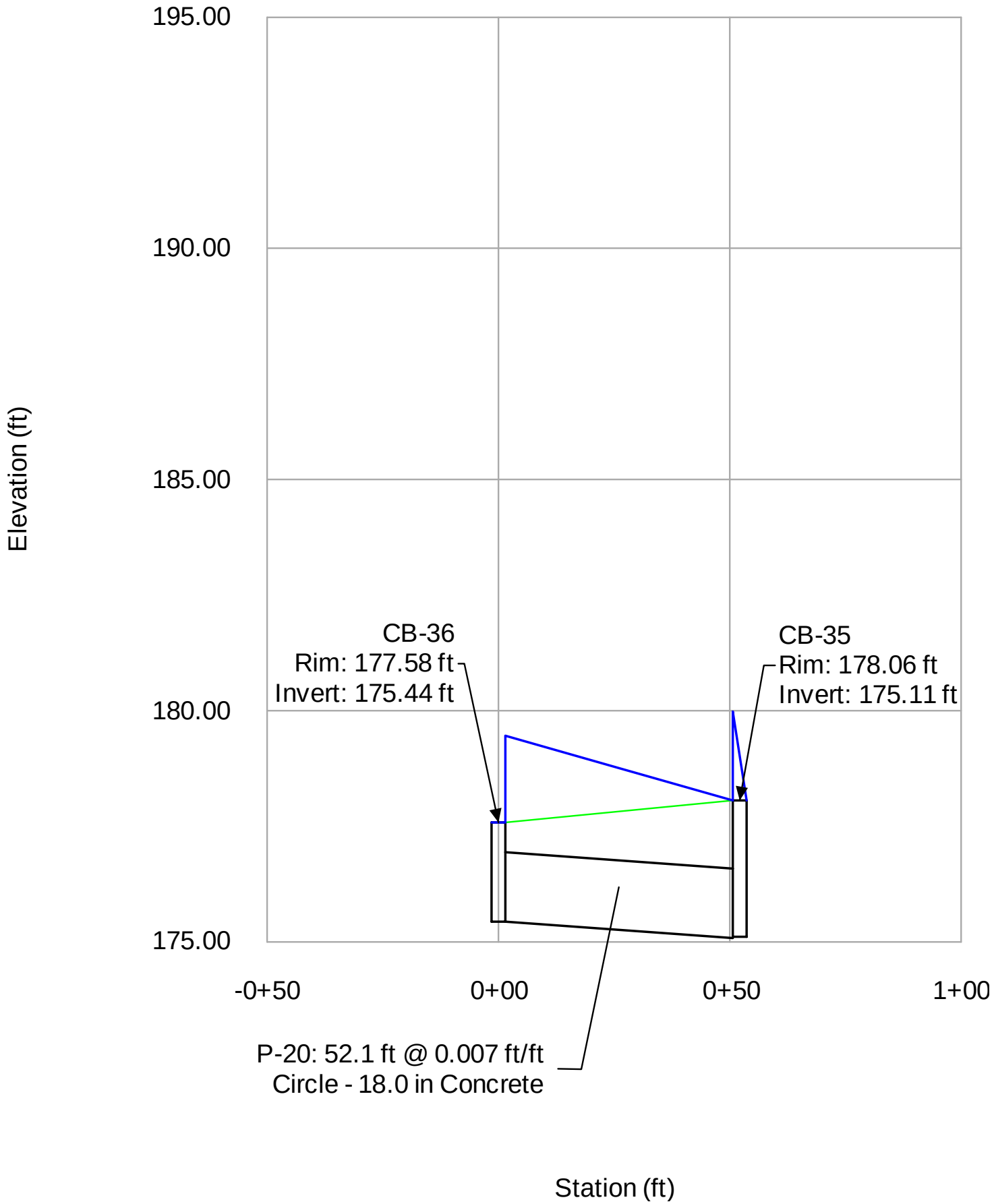


Profile Report
Engineering Profile - CB-12 to CB-11 10-Year (TownOfCameron.stsw)

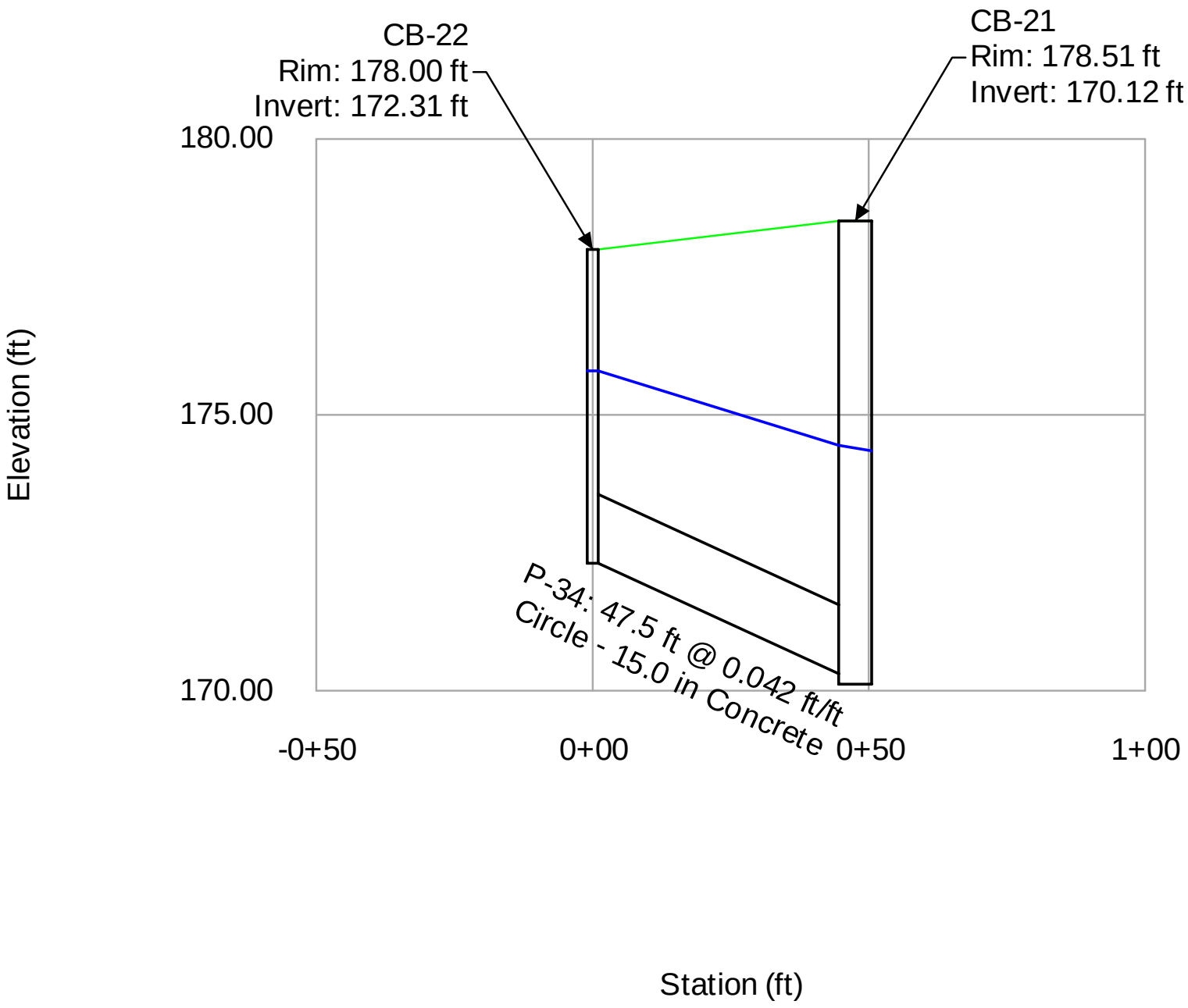


Profile Report

Engineering Profile - CB-36 to CB-35 10-Year (TownOfCameron.stsw)

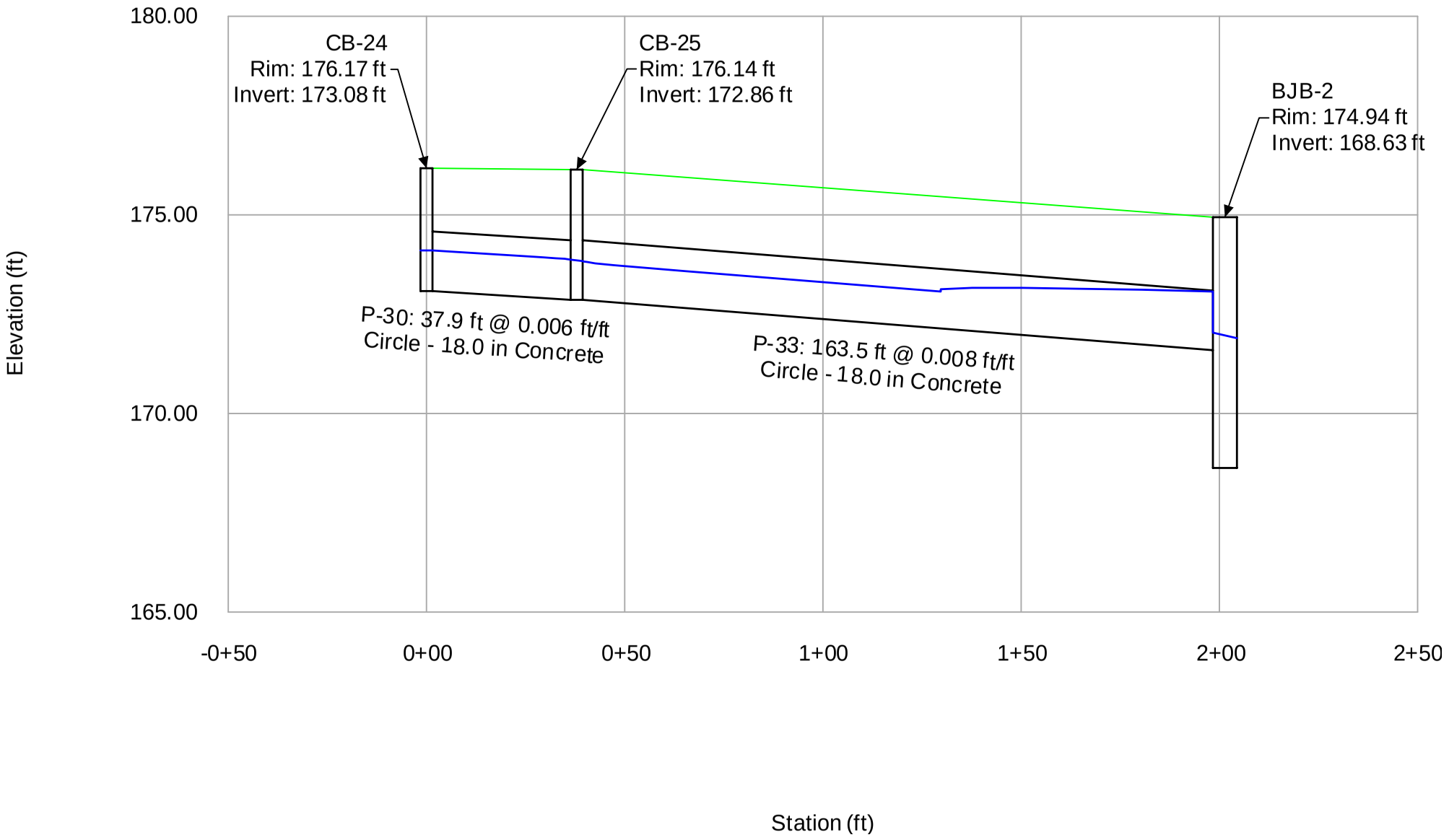


Profile Report
Engineering Profile - CB-22 to CB-21 10-Year (TownOfCameron.stsw)

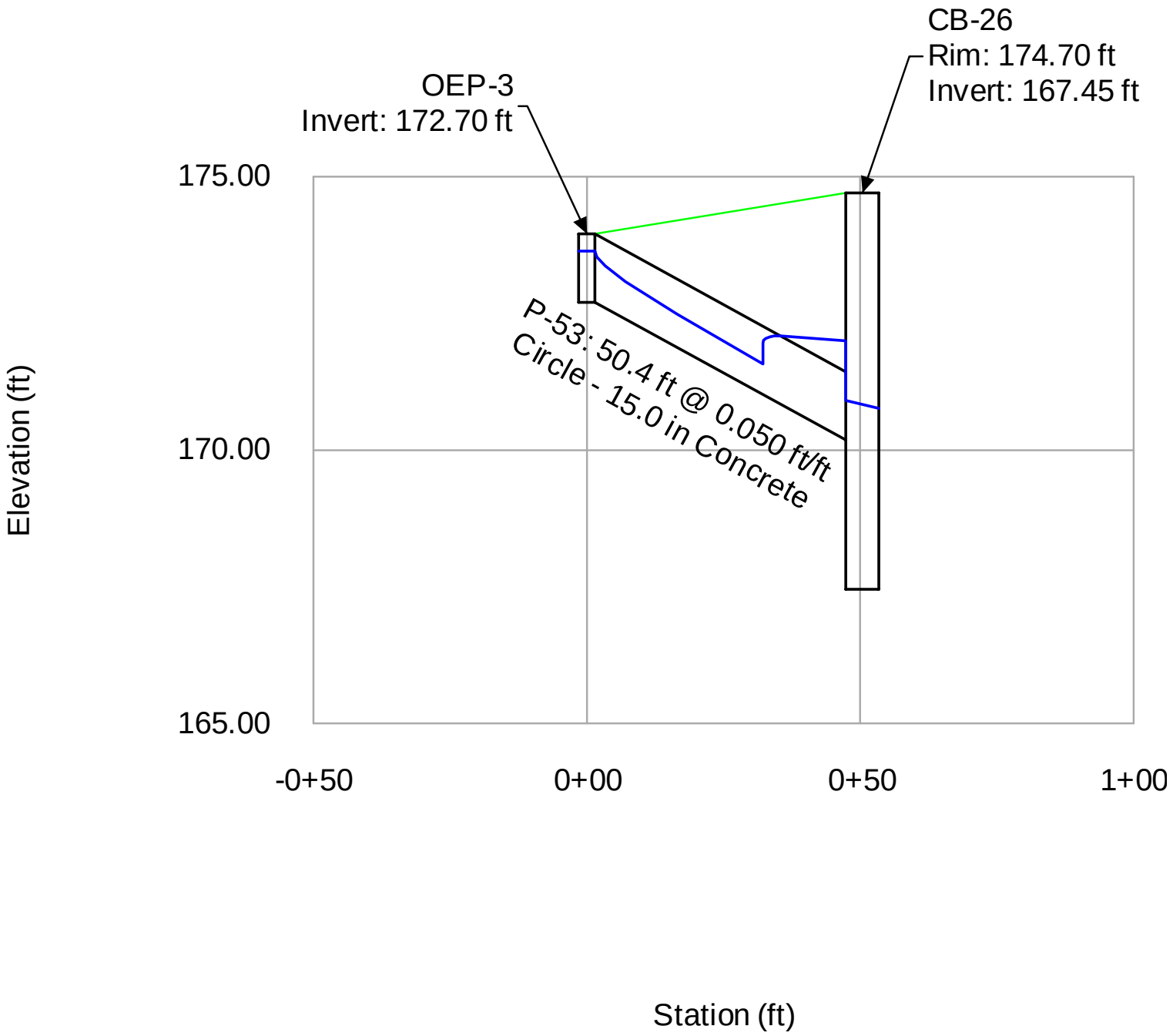


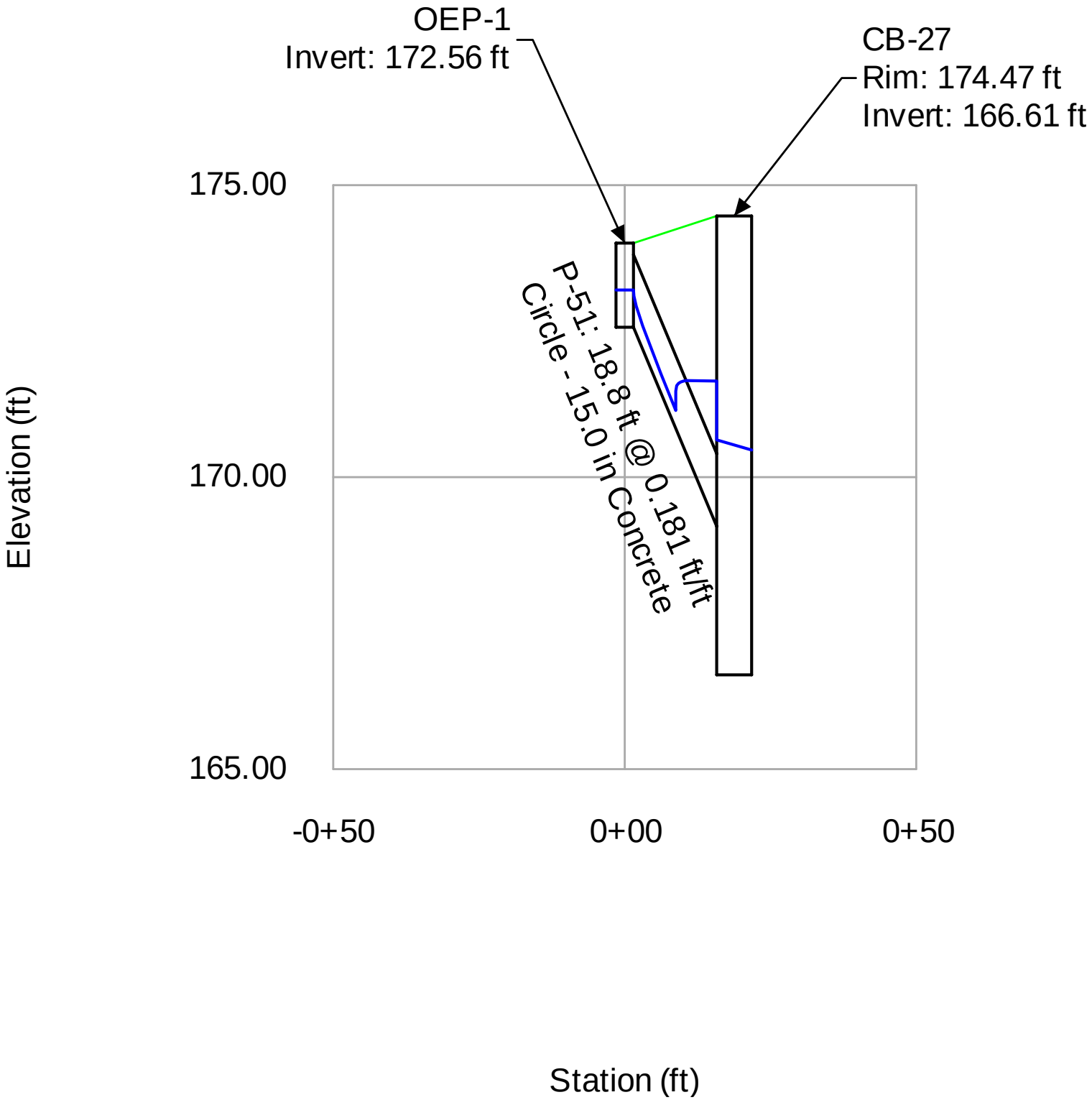
Profile Report

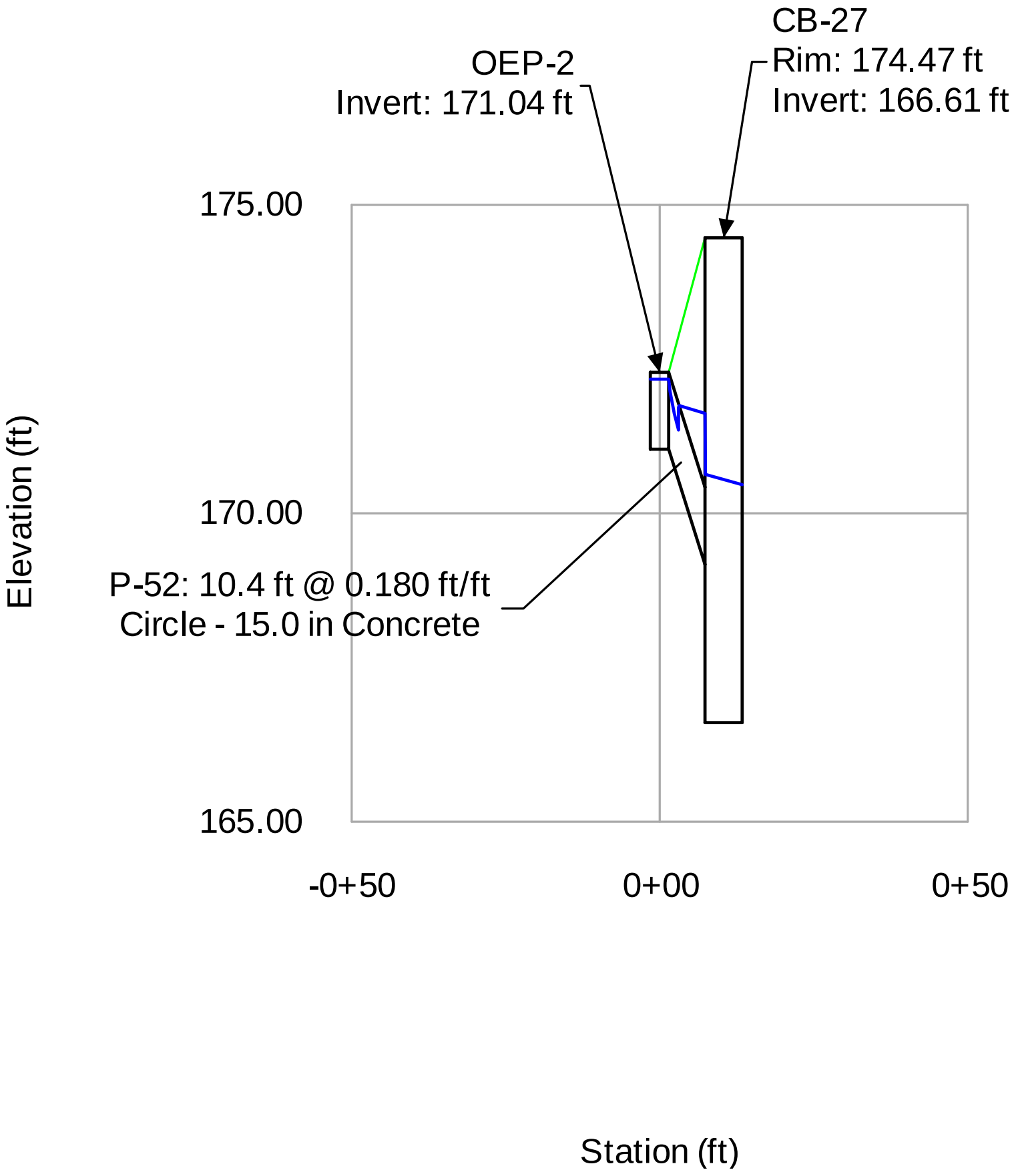
Engineering Profile - CB-24 to BJB-2 10-Year (TownOfCameron.stsw)



Profile Report
Engineering Profile - OEP-3 to CB-26 10-Year (TownOfCameron.stsw)

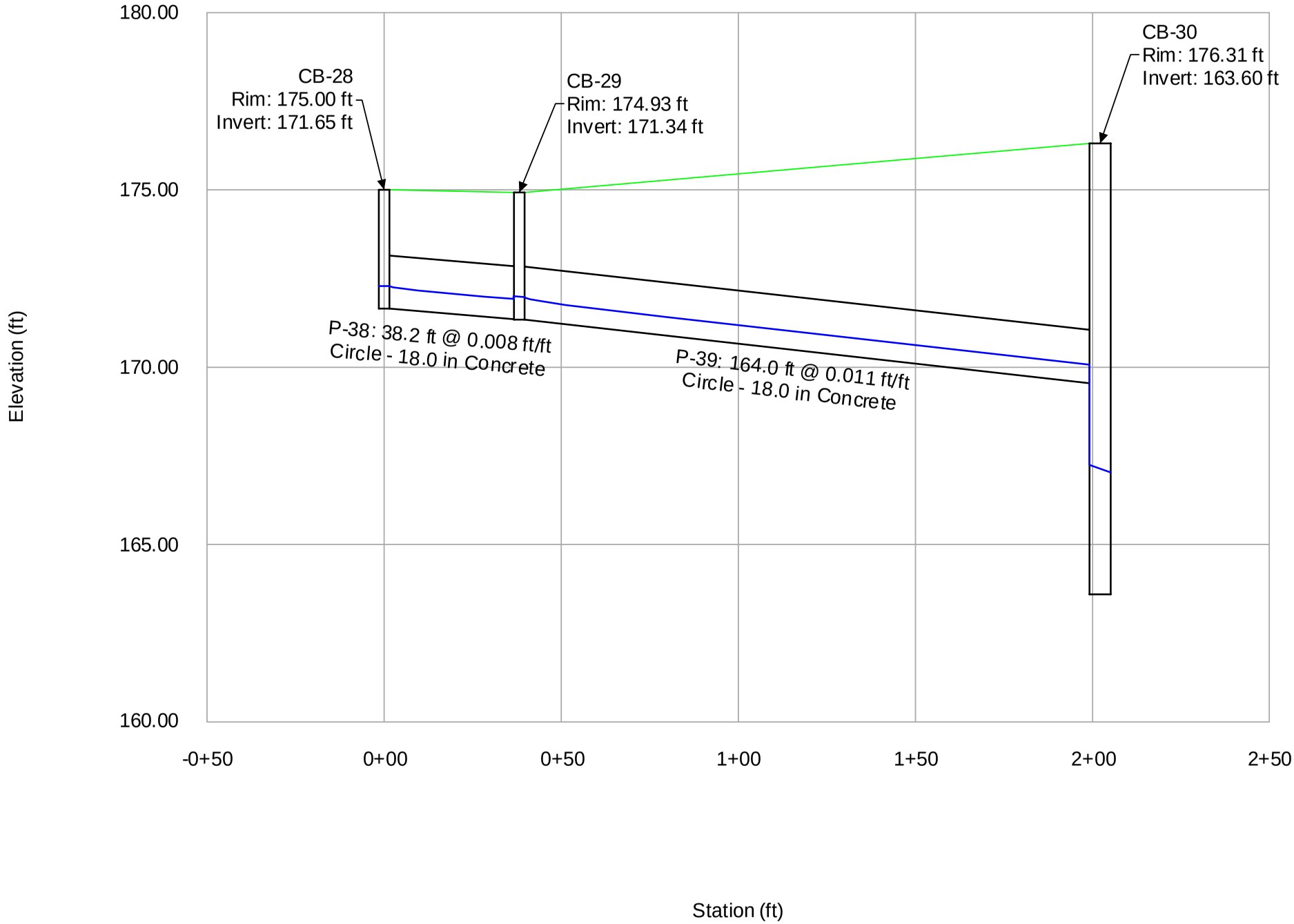



OEP-1
Invert: 172.56 ft
CB-27
Rim: 174.47 ft
Invert: 166.61 ft
175.00
170.00
165.00
Elevation (ft)
P-51: 18.8 ft @ 0.181 ft/ft
Circle - 15.0 in Concrete
-0+50
0+00
0+50
Station (ft)

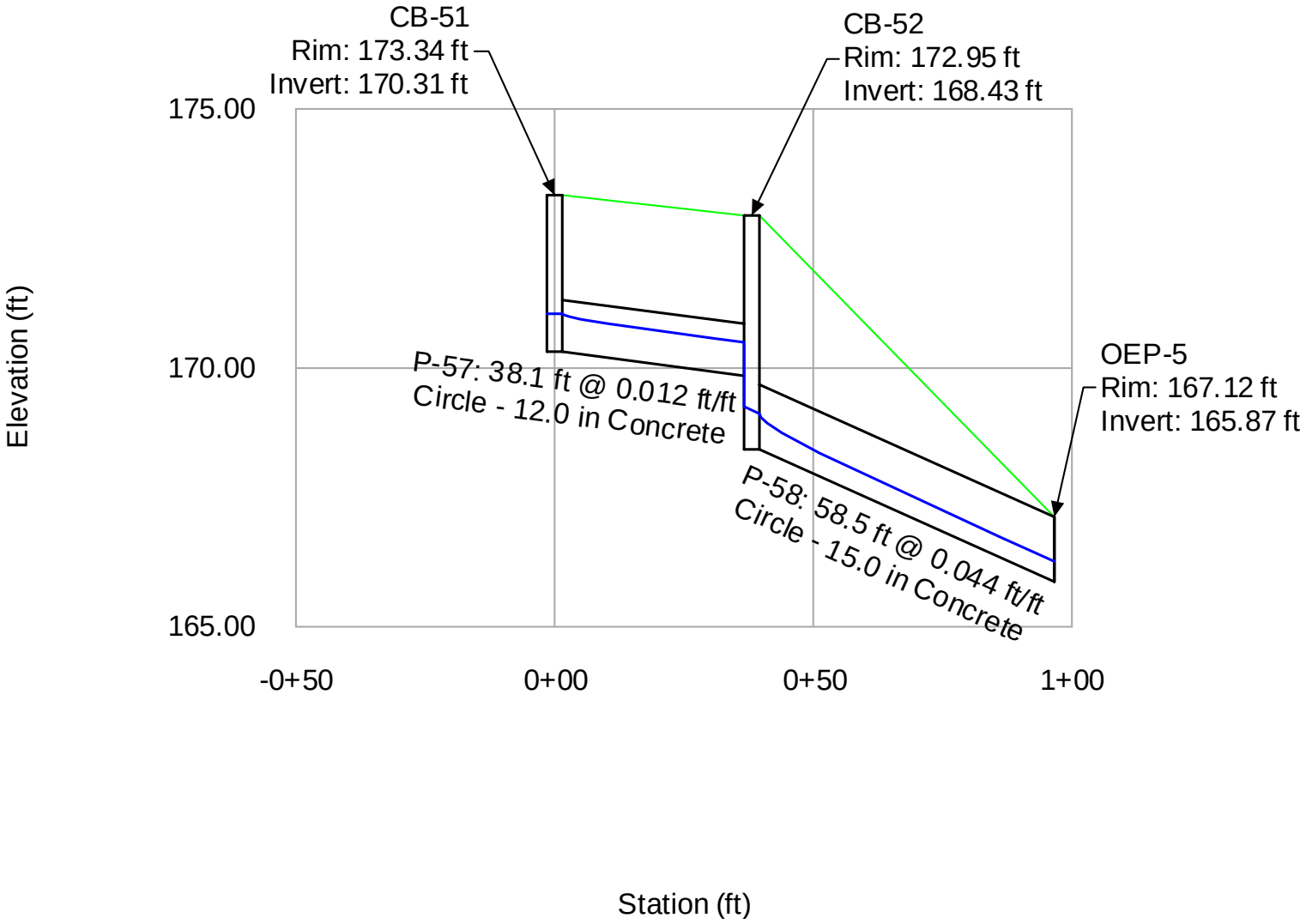

CB-27
Rim: 174.47 ft
Invert: 166.61 ft
OEP-2
Invert: 171.04 ft
175.00
170.00
165.00
Elevation (ft)
P-52: 10.4 ft @ 0.180 ft/ft
Circle - 15.0 in Concrete
-0+50
0+00
0+50
Station (ft)

Profile Report

Engineering Profile - CB-28 to CB-30 10-Year (TownOfCameron.stsw)

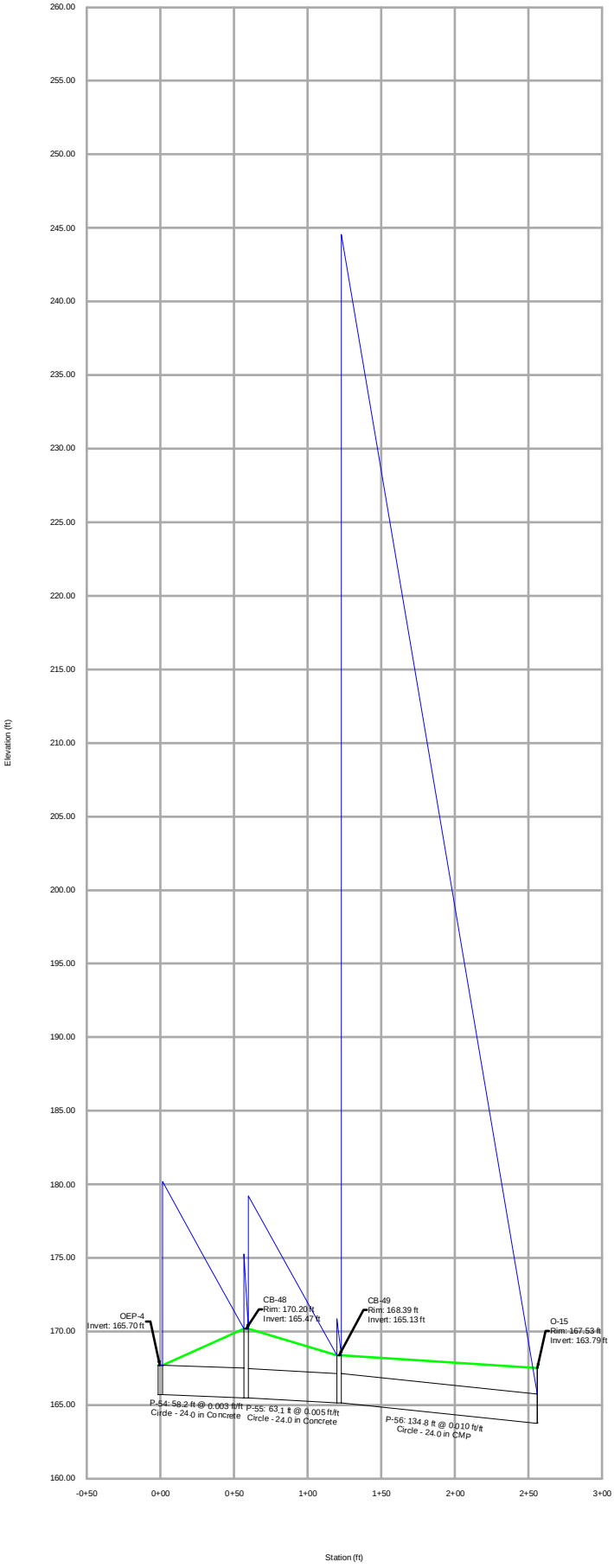


Profile Report
Engineering Profile - CB-51 to OEP-5 10-Year (TownOfCameron.stsw)



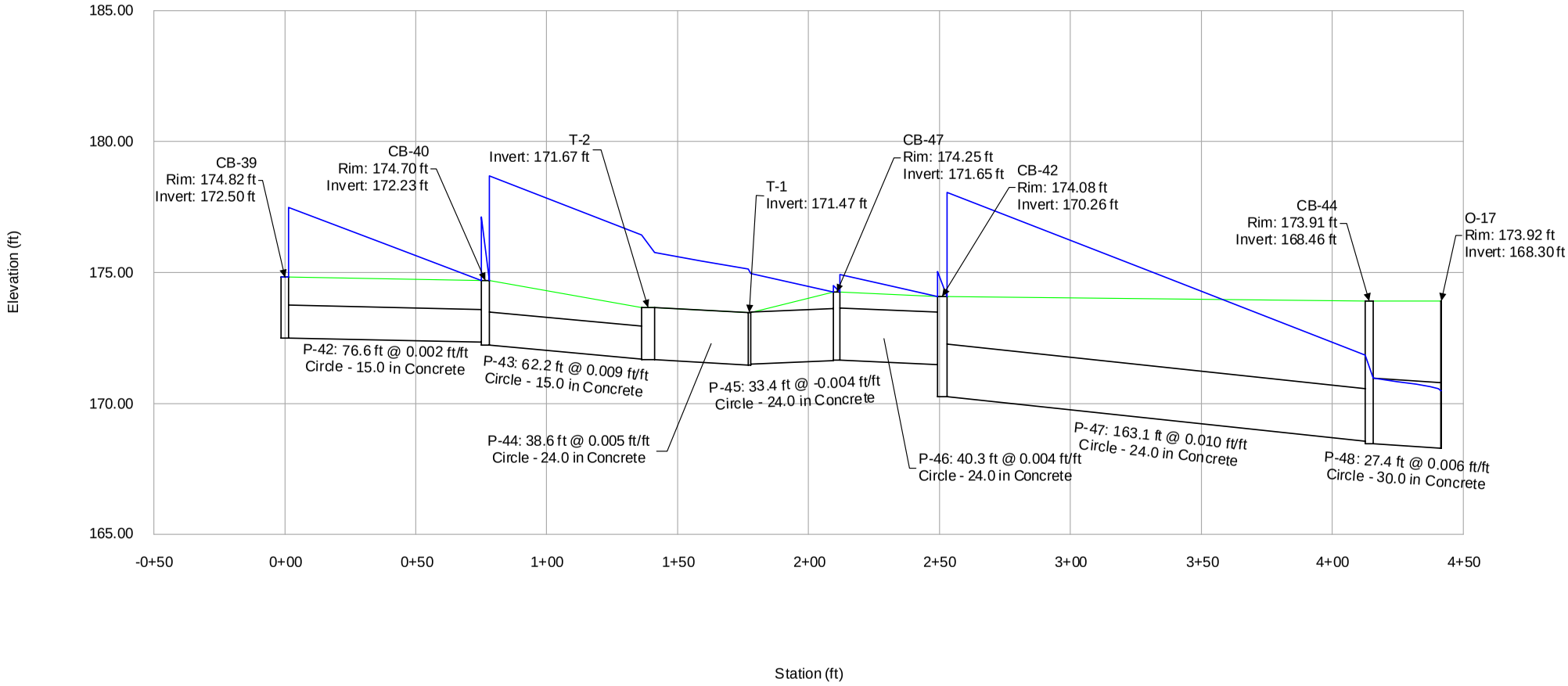
Profile Report

Engineering Profile - OEP-4 to O-15 25-Year (TownOfCameron.stsw)

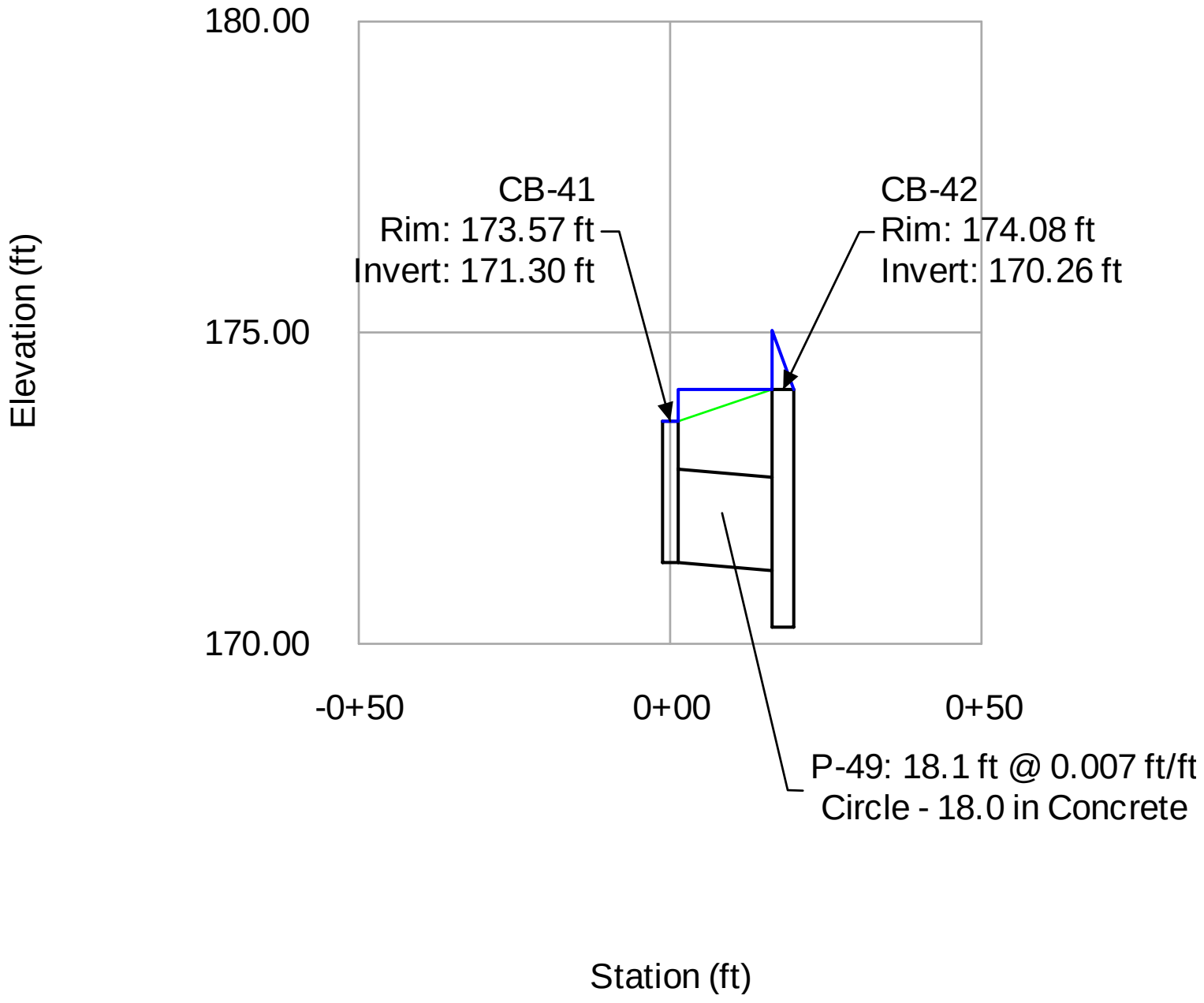


Profile Report

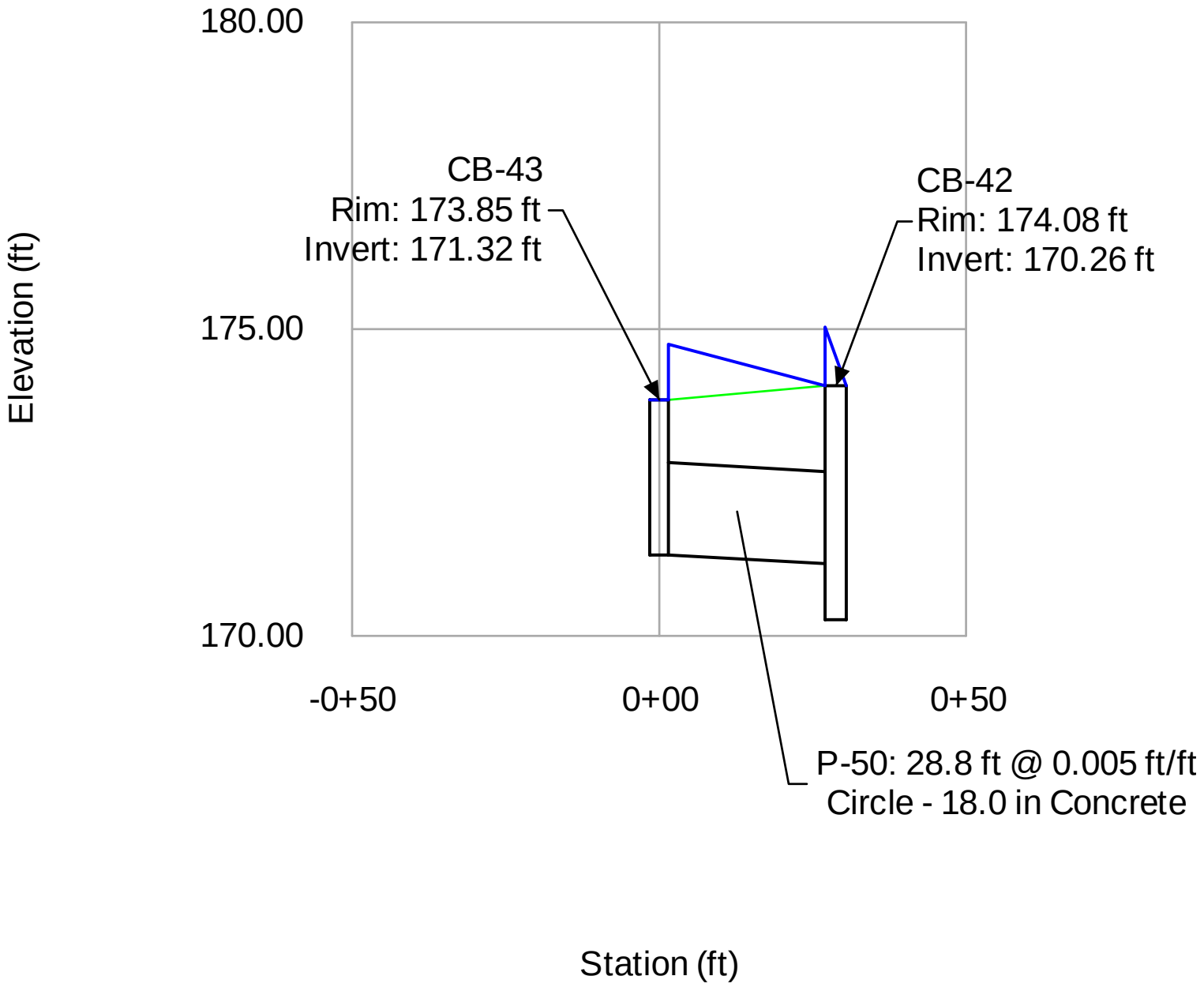
Engineering Profile - CB-39 to O-17 10-Year (TownOfCameron.stsw)



Profile Report
Engineering Profile - CB-41 to CB-42 10-Year (TownOfCameron.stsw)



Profile Report
Engineering Profile - CB-43 to CB-42 10-Year (TownOfCameron.stsw)



FLOWMASTER OUTPUT

Detailed Report for Boyce Lawton and Old State Rd North (DA10)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	10.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3.65
0+16	3.57
0+21	0.00
0+24	0.27
0+27	1.30

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.65)	(0+27, 1.30)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	12.3 in
Roughness Coefficient	0.030
Elevation	1.02 ft
Elevation Range	0.0 to 3.7 ft
Flow Area	4.1 ft²
Wetted Perimeter	6.8 ft
Hydraulic Radius	7.2 in
Top Width	6.33 ft
Normal Depth	12.3 in
Critical Depth	9.1 in
Critical Slope	0.018 ft/ft
Velocity	2.49 ft/s
Velocity Head	0.10 ft
Specific Energy	1.12 ft
Froude Number	0.547
Flow Type	Subcritical

Detailed Report for Boyce Lawton and Old State Rd North (DA10)

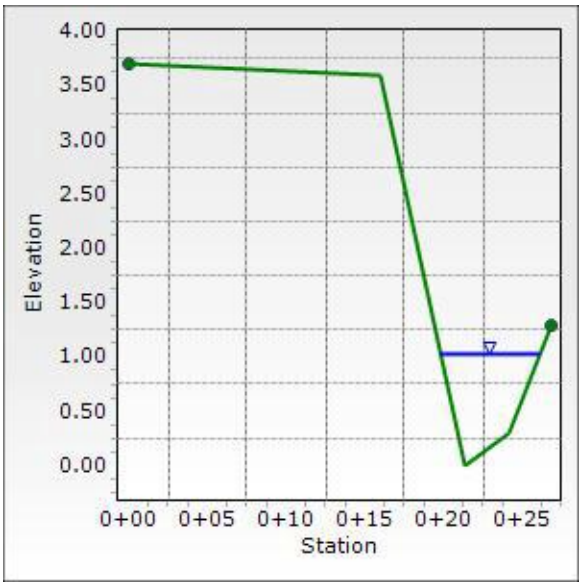
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	12.3 in
Critical Depth	9.1 in
Channel Slope	0.005 ft/ft
Critical Slope	0.018 ft/ft

Cross Section for Boyce Lawton and Old State Rd North (DA10)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	12.3 in
Discharge	10.10 cfs



Detailed Report for Boyce Lawton and Old State Rd South (DA12)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.003	ft/ft
Discharge	3.60	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.32
0+19	0.99
0+24	0.00
0+28	0.16
0+36	2.98
0+46	2.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.32)	(0+46, 2.81)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	6.7	in
Roughness Coefficient	0.030	
Elevation	0.56	ft
Elevation Range	0.0 to 3.0	ft
Flow Area	2.7	ft²
Wetted Perimeter	7.5	ft
Hydraulic Radius	4.2	in
Top Width	7.39	ft
Normal Depth	6.7	in
Critical Depth	4.3	in
Critical Slope	0.022	ft/ft
Velocity	1.36	ft/s
Velocity Head	0.03	ft
Specific Energy	0.59	ft
Froude Number	0.399	
Flow Type	Subcritical	

Detailed Report for Boyce Lawton and Old State Rd South (DA12)

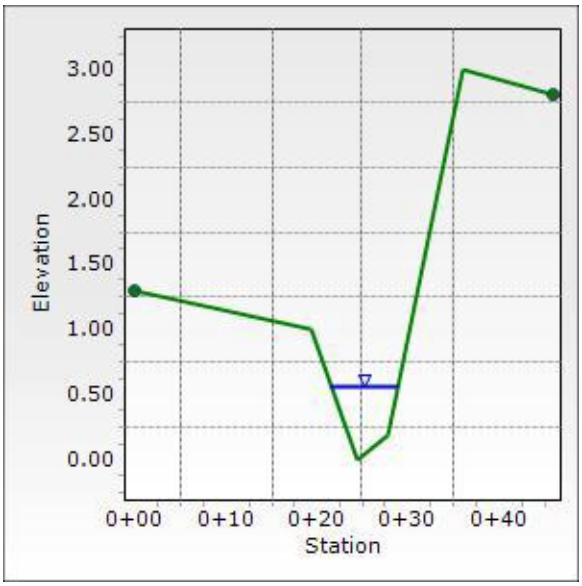
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	6.7 in
Critical Depth	4.3 in
Channel Slope	0.003 ft/ft
Critical Slope	0.022 ft/ft

Cross Section for Boyce Lawton and Old State Rd South (DA12)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003 ft/ft
Normal Depth	6.7 in
Discharge	3.60 cfs



Detailed Report for Boyce Lawton and 1st St North (DA11)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.003	ft/ft
Discharge	10.50	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.28
0+05	0.00
0+06	0.00
0+28	3.43
0+39	3.52

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.28)	(0+39, 3.52)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	11.4	in
Roughness Coefficient	0.030	
Elevation	0.95	ft
Elevation Range	0.0 to 3.5	ft
Flow Area	6.0	ft²
Wetted Perimeter	11.4	ft
Hydraulic Radius	6.3	in
Top Width	11.19	ft
Normal Depth	11.4	in
Critical Depth	7.7	in
Critical Slope	0.019	ft/ft
Velocity	1.76	ft/s
Velocity Head	0.05	ft
Specific Energy	1.00	ft
Froude Number	0.426	
Flow Type	Subcritical	

Detailed Report for Boyce Lawton and 1st St North (DA11)

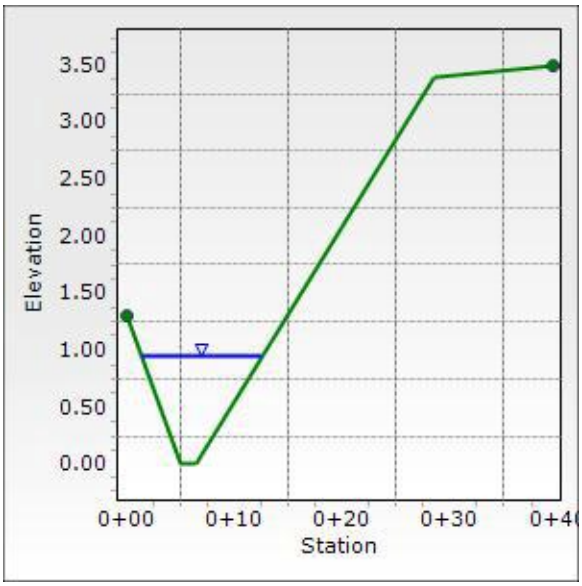
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	11.4 in
Critical Depth	7.7 in
Channel Slope	0.003 ft/ft
Critical Slope	0.019 ft/ft

Cross Section for Boyce Lawton and 1st St North (DA11)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.003 ft/ft
Normal Depth	11.4 in
Discharge	10.50 cfs



Detailed Report for Boyce Lawton and 1st St South (DA13)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.000 ft/ft
Discharge	2.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3.26
0+07	0.17
0+08	0.00
0+16	1.36
0+30	2.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.26)	(0+30, 2.11)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	16.0 in
Roughness Coefficient	0.030
Elevation	1.33 ft
Elevation Range	0.0 to 3.3 ft
Flow Area	7.5 ft²
Wetted Perimeter	11.6 ft
Hydraulic Radius	7.8 in
Top Width	11.27 ft
Normal Depth	16.0 in
Critical Depth	5.8 in
Critical Slope	0.022 ft/ft
Velocity	0.37 ft/s
Velocity Head	0.00 ft
Specific Energy	1.33 ft
Froude Number	0.080
Flow Type	Subcritical

Detailed Report for Boyce Lawton and 1st St South (DA13)

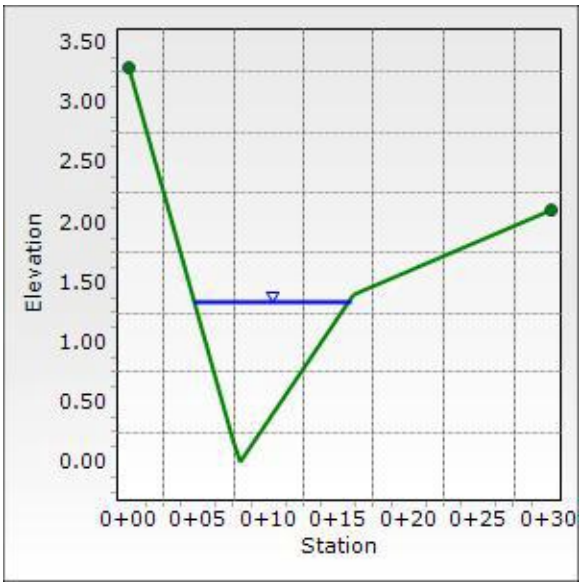
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	16.0 in
Critical Depth	5.8 in
Channel Slope	0.000 ft/ft
Critical Slope	0.022 ft/ft

Cross Section for Boyce Lawton and 1st St South (DA13)

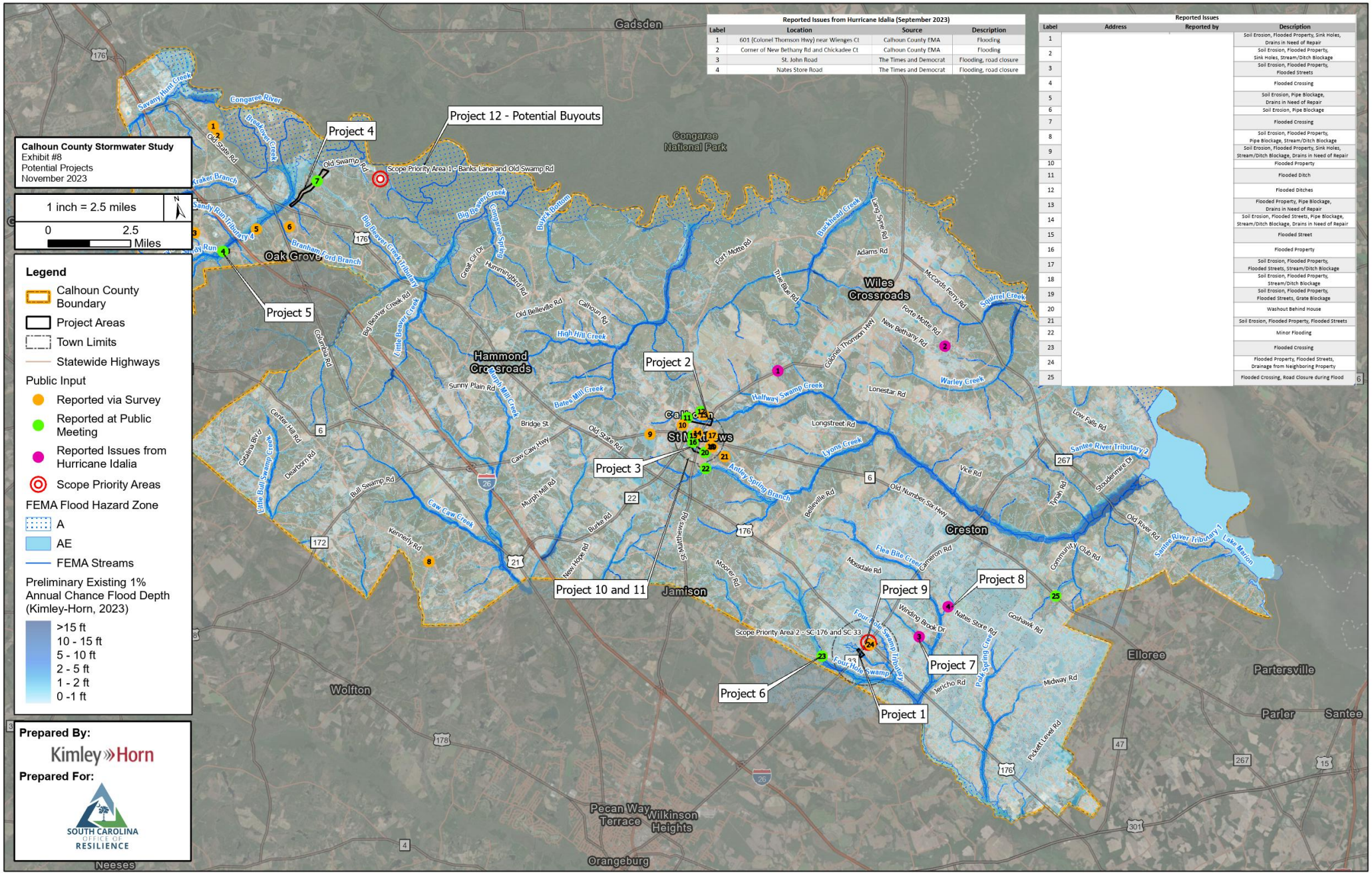
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.000 ft/ft
Normal Depth	16.0 in
Discharge	2.80 cfs



APPENDIX C

PROJECT ALTERNATIVES

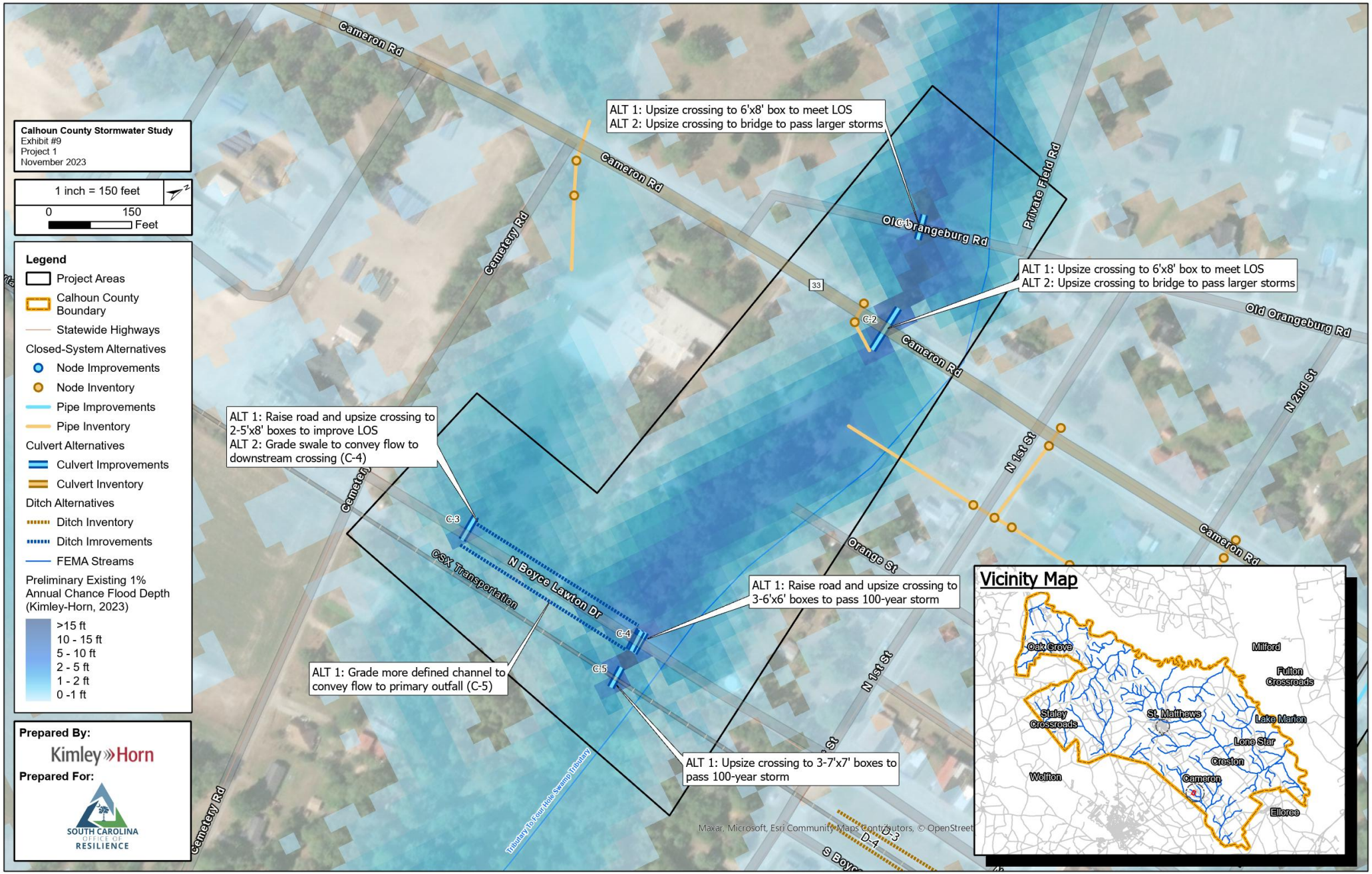


Reported Issues from Hurricane Idalia (September 2023)

Label	Location	Source	Description
1	601 (Colonel Thomson Hwy) near Wienges Ct	Calhoun County EMA	Flooding
2	Corner of New Bethany Rd and Chickadee Ct	Calhoun County EMA	Flooding
3	St. John Road	The Times and Democrat	Flooding, road closure
4	Nates Store Road	The Times and Democrat	Flooding, road closure

Reported Issues

Label	Address	Reported by	Description
1			Soil Erosion, Flooded Property, Sink Holes, Drains in Need of Repair
2			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage
3			Soil Erosion, Flooded Property, Flooded Streets
4			Flooded Crossing
5			Soil Erosion, Pipe Blockage, Drains in Need of Repair
6			Soil Erosion, Pipe Blockage
7			Flooded Crossing
8			Soil Erosion, Flooded Property, Pipe Blockage, Stream/Ditch Blockage
9			Soil Erosion, Flooded Property, Sink Holes, Stream/Ditch Blockage, Drains in Need of Repair
10			Flooded Property
11			Flooded Ditch
12			Flooded Ditches
13			Flooded Property, Pipe Blockage, Drains in Need of Repair
14			Soil Erosion, Flooded Streets, Pipe Blockage, Stream/Ditch Blockage, Drains in Need of Repair
15			Flooded Street
16			Flooded Property
17			Soil Erosion, Flooded Property, Flooded Streets, Stream/Ditch Blockage
18			Soil Erosion, Flooded Property, Stream/Ditch Blockage
19			Soil Erosion, Flooded Property, Flooded Streets, Grate Blockage
20			Washout Behind House
21			Soil Erosion, Flooded Property, Flooded Streets
22			Minor Flooding
23			Flooded Crossing
24			Flooded Property, Flooded Streets, Drainage from Neighboring Property
25			Flooded Crossing, Road Closure during Flood


Calhoun County Stormwater Study
Exhibit #9
Project 1
November 2023
1 inch = 150 feet
0
150
Feet
Legend
Project Areas
Calhoun County Boundary
Statewide Highways
Closed-System Alternatives
Node Improvements
Node Inventory
Pipe Improvements
Pipe Inventory
Culvert Alternatives
Culvert Improvements
Culvert Inventory
Ditch Alternatives
Ditch Inventory
Ditch Imrovements
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
ALT 1: Upsize crossing to 6'x8' box to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
ALT 1: Upsize crossing to 6'x8' box to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
ALT 1: Raise road and upsize crossing to 2-5'x8' boxes to improve LOS
ALT 2: Grade swale to convey flow to downstream crossing (C-4)
ALT 1: Raise road and upsize crossing to 3-6'x6' boxes to pass 100-year storm
ALT 1: Grade more defined channel to convey flow to primary outfall (C-5)
ALT 1: Upsize crossing to 3-7'x7' boxes to pass 100-year storm
Cameron Rd
Old Orangeburg Rd
Cemetery Rd
Private Field Rd
N 2nd St
N 1st St
Orange St
N Boyce Lawton Dr
CSX Transportation
C-2
C-3
C-4
C-5
D-1
D-3
33
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree
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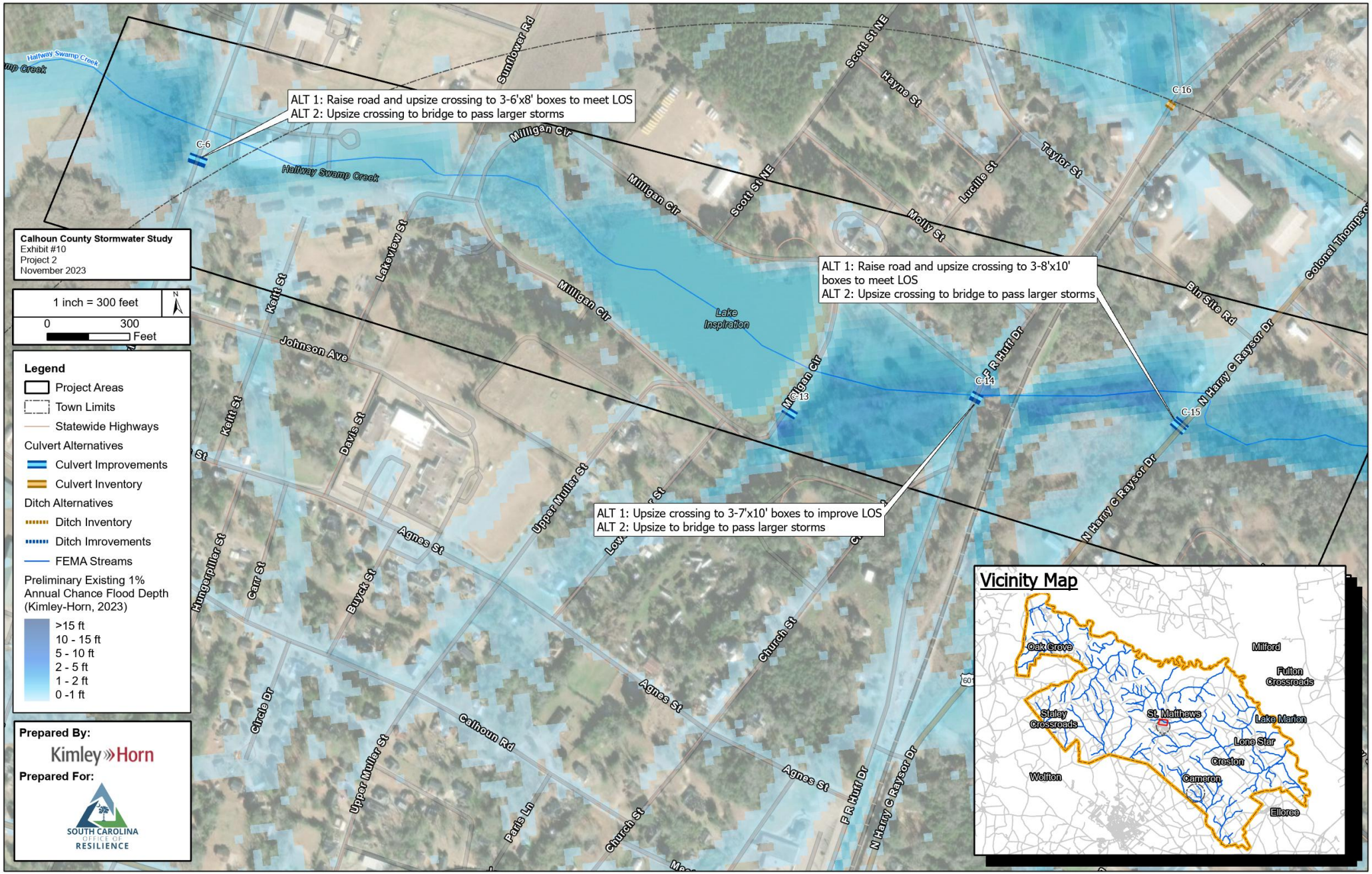
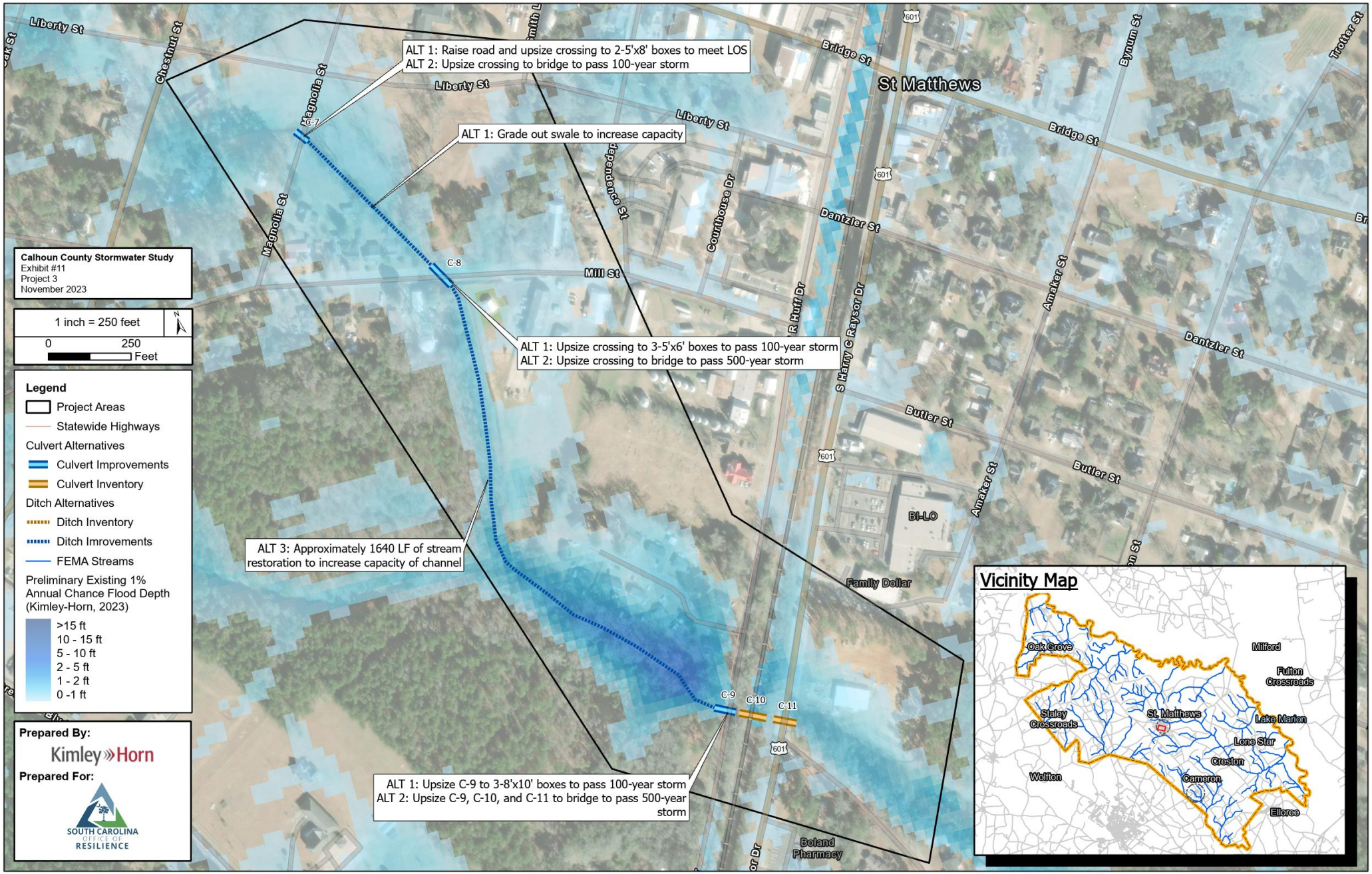
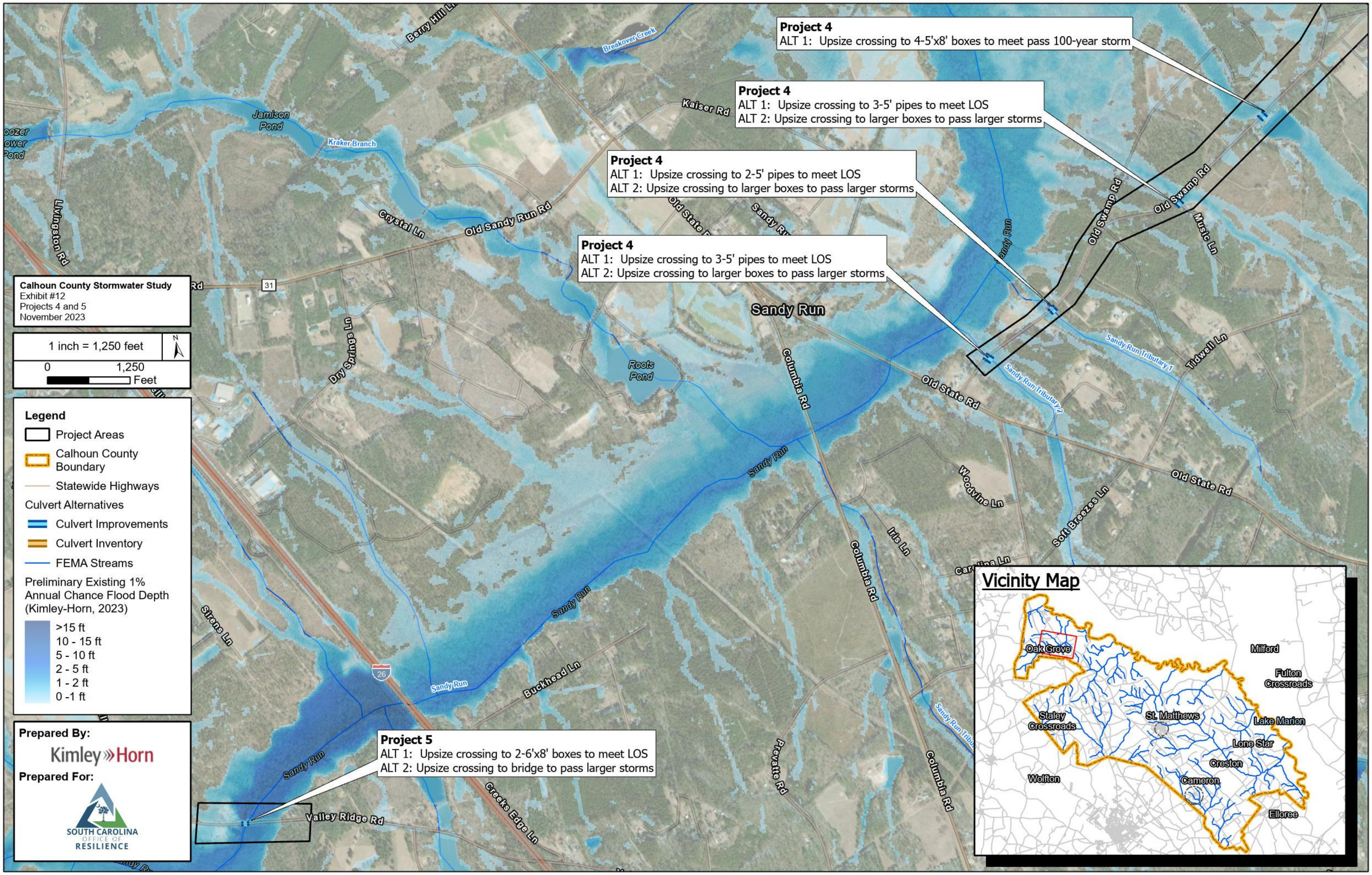
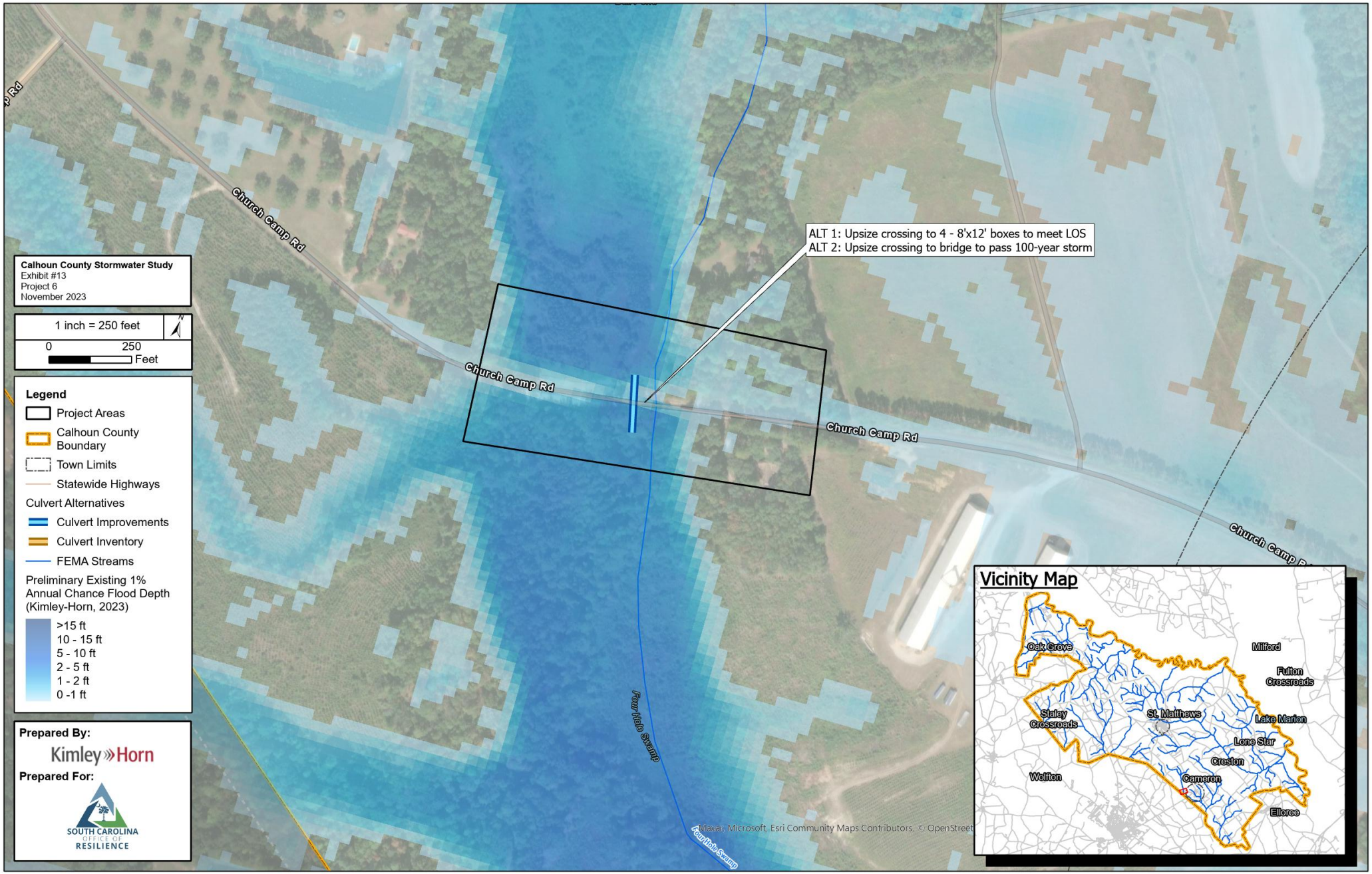
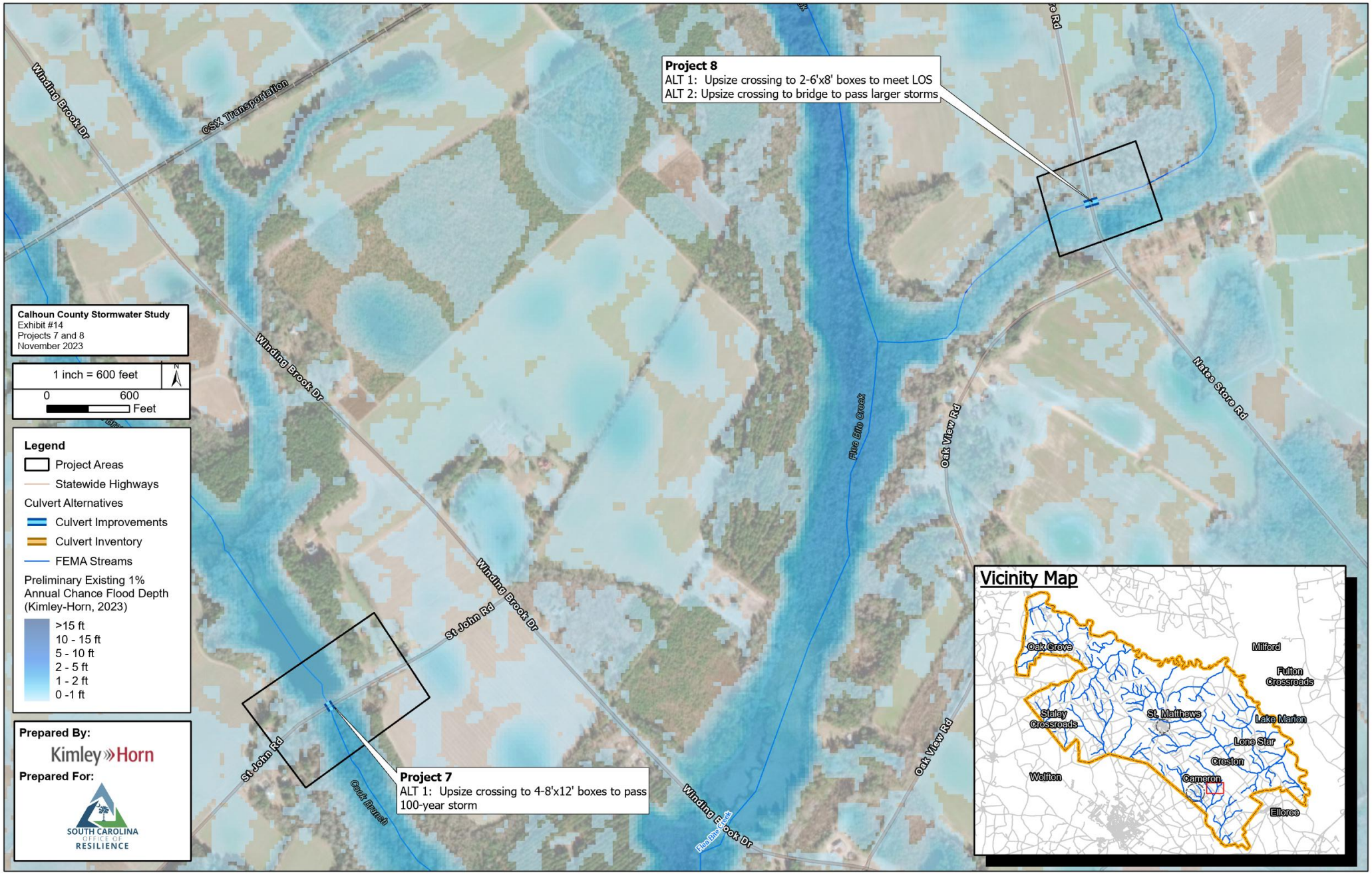
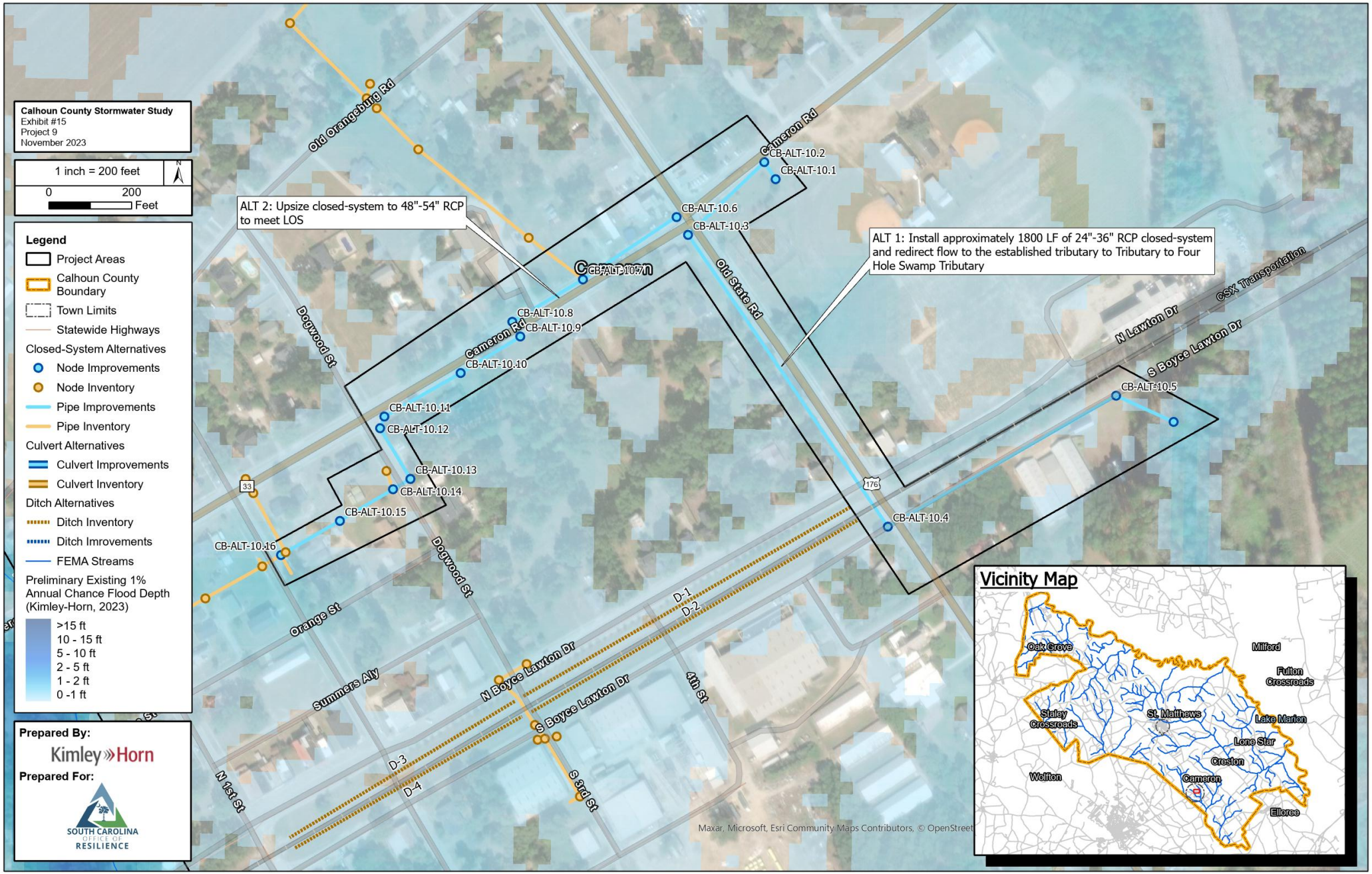

ALT 1: Raise road and upsize crossing to 3-6'x8' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
ALT 1: Raise road and upsize crossing to 3-8'x10' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
ALT 1: Upsize crossing to 3-7'x10' boxes to improve LOS
ALT 2: Upsize to bridge to pass larger storms
C-6
C-13
C-14
C-15
C-16
Halfway Swamp Creek
Lake Inspiration
Milligan Cir
Scott St NE
Hayne St
Lucille St
Taylor St
Molly St
Sunflower Rd
Lakeview St
Keitt St
Johnson Ave
Davis St
Upper Muller St
Agnes St
Church St
Calhoun Rd
Paris Ln
Buyck St
Carr St
Hungerpiller St
Circle Dr
P R Huff Dr
N Harry C Raysor Dr
Big Slte Rd
Colonel Thompson
Calhoun County Stormwater Study
Exhibit #10
Project 2
November 2023
1 inch = 300 feet
0 300
Feet
N
Legend
Project Areas
Town Limits
Statewide Highways
Culvert Alternatives
Culvert Improvements
Culvert Inventory
Ditch Alternatives
Ditch Inventory
Ditch Imrovements
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Cameron
Wolfton
Elloree

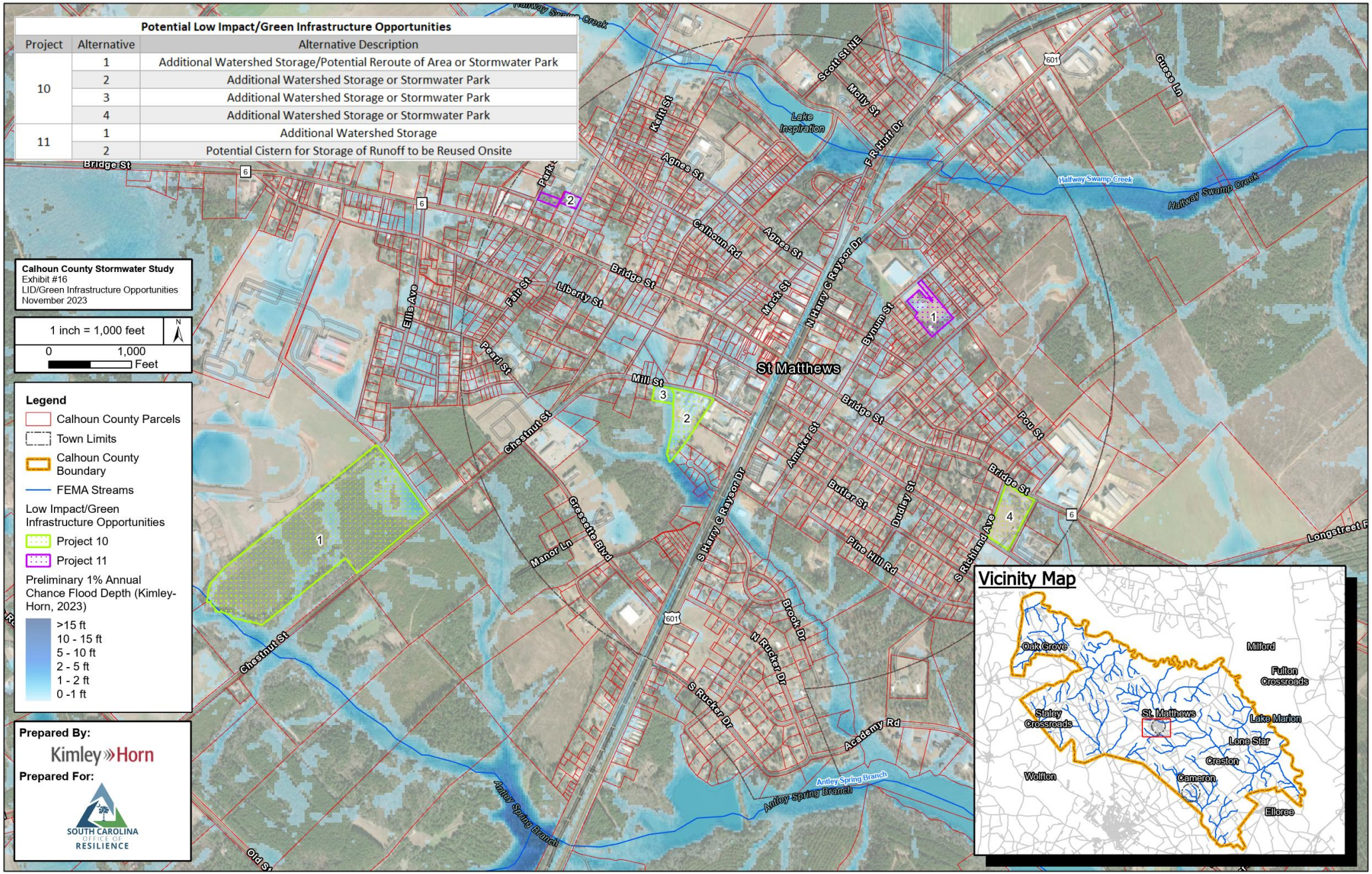

ALT 1: Raise road and upsize crossing to 2-5'x8' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass 100-year storm
ALT 1: Grade out swale to increase capacity
ALT 1: Upsize crossing to 3-5'x6' boxes to pass 100-year storm
ALT 2: Upsize crossing to bridge to pass 500-year storm
ALT 3: Approximately 1640 LF of stream restoration to increase capacity of channel
ALT 1: Upsize C-9 to 3-8'x10' boxes to pass 100-year storm
ALT 2: Upsize C-9, C-10, and C-11 to bridge to pass 500-year storm
C-7
C-8
C-9
C-10
C-11
St Matthews
Liberty St
Bridge St
Dantzler St
Butler St
Mill St
Magnolia St
Chestnut St
Courthouse Dr
Amaker St
S Harry C Raysor Dr
Bynum St
Trotter St
Independence St
BI-LO
Family Dollar
Boland Pharmacy
601
Calhoun County Stormwater Study
Exhibit #11
Project 3
November 2023
1 inch = 250 feet
0
250
Feet
N
Legend
Project Areas
Statewide Highways
Culvert Alternatives
Culvert Improvements
Culvert Inventory
Ditch Alternatives
Ditch Inventory
Ditch Imrovements
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Cameron
Wolfton
Elloree

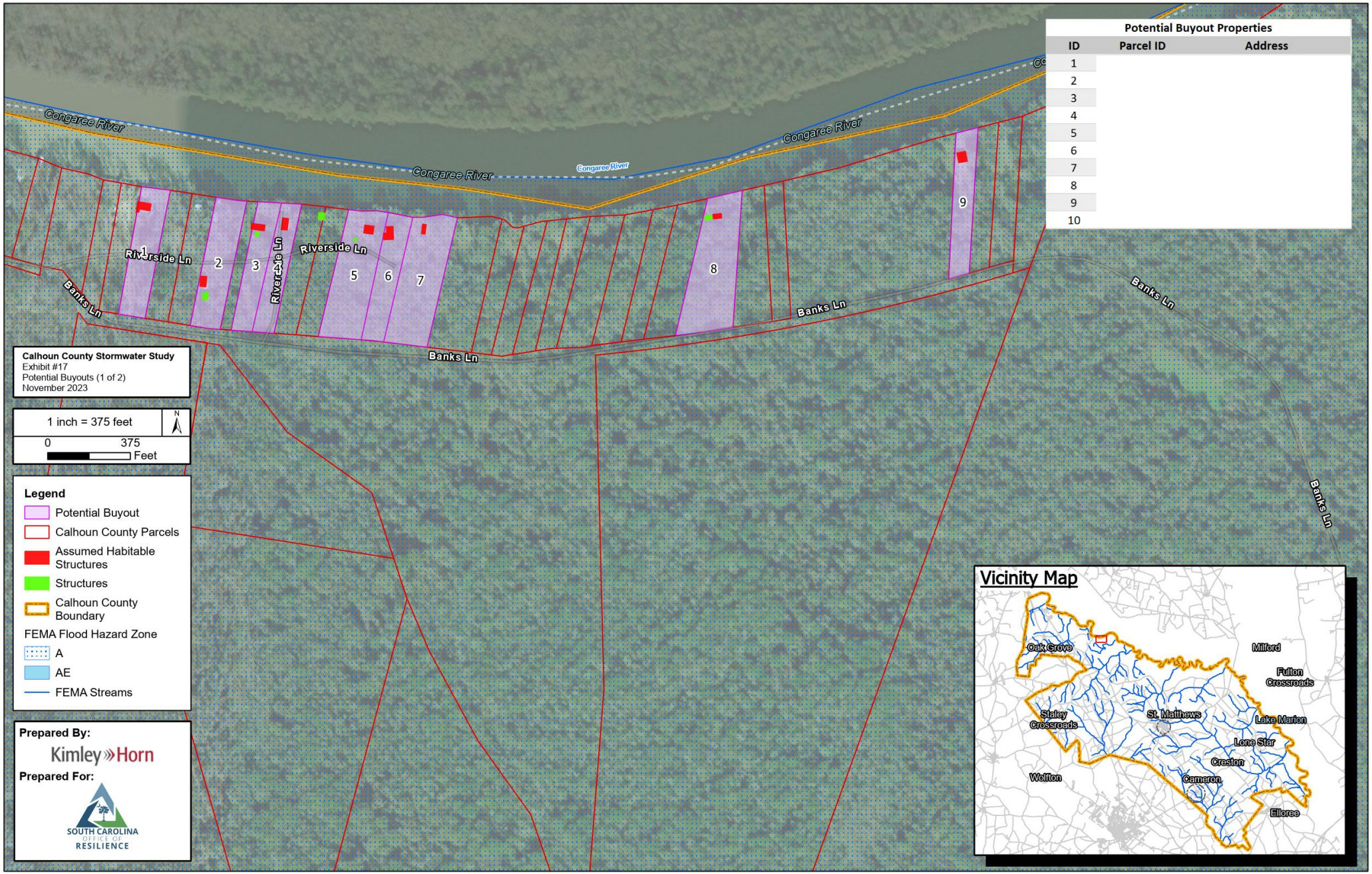

Calhoun County Stormwater Study
Exhibit #12
Projects 4 and 5
November 2023
1 inch = 1,250 feet
0
1,250
Feet
N
Legend
Project Areas
Calhoun County Boundary
Statewide Highways
Culvert Alternatives
Culvert Improvements
Culvert Inventory
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Project 4
ALT 1: Upsize crossing to 4-5'x8' boxes to meet pass 100-year storm
Project 4
ALT 1: Upsize crossing to 3-5' pipes to meet LOS
ALT 2: Upsize crossing to larger boxes to pass larger storms
Project 4
ALT 1: Upsize crossing to 2-5' pipes to meet LOS
ALT 2: Upsize crossing to larger boxes to pass larger storms
Project 4
ALT 1: Upsize crossing to 3-5' pipes to meet LOS
ALT 2: Upsize crossing to larger boxes to pass larger storms
Project 5
ALT 1: Upsize crossing to 2-6'x8' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
Sandy Run
Berry Hill Ln
Breakover Creek
Kaiser Rd
Jamison Pond
Kraker Branch
Livingston Rd
Crystal Ln
Old Sandy Run Rd
Old State Rd
Old Swamp Rd
Music Ln
Sandy Run Tributary 1
Sandy Run Tributary 2
Tidwell Ln
31
Dry Springs Ln
Roots Pond
Columbia Rd
Woodvine Ln
Soft Breezes Ln
Iris Ln
Sirens Ln
26
Buckhead Ln
Prevatte Rd
Valley Ridge Rd
Creeks Edge Ln
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Cameron
Wolfton
Elloree


Church Camp Rd
Church Camp Rd
Church Camp Rd
Church Camp Rd
ALT 1: Upsize crossing to 4 - 8'x12' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass 100-year storm
Four Hole Swamp
Four Hole Swamp
Maxar, Microsoft, Esri Community Maps Contributors, © OpenStreet
Calhoun County Stormwater Study
Exhibit #13
Project 6
November 2023
1 inch = 250 feet
0
250
Feet
Legend
Project Areas
Calhoun County Boundary
Town Limits
Statewide Highways
Culvert Alternatives
Culvert Improvements
Culvert Inventory
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree

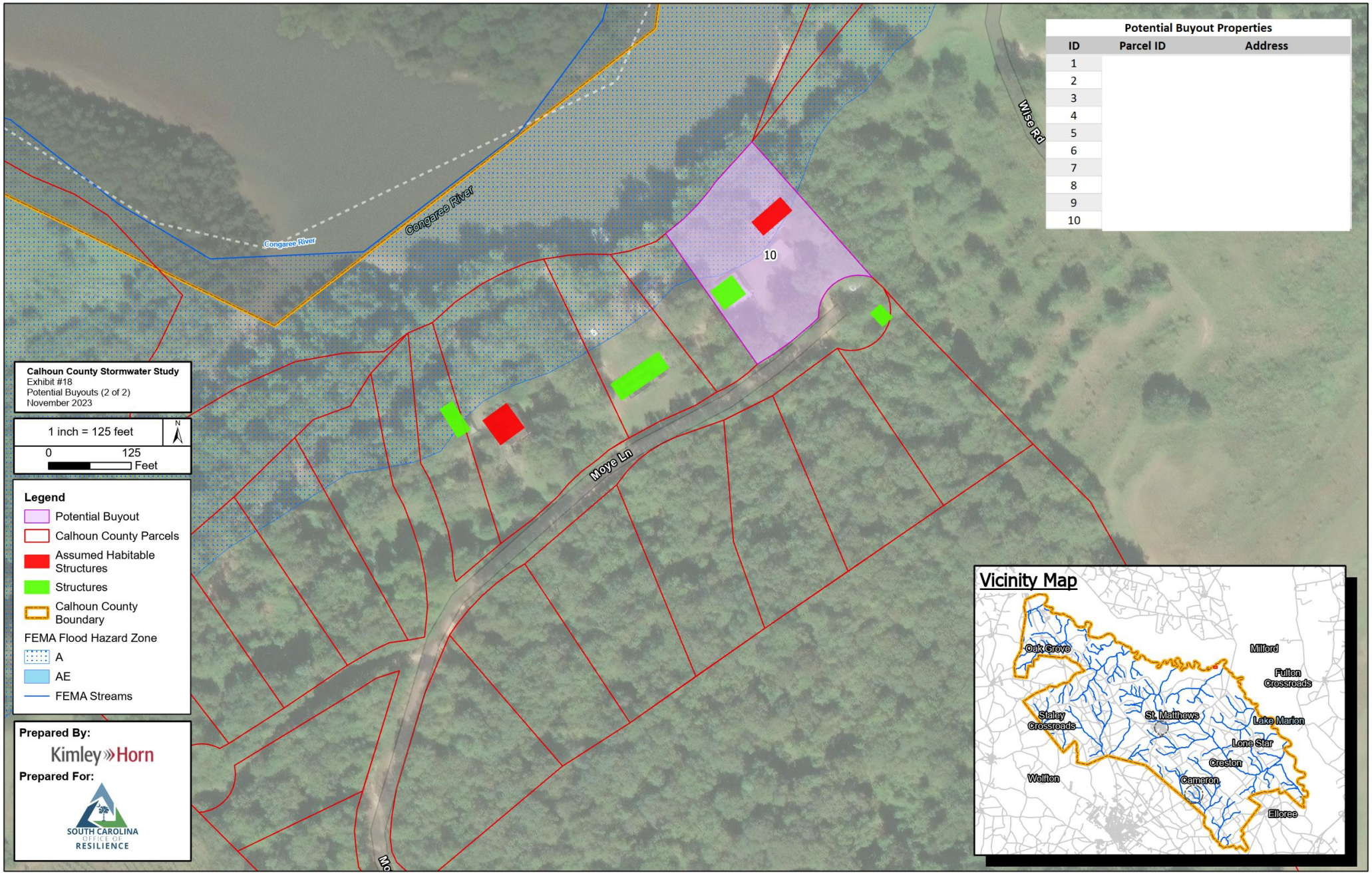

Project 8
ALT 1: Upsize crossing to 2-6'x8' boxes to meet LOS
ALT 2: Upsize crossing to bridge to pass larger storms
Project 7
ALT 1: Upsize crossing to 4-8'x12' boxes to pass 100-year storm
Calhoun County Stormwater Study
Exhibit #14
Projects 7 and 8
November 2023
1 inch = 600 feet
0
600
Feet
Legend
Project Areas
Statewide Highways
Culvert Alternatives
Culvert Improvements
Culvert Inventory
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree
Winding Brook Dr
St John Rd
Oak View Rd
Natts Store Rd
Flee Bite Creek
Cook Branch
CSX Transportation


Calhoun County Stormwater Study
Exhibit #15
Project 9
November 2023
1 inch = 200 feet
0
200
Feet
N
Legend
Project Areas
Calhoun County Boundary
Town Limits
Statewide Highways
Closed-System Alternatives
Node Improvements
Node Inventory
Pipe Improvements
Pipe Inventory
Culvert Alternatives
Culvert Improvements
Culvert Inventory
Ditch Alternatives
Ditch Inventory
Ditch Imrovements
FEMA Streams
Preliminary Existing 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
ALT 2: Upsize closed-system to 48"-54" RCP to meet LOS
ALT 1: Install approximately 1800 LF of 24"-36" RCP closed-system and redirect flow to the established tributary to Tributary to Four Hole Swamp Tributary
CB-ALT-10.1
CB-ALT-10.2
CB-ALT-10.3
CB-ALT-10.4
CB-ALT-10.5
CB-ALT-10.6
CB-ALT-10.7
CB-ALT-10.8
CB-ALT-10.9
CB-ALT-10.10
CB-ALT-10.11
CB-ALT-10.12
CB-ALT-10.13
CB-ALT-10.14
CB-ALT-10.15
CB-ALT-10.16
Old Orangeburg Rd
Cameron Rd
Dogwood St
Old State Rd
N Lawton Dr
S Boyce Lawton Dr
CSX Transportation
33
176
Orange St
Summers Aly
N Boyce Lawton Dr
S Boyce Lawton Dr
4th St
N 1st St
S 3rd St
D-1
D-2
D-3
D-4
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree
Maxar, Microsoft, Esri Community Maps Contributors, © OpenStreet


Potential Low Impact/Green Infrastructure Opportunities
Project | Alternative | Alternative Description
10 | 1 | Additional Watershed Storage/Potential Reroute of Area or Stormwater Park
10 | 2 | Additional Watershed Storage or Stormwater Park
10 | 3 | Additional Watershed Storage or Stormwater Park
10 | 4 | Additional Watershed Storage or Stormwater Park
11 | 1 | Additional Watershed Storage
11 | 2 | Potential Cistern for Storage of Runoff to be Reused Onsite
Calhoun County Stormwater Study
Exhibit #16
LID/Green Infrastructure Opportunities
November 2023
1 inch = 1,000 feet
0 1,000 Feet
N
Legend
Calhoun County Parcels
Town Limits
Calhoun County Boundary
FEMA Streams
Low Impact/Green Infrastructure Opportunities
Project 10
Project 11
Preliminary 1% Annual Chance Flood Depth (Kimley-Horn, 2023)
>15 ft
10 - 15 ft
5 - 10 ft
2 - 5 ft
1 - 2 ft
0 -1 ft
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA OFFICE OF RESILIENCE
Vicinity Map
St Matthews
Bridge St
Calhoun Rd
Agnes St
Liberty St
Fair St
Ellis Ave
Pearl St
Mill St
Chestnut St
Gressette Blvd
Manor Ln
Old St
Antley Spring Branch
Halfway Swamp Creek
Lake Inspiration
Scott St NE
Molly St
Keith St
F R Huff Dr
Guess Ln
Park St
Mack St
N Harry C Rayson Dr
S Harry C Rayson Dr
Bynum St
Amaker St
Butler St
Dudley St
Pou St
Pine Hill Rd
S Richland Ave
Brook Dr
N Rucker Dr
S Rucker Dr
Academy Rd
Longstreet
601
6
Oak Grove
Milford
Fulton Crossroads
Stuley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree



Potential Buyout Properties		
ID	Parcel ID	Address
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		


Potential Buyout Properties
ID
Parcel ID
Address
1
2
3
4
5
6
7
8
9
10
Wise Rd
Congaree River
Congaree River
10
Moye Ln
Calhoun County Stormwater Study
Exhibit #18
Potential Buyouts (2 of 2)
November 2023
1 inch = 125 feet
N
0
125
Feet
Legend
Potential Buyout
Calhoun County Parcels
Assumed Habitable Structures
Structures
Calhoun County Boundary
FEMA Flood Hazard Zone
A
AE
FEMA Streams
Prepared By:
Kimley»Horn
Prepared For:
SOUTH CAROLINA
OFFICE OF
RESILIENCE
Vicinity Map
Oak Grove
Milford
Fulton Crossroads
Staley Crossroads
St. Matthews
Lake Marion
Lone Star
Creston
Wolfton
Cameron
Elloree

APPENDIX D

INDIVIDUAL PROJECT SCORING MATRICES AND OPCCS

Kimley»Horn

SOUTH CAROLINA OFFICE OF RESILIENCE

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 1 - CAMERON - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of railroad easements and permitting along drainage easements from multiple private land owners.
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	8	4 out of 5 crossings meet LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	12	5 out of 7 structures removed from the floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	8	Roads primarily cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	8	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**60**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-1) ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$28,350**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	45	LF	$30	$1,350
DRAINAGE					**$40,500**
	8' x 6' CONC. BOX CULVERT	45	LF	$900	$40,500
CONSTRUCTION SUBTOTAL					**$68,900**
INCIDENTALS					**$20,800**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$6,900	$6,900
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$5,600	$5,600
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$8,300	$8,300
PROPERTY ACQUISITION					**$6,900**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$6,900	$6,900
DESIGN & CONSTRUCTION SERVICES					**$13,900**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$10,400	$10,400
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$3,500	$3,500
CONTINGENCY					**$20,700**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$20,700	$20,700
TOTAL CONSTRUCTION COST					**$131,200**

Notes:

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*Cost of real estate acquisition assumes majority of required easements will be donated by the property owner.

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-2) ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$29,700**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	90	LF	$30	$2,700
DRAINAGE					**$81,000**
	8' x 6' CONC. BOX CULVERT	90	LF	$900	$81,000
CONSTRUCTION SUBTOTAL					**$110,700**
INCIDENTALS					**$33,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$11,100	$11,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$8,900	$8,900
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$13,300	$13,300
PROPERTY ACQUISITION					**$11,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$11,100	$11,100
DESIGN & CONSTRUCTION SERVICES					**$22,300**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$16,700	$16,700
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$5,600	$5,600
CONTINGENCY					**$33,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$33,300	$33,300
TOTAL CONSTRUCTION COST					**$210,700**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-3) ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	100	LF	$30	$3,000
DRAINAGE					**$100,000**
	8' x 5' CONC. BOX CULVERT	100	LF	$1,000	$100,000
CONSTRUCTION SUBTOTAL					**$130,000**
INCIDENTALS					**$39,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$13,000	$13,000
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$10,400	$10,400
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$15,600	$15,600
PROPERTY ACQUISITION					**$13,000**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$13,000	$13,000
DESIGN & CONSTRUCTION SERVICES					**$26,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$19,500	$19,500
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$6,500	$6,500
CONTINGENCY					**$39,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$39,000	$39,000
TOTAL CONSTRUCTION COST					**$247,000**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-4) ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$88,560**
	6' x 6' CONC. BOX CULVERT	120	LF	$738	$88,560
CONSTRUCTION SUBTOTAL					**$119,200**
INCIDENTALS					**$36,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$12,000	$12,000
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$9,600	$9,600
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$14,400	$14,400
PROPERTY ACQUISITION					**$12,000**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$12,000	$12,000
DESIGN & CONSTRUCTION SERVICES					**$23,900**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$17,900	$17,900
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$6,000	$6,000
CONTINGENCY					**$35,800**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$35,800	$35,800
TOTAL CONSTRUCTION COST					**$226,900**

Notes:

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-5) ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$31,500**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	150	LF	$30	$4,500
DRAINAGE					**$225,000**
	7' x 7' CONC. BOX CULVERT	150	LF	$1,500	$225,000
CONSTRUCTION SUBTOTAL					**$256,500**
INCIDENTALS					**$77,100**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$25,700	$25,700
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$20,600	$20,600
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$30,800	$30,800
PROPERTY ACQUISITION					**$25,700**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$25,700	$25,700
DESIGN & CONSTRUCTION SERVICES					**$51,400**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$38,500	$38,500
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$12,900	$12,900
CONTINGENCY					**$77,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$77,000	$77,000
TOTAL CONSTRUCTION COST					**$487,700**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (DITCH) - ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$27,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
DRAINAGE					**$14,600**
	DITCH EXCAVATION	365	LF	$40	$14,600
CONSTRUCTION SUBTOTAL					**$41,600**
INCIDENTALS					**$12,600**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$4,200	$4,200
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$3,400	$3,400
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$5,000	$5,000
PROPERTY ACQUISITION					**$4,200**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$4,200	$4,200
DESIGN & CONSTRUCTION SERVICES					**$8,400**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$6,300	$6,300
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$2,100	$2,100
CONTINGENCY					**$12,500**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$12,500	$12,500
TOTAL CONSTRUCTION COST					**$79,300**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 1 - CAMERON - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of railroad easements and permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	12	All crossings meet or exceed LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	10	5 out of 7 structures removed from the floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridges
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**66**	

SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-1) - ALT 2 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$28,350**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	45	LF	$30	$1,350
DRAINAGE					**$49,500**
	10' x 8' CONC. BOX CULVERT	45	LF	$1,100	$49,500
CONSTRUCTION SUBTOTAL					**$77,900**
INCIDENTALS					**$23,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$7,800	$7,800
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,300	$6,300
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$9,400	$9,400
PROPERTY ACQUISITION					**$7,800**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$7,800	$7,800
DESIGN & CONSTRUCTION SERVICES					**$15,600**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$11,700	$11,700
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$3,900	$3,900
CONTINGENCY					**$23,400**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$23,400	$23,400
TOTAL CONSTRUCTION COST					**$148,200**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-2) ALT 2 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$29,700**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	90	LF	$30	$2,700
DRAINAGE					**$35,000**
	BRIDGE	140	LF	$250	$35,000
CONSTRUCTION SUBTOTAL					**$64,700**
INCIDENTALS					**$19,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$6,500	$6,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$5,200	$5,200
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$7,800	$7,800
PROPERTY ACQUISITION					**$6,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$6,500	$6,500
DESIGN & CONSTRUCTION SERVICES					**$13,100**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$9,800	$9,800
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$3,300	$3,300
CONTINGENCY					**$19,500**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$19,500	$19,500
TOTAL CONSTRUCTION COST					**$123,300**

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 1 (C-3) ALT 2 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$27,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
DRAINAGE					**$3,400**
	DITCH EXCAVATION	85	LF	$40	$3,400
CONSTRUCTION SUBTOTAL					**$30,400**
INCIDENTALS					**$9,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$3,100	$3,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$2,500	$2,500
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$3,700	$3,700
PROPERTY ACQUISITION					**$3,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$3,100	$3,100
DESIGN & CONSTRUCTION SERVICES					**$6,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$4,600	$4,600
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$1,600	$1,600
CONTINGENCY					**$9,200**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$9,200	$9,200
TOTAL CONSTRUCTION COST					**$58,200**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 2 - ST. MATTHEWS - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	12	Requires SCDOT permitting and possible FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			12	58% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	8	2 out of 3 crossings meet LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures removed, reduced flooding
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	8	Roads primarily cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**60**	

SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-6) ALT 1- TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$32,850**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	195	LF	$30	$5,850
DRAINAGE					**$175,500**
	8' x 6' CONC. BOX CULVERT	195	LF	$900	$175,500
CONSTRUCTION SUBTOTAL					**$208,400**
INCIDENTALS					**$62,700**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$20,900	$20,900
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$16,700	$16,700
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$25,100	$25,100
PROPERTY ACQUISITION					**$20,900**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$20,900	$20,900
DESIGN & CONSTRUCTION SERVICES					**$41,800**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$31,300	$31,300
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$10,500	$10,500
CONTINGENCY					**$62,600**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$62,600	$62,600
TOTAL CONSTRUCTION COST					**$396,400**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-14) ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$120,000**
	10' x 7' CONC. BOX CULVERT	120	LF	$1,000	$120,000
CONSTRUCTION SUBTOTAL					**$150,600**
INCIDENTALS					**$45,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$15,100	$15,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$12,100	$12,100
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$18,100	$18,100
PROPERTY ACQUISITION					**$15,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$15,100	$15,100
DESIGN & CONSTRUCTION SERVICES					**$30,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$22,600	$22,600
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$7,600	$7,600
CONTINGENCY					**$45,200**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$45,200	$45,200
TOTAL CONSTRUCTION COST					**$286,400**

Notes:

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*Cost of real estate acquisition assumes majority of required easements will be donated by the property owner.

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-15) ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$31,950**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	165	LF	$30	$4,950
DRAINAGE					**$181,500**
	10' x 8' CONC. BOX CULVERT	165	LF	$1,100	$181,500
CONSTRUCTION SUBTOTAL					**$213,500**
INCIDENTALS					**$64,200**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$21,400	$21,400
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$17,100	$17,100
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$25,700	$25,700
PROPERTY ACQUISITION					**$21,400**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$21,400	$21,400
DESIGN & CONSTRUCTION SERVICES					**$42,800**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$32,100	$32,100
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$10,700	$10,700
CONTINGENCY					**$64,100**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$64,100	$64,100
TOTAL CONSTRUCTION COST					**$406,000**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 2 - ST. MATTHEWS - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	12	Requires SCDOT permitting and possible FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			12	58% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	12	All crossings meet or exceed LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures removed, reduced flooding
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridges
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**66**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-6) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$32,850**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	195	LF	$30	$5,850
DRAINAGE					**$52,500**
	BRIDGE	210	SQ. FT	$250	$52,500
CONSTRUCTION SUBTOTAL					**$85,400**
INCIDENTALS					**$25,800**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$8,600	$8,600
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,900	$6,900
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$10,300	$10,300
PROPERTY ACQUISITION					**$8,600**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$8,600	$8,600
DESIGN & CONSTRUCTION SERVICES					**$17,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$12,900	$12,900
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,300	$4,300
CONTINGENCY					**$25,700**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$25,700	$25,700
TOTAL CONSTRUCTION COST					**$162,700**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-14) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$60,000**
	BRIDGE	240	LF	$250	$60,000
CONSTRUCTION SUBTOTAL					**$90,600**
INCIDENTALS					**$27,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$9,100	$9,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$7,300	$7,300
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$10,900	$10,900
PROPERTY ACQUISITION					**$9,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$9,100	$9,100
DESIGN & CONSTRUCTION SERVICES					**$18,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$13,600	$13,600
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,600	$4,600
CONTINGENCY					**$27,200**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$27,200	$27,200
TOTAL CONSTRUCTION COST					**$172,400**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 2 (C-15) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$31,950**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	165	LF	$30	$4,950
DRAINAGE					**$60,000**
	BRIDGE	240	LF	$250	$60,000
CONSTRUCTION SUBTOTAL					**$92,000**
INCIDENTALS					**$27,700**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$9,200	$9,200
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$7,400	$7,400
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$11,100	$11,100
PROPERTY ACQUISITION					**$9,200**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$9,200	$9,200
DESIGN & CONSTRUCTION SERVICES					**$18,400**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$13,800	$13,800
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,600	$4,600
CONTINGENCY					**$27,600**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$27,600	$27,600
TOTAL CONSTRUCTION COST					**$174,900**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 3 - ST. MATTHEWS - ALT 1

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of railroad easements and permitting, SCDOT permitting, and drainage easements from multiple private land owners.
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	39% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	12	All crossings meet or exceed LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures removed, reduced flooding
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	12	Roads are primarily cleared from 100-year flooding
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**60**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-7) ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	100	LF	$30	$3,000
DRAINAGE					**$100,000**
	8' x 5' CONC. BOX CULVERT	100	LF	$1,000	$100,000
CONSTRUCTION SUBTOTAL					**$130,000**
INCIDENTALS					**$39,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$13,000	$13,000
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$10,400	$10,400
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$15,600	$15,600
PROPERTY ACQUISITION					**$13,000**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$13,000	$13,000
DESIGN & CONSTRUCTION SERVICES					**$26,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$19,500	$19,500
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$6,500	$6,500
CONTINGENCY					**$39,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$39,000	$39,000
TOTAL CONSTRUCTION COST					**$247,000**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (SWALE) - ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$27,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
DRAINAGE					**$22,400**
	DITCH EXCAVATION	560	LF	$40	$22,400
CONSTRUCTION SUBTOTAL					**$49,400**
INCIDENTALS					**$15,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$5,000	$5,000
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$4,000	$4,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$6,000	$6,000
PROPERTY ACQUISITION					**$5,000**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$5,000	$5,000
DESIGN & CONSTRUCTION SERVICES					**$10,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$7,500	$7,500
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$2,500	$2,500
CONTINGENCY					**$14,900**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$14,900	$14,900
TOTAL CONSTRUCTION COST					**$94,300**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-8) ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$35,100**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	270	LF	$30	$8,100
DRAINAGE					**$189,000**
	6' x 5' CONC. BOX CULVERT	270	LF	$700	$189,000
CONSTRUCTION SUBTOTAL					**$224,100**
INCIDENTALS					**$67,400**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$22,500	$22,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$18,000	$18,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$26,900	$26,900
PROPERTY ACQUISITION					**$22,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$22,500	$22,500
DESIGN & CONSTRUCTION SERVICES					**$45,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$33,700	$33,700
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$11,300	$11,300
CONTINGENCY					**$67,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$67,300	$67,300
TOTAL CONSTRUCTION COST					**$426,300**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-9) ALT 1 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$32,850**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	195	LF	$30	$5,850
DRAINAGE					**$214,500**
	10' x 8' CONC. BOX CULVERT	195	LF	$1,100	$214,500
CONSTRUCTION SUBTOTAL					**$247,400**
INCIDENTALS					**$74,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$24,800	$24,800
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$19,800	$19,800
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$29,700	$29,700
PROPERTY ACQUISITION					**$24,800**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$24,800	$24,800
DESIGN & CONSTRUCTION SERVICES					**$49,600**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$37,200	$37,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$12,400	$12,400
CONTINGENCY					**$74,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$74,300	$74,300
TOTAL CONSTRUCTION COST					**$470,400**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 3 - ST. MATTHEWS - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of railroad easements and permitting, SCDOT permitting, and drainage easements from multiple private land owners.
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	39% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	All crossings exceed LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures removed, reduced flooding
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	15	Roads are cleared from 100-year events or higher
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridges
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Many crossings in series
TOTAL SCORE		**100**				**66**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-7) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	100	LF	$30	$3,000
DRAINAGE					**$22,500**
	BRIDGE	90	SQ. FT	$250	$22,500
CONSTRUCTION SUBTOTAL					**$52,500**
INCIDENTALS					**$15,800**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$5,300	$5,300
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$4,200	$4,200
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$6,300	$6,300
PROPERTY ACQUISITION					**$5,300**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$5,300	$5,300
DESIGN & CONSTRUCTION SERVICES					**$10,600**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$7,900	$7,900
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$2,700	$2,700
CONTINGENCY					**$15,800**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$15,800	$15,800
TOTAL CONSTRUCTION COST					**$100,000**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-8) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$35,100**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	270	LF	$30	$8,100
DRAINAGE					**$52,000**
	BRIDGE	208	LF	$250	$52,000
CONSTRUCTION SUBTOTAL					**$87,100**
INCIDENTALS					**$26,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$8,800	$8,800
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$7,000	$7,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$10,500	$10,500
PROPERTY ACQUISITION					**$8,800**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$8,800	$8,800
DESIGN & CONSTRUCTION SERVICES					**$17,500**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$13,100	$13,100
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,400	$4,400
CONTINGENCY					**$26,200**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$26,200	$26,200
TOTAL CONSTRUCTION COST					**$165,900**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (C-9,C-10,C-11) ALT 2 - TOWN OF ST. MATTHEWS

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$32,850**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	195	LF	$30	$5,850
DRAINAGE					**$80,000**
	BRIDGE	320	LF	$250	$80,000
CONSTRUCTION SUBTOTAL					**$112,900**
INCIDENTALS					**$34,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$11,300	$11,300
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$9,100	$9,100
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$13,600	$13,600
PROPERTY ACQUISITION					**$11,300**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$11,300	$11,300
DESIGN & CONSTRUCTION SERVICES					**$22,700**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$17,000	$17,000
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$5,700	$5,700
CONTINGENCY					**$33,900**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$33,900	$33,900
TOTAL CONSTRUCTION COST					**$214,800**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 3 - ST. MATTHEWS - ALT 3

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Primarily public owned land, some drainage easements needed from private land owners
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	39% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	Meets LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	15	Many structures removed from floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	9	Little to no stream maintenance
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	5	Crossing improvements upstream and downstream
TOTAL SCORE		**100**				**65**	

SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 3 (STREAM RESTORATION) ALT 3 - TOWN OF ST. MATTHEWS

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$27,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
DRAINAGE					**$156,564**
	EARTHWORK	1,640	LF	$40	$65,600
	EROSION CONTROL STREAM RESTORATION	1	LS	$65,313	$65,313
	PLANTING	1	LS	$25,651	$25,651
CONSTRUCTION SUBTOTAL					**$183,600**
INCIDENTALS					**$36,800**
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$14,700	$14,700
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$22,100	$22,100
PROPERTY ACQUISITION					**$18,400**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$18,400	$18,400
DESIGN & CONSTRUCTION SERVICES					**$36,800**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$27,600	$27,600
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$9,200	$9,200
CONTINGENCY					**$55,100**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$55,100	$55,100
TOTAL CONSTRUCTION COST					**$330,700**

Notes:

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive

SOUTH CAROLINA OFFICE OF RESILIENCE

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PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 4 - SANDY RUN - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	16	Requires acquisition of drainage easements from some private land owners along with FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	41% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	All crossings meet LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	3	Multiple culvert improvements along same road
TOTAL SCORE		**100**				**62**	

SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.1) ALT 1 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$32,040**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	168	LF	$30	$5,040
DRAINAGE					**$8,400**
	60" CONC. PIPE	168	LF	$50	$8,400
CONSTRUCTION SUBTOTAL					**$40,500**
INCIDENTALS					**$12,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$4,100	$4,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$3,300	$3,300
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$4,900	$4,900
PROPERTY ACQUISITION					**$4,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$4,100	$4,100
DESIGN & CONSTRUCTION SERVICES					**$8,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$6,100	$6,100
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$2,100	$2,100
CONTINGENCY					**$12,200**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$12,200	$12,200
TOTAL CONSTRUCTION COST					**$77,300**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.2) ALT 1 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,240**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	108	LF	$30	$3,240
DRAINAGE					**$54,000**
	60" CONC. PIPE	108	LF	$500	$54,000
CONSTRUCTION SUBTOTAL					**$84,300**
INCIDENTALS					**$25,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$8,500	$8,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,800	$6,800
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$10,200	$10,200
PROPERTY ACQUISITION					**$8,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$8,500	$8,500
DESIGN & CONSTRUCTION SERVICES					**$17,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$12,700	$12,700
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,300	$4,300
CONTINGENCY					**$25,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$25,300	$25,300
TOTAL CONSTRUCTION COST					**$160,600**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.3) ALT 1 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$31,950**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	165	LF	$30	$4,950
DRAINAGE					**$82,500**
	60" CONC. PIPE	165	LF	$500	$82,500
CONSTRUCTION SUBTOTAL					**$114,500**
INCIDENTALS					**$34,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$11,500	$11,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$9,200	$9,200
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$13,800	$13,800
PROPERTY ACQUISITION					**$11,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$11,500	$11,500
DESIGN & CONSTRUCTION SERVICES					**$23,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$17,200	$17,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$5,800	$5,800
CONTINGENCY					**$34,400**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$34,400	$34,400
TOTAL CONSTRUCTION COST					**$217,900**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

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OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.4) ALT 1 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$34,200**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	240	LF	$30	$7,200
DRAINAGE					**$240,000**
	8' x 5' CONC. BOX CULVERT	240	LF	$1,000	$240,000
CONSTRUCTION SUBTOTAL					**$274,200**
INCIDENTALS					**$82,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$27,500	$27,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$22,000	$22,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$33,000	$33,000
PROPERTY ACQUISITION					**$27,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$27,500	$27,500
DESIGN & CONSTRUCTION SERVICES					**$55,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$41,200	$41,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$13,800	$13,800
CONTINGENCY					**$82,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$82,300	$82,300
TOTAL CONSTRUCTION COST					**$521,500**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 4 - SANDY RUN - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	16	Requires acquisition of drainage easements from some private land owners along with FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	41% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	All crossings exceed LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	15	Roads are cleared from 100-year event
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	3	Multiple culvert improvements along same road
TOTAL SCORE		**100**				**72**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.1) ALT 2 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,360**
		1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	112	LF	$30	$3,360
DRAINAGE					**$100,800**
	8' x 6' CONC. BOX CULVERT	112	LF	$900	$100,800
CONSTRUCTION SUBTOTAL					**$131,200**
INCIDENTALS					**$39,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$13,200	$13,200
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$10,500	$10,500
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$15,800	$15,800
PROPERTY ACQUISITION					**$13,200**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$13,200	$13,200
DESIGN & CONSTRUCTION SERVICES					**$26,300**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$19,700	$19,700
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$6,600	$6,600
CONTINGENCY					**$39,400**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$39,400	$39,400
TOTAL CONSTRUCTION COST					**$249,600**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.2) ALT 2 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,240**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	108	LF	$30	$3,240
DRAINAGE					**$75,600**
	6' x 5' CONC. BOX CULVERT	108	LF	$700	$75,600
CONSTRUCTION SUBTOTAL					**$105,900**
INCIDENTALS					**$31,900**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$10,600	$10,600
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$8,500	$8,500
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$12,800	$12,800
PROPERTY ACQUISITION					**$10,600**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$10,600	$10,600
DESIGN & CONSTRUCTION SERVICES					**$21,200**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$15,900	$15,900
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$5,300	$5,300
CONTINGENCY					**$31,800**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$31,800	$31,800
TOTAL CONSTRUCTION COST					**$201,400**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 4 (4.3) ALT 2 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$31,950**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	165	LF	$30	$4,950
DRAINAGE					**$115,500**
	6' x 5' CONC. BOX CULVERT	165	LF	$700	$115,500
CONSTRUCTION SUBTOTAL					**$147,500**
INCIDENTALS					**$44,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$14,800	$14,800
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$11,800	$11,800
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$17,700	$17,700
PROPERTY ACQUISITION					**$14,800**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$14,800	$14,800
DESIGN & CONSTRUCTION SERVICES					**$29,600**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$22,200	$22,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$7,400	$7,400
CONTINGENCY					**$44,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$44,300	$44,300
TOTAL CONSTRUCTION COST					**$280,500**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 5 - SANDY RUN - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	14	Requires acquisition of drainage easements from some private land owners along with SCDOT permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	41% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	Meets LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**58**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 5 - ALT 1 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$108,000**
	8' x 6' CONC. BOX CULVERT	120	LF	$900	$108,000
CONSTRUCTION SUBTOTAL					**$138,600**
INCIDENTALS					**$41,700**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$13,900	$13,900
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$11,100	$11,100
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$16,700	$16,700
PROPERTY ACQUISITION					**$13,900**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$13,900	$13,900
DESIGN & CONSTRUCTION SERVICES					**$27,800**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$20,800	$20,800
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$7,000	$7,000
CONTINGENCY					**$41,600**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$41,600	$41,600
TOTAL CONSTRUCTION COST					**$263,600**

Notes:

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*Cost of real estate acquisition assumes majority of required easements will be donated by the property owner.

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 5 - SANDY RUN - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	14	Requires acquisition of drainage easements from some private land owners along with SCDOT permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			8	41% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	Exceeds LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	12	Roads are primarily cleared from 100-year event
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridge
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**65**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 5 - ALT 2 - SANDY RUN

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$43,750**
	BRIDGE	175	LF	$250	$43,750
CONSTRUCTION SUBTOTAL					**$74,400**
INCIDENTALS					**$22,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$7,500	$7,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,000	$6,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$9,000	$9,000
PROPERTY ACQUISITION					**$7,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$7,500	$7,500
DESIGN & CONSTRUCTION SERVICES					**$15,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$11,200	$11,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$3,800	$3,800
CONTINGENCY					**$22,400**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$22,400	$22,400
TOTAL CONSTRUCTION COST					**$141,800**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 6 - CALHOUN COUNTY - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	10	Requires acquisition of drainage easements from some private land owners along with SCDOT and FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	Meets LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**57**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 6- ALT 1 - CALHOUN COUNTY

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$156,000**
	12' x 8' CONC. BOX CULVERT	120	LF	$1,300	$156,000
CONSTRUCTION SUBTOTAL					**$186,600**
INCIDENTALS					**$56,100**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$18,700	$18,700
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$15,000	$15,000
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$22,400	$22,400
PROPERTY ACQUISITION					**$18,700**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$18,700	$18,700
DESIGN & CONSTRUCTION SERVICES					**$37,400**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$28,000	$28,000
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$9,400	$9,400
CONTINGENCY					**$56,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$56,000	$56,000
TOTAL CONSTRUCTION COST					**$354,800**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 6 - CALHOUN COUNTY - ALT 2

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	10	Requires acquisition of drainage easements from some private land owners along with SCDOT and FEMA permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	Exceeds LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	5	No structures in floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	12	Roads are primarily cleared from 100-year event
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridge
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**64**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 6- ALT 2 - CALHOUN COUNTY

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,600**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	120	LF	$30	$3,600
DRAINAGE					**$52,500**
	BRIDGE	210	SQ. FT	$250	$52,500
CONSTRUCTION SUBTOTAL					**$83,100**
INCIDENTALS					**$25,100**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$8,400	$8,400
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,700	$6,700
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$10,000	$10,000
PROPERTY ACQUISITION					**$8,400**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$8,400	$8,400
DESIGN & CONSTRUCTION SERVICES					**$16,700**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$12,500	$12,500
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,200	$4,200
CONTINGENCY					**$25,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$25,000	$25,000
TOTAL CONSTRUCTION COST					**$158,300**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 7 - CALHOUN COUNTY - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	12	Requires acquisition of drainage easements from some private land owners along with SCDOT permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	Exceeds LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	8	1 of 2 structures removed from floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	15	Roads are cleared from 100-year flooding
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridge
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**72**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 7 - ALT 1 - CALHOUN COUNTY

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$33,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	200	LF	$30	$6,000
DRAINAGE					**$260,000**
	12' x 8' CONC. BOX CULVERT	200	LF	$1,300	$260,000
CONSTRUCTION SUBTOTAL					**$293,000**
INCIDENTALS					**$88,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$29,300	$29,300
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$23,500	$23,500
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$35,200	$35,200
PROPERTY ACQUISITION					**$29,300**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$29,300	$29,300
DESIGN & CONSTRUCTION SERVICES					**$58,700**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$44,000	$44,000
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$14,700	$14,700
CONTINGENCY					**$87,900**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$87,900	$87,900
TOTAL CONSTRUCTION COST					**$556,900**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 8 - CALHOUN COUNTY - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	16	Requires acquisition of drainage easements from some private land owners along with SCDOT permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			9	45% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	Meets LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	8	1 of 2 structures removed from floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Roads are cleared from 25-year flooding but not in higher events
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance/clearing of culverts
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**64**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 8 - ALT 1 - CALHOUN COUNTY

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	100	LF	$30	$3,000
DRAINAGE					**$90,000**
	8' x 6' CONC. BOX CULVERT	100	LF	$900	$90,000
CONSTRUCTION SUBTOTAL					**$120,000**
INCIDENTALS					**$36,000**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$12,000	$12,000
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$9,600	$9,600
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$14,400	$14,400
PROPERTY ACQUISITION					**$12,000**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$12,000	$12,000
DESIGN & CONSTRUCTION SERVICES					**$24,000**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$18,000	$18,000
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$6,000	$6,000
CONTINGENCY					**$36,000**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$36,000	$36,000
TOTAL CONSTRUCTION COST					**$228,000**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA
CALHOUN COUNTY STORMWATER STUDY
PROJECT 8 - CALHOUN COUNTY - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	16	Requires acquisition of drainage easements from some private land owners along with SCDOT permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			9	45% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	12	Exceeds LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	10	2 of 2 structures removed from the floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	7	Roads are cleared from 100-year event
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	10	Regular maintenance of bridge
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	1	No other projects in proximity
TOTAL SCORE		**100**				**65**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 8 - ALT 2 - CALHOUN COUNTY

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$30,000**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	100	LF	$30	$3,000
DRAINAGE					**$52,000**
	BRIDGE	208	SQ. FT	$250	$52,000
CONSTRUCTION SUBTOTAL					**$82,000**
INCIDENTALS					**$24,700**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$8,200	$8,200
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$6,600	$6,600
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$9,900	$9,900
PROPERTY ACQUISITION					**$8,200**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$8,200	$8,200
DESIGN & CONSTRUCTION SERVICES					**$16,400**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$12,300	$12,300
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$4,100	$4,100
CONTINGENCY					**$24,600**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$24,600	$24,600
TOTAL CONSTRUCTION COST					**$155,900**

Notes:

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SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA

CALHOUN COUNTY STORMWATER STUDY

PROJECT 9 - CAMERON CLOSED SYSTEM - ALT 1

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of easments from private land owners along with SCDOT and railroad permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	10	Meets LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	8	Removes some structures from floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	10	Clears Old State Road partially
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	3	Difficult to access underground stormwater structures
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	2	Benefits of new closed system in addition to existing system
TOTAL SCORE		**100**				**52**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 9 - ALT 1 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$121,800**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	3060	LF	$30	$91,800
	REMOVE EXISTING STRUCTURE	3	EA	$1,000	$3,000
DRAINAGE					**$333,000**
	24" CONC. PIPE	900	LF	$145	$130,500
	36" CONC. PIPE	900	LF	$215	$193,500
	DRAINAGE STRUCTURES	3	EA	$3,000	$9,000
CONSTRUCTION SUBTOTAL					**$454,800**
INCIDENTALS					**$136,500**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$45,500	$45,500
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$36,400	$36,400
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$54,600	$54,600
PROPERTY ACQUISITION					**$45,500**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$45,500	$45,500
DESIGN & CONSTRUCTION SERVICES					**$91,100**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$68,300	$68,300
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$22,800	$22,800
CONTINGENCY					**$136,500**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$136,500	$136,500
TOTAL CONSTRUCTION COST					**$864,400**

Notes:

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

*Cost of real estate acquisition assumes majority of required easements will be donated by the property owner.

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

PROJECT SCORING CRITERIA

CALHOUN COUNTY STORMWATER STUDY

PROJECT 9 - CAMERON CLOSED SYSTEM - ALT 2

SOUTH CAROLINA OFFICE OF RESILIENCE

CRITERIA	DEFINITION	Maximum Points	SCORING SCALE DESCRIPTIONS			SCORE	NOTES
			Low	Medium	High		
Permitting/Scheduling/ Easements	Extent of environmental state/federal regulatory approvals that are required. The acquisition of land that is required for implementation of the alternative.	20	*Significant challenges*	*Potential challenges*	*Little to no challenges*	8	Requires acquisition of easments from private land owners along with SCDOT and railroad permitting
Low-to-Moderate Income (LMI) Percent Served	Prioritizing positive impacts within low-to-moderate income groups	20	*LMI % Served x20*			11	52% LMI served
Level of Flood Risk Reduction	Meeting or exceeding 25-year level of service	15	*Improves LOS*	*Meets LOS*	*Exceeds LOS*	15	Exceeds LOS
Quantity of Flood Risk Reduction	Removal of Structures from the floodplain	15	*Removes no structures*	*Removes 3-8 structures*	*Removes over 8 structures*	12	Removes many structures throughout Cameron from floodplain
Mobility Improvement	Project alternative clears roads as paths of exits for flooded properties	15	*No roads cleared*	*Some access cleared*	*One or more roads fully cleared*	15	Clears Old State Road and Cameron Road intersection
Operation and Maintenance	O&M requirements of the alternative to maintain successful operation and extend longevity of the proposed infrastructure.	10	*Involves significant maintenance procedures and/or difficult access*	*Involves maintenance with some difficulty*	*Involves typical maintenance procedures and easy access*	3	Difficult to access underground stormwater structures
Project Synergies	Level of interaction or mutual benefit from two or more projects in close proximity	5	*No mutual benefit or interactions*	*Some mutual benefits*	*High mutual benefits*	4	Benefits from upsizing several pipes at once
TOTAL SCORE		**100**				**68**	

SOUTH CAROLINA OFFICE OF RESILIENCE

Kimley»Horn

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

CALHOUN COUNTY STORMWATER STUDY

PROJECT 9 - ALT 2 - TOWN OF CAMERON

SOUTH CAROLINA OFFICE OF RESILIENCE

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
GENERAL					**$74,500**
	MOBILIZATION	1	LS	$11,000	$11,000
	CONSTRUCTION SURVEYING	1	LS	$16,000	$16,000
	PIPE REMOVAL	1,250	LF	$30	$37,500
	REMOVE EXISTING STRUCTURE	10	EA	$1,000	$10,000
DRAINAGE					**$486,250**
	48" CONC. PIPE	625	LF	$310	$193,750
	54" CONC. PIPE	625	LF	$420	$262,500
	DRAINAGE STRUCTURES	10	EA	$3,000	$30,000
CONSTRUCTION SUBTOTAL					**$560,800**
INCIDENTALS					**$168,300**
	EROSION AND SEDIMENT CONTROL	10%	% OF CN SUBTOTAL	$56,100	$56,100
	TRAFFIC CONTROL	8%	% OF CN SUBTOTAL	$44,900	$44,900
	UTILITY RELOCATION	12%	% OF CN SUBTOTAL	$67,300	$67,300
PROPERTY ACQUISITION					**$56,100**
	DRAINAGE/TEMPORARY CONSTRUCTION EASEMENT	10%	% OF CN SUBTOTAL	$56,100	$56,100
DESIGN & CONSTRUCTION SERVICES					**$112,300**
	ENGINEERING DESIGN	15%	% OF CN SUBTOTAL	$84,200	$84,200
	CONSTRUCTION MANAGEMENT	5%	% OF CN SUBTOTAL	$28,100	$28,100
CONTINGENCY					**$168,300**
	CONTINGENCY	30%	% OF CN SUBTOTAL	$168,300	$168,300
TOTAL CONSTRUCTION COST					**$1,065,800**

Notes:

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

*Cost of real estate acquisition assumes majority of required easements will be donated by the property owner.

APPENDIX E

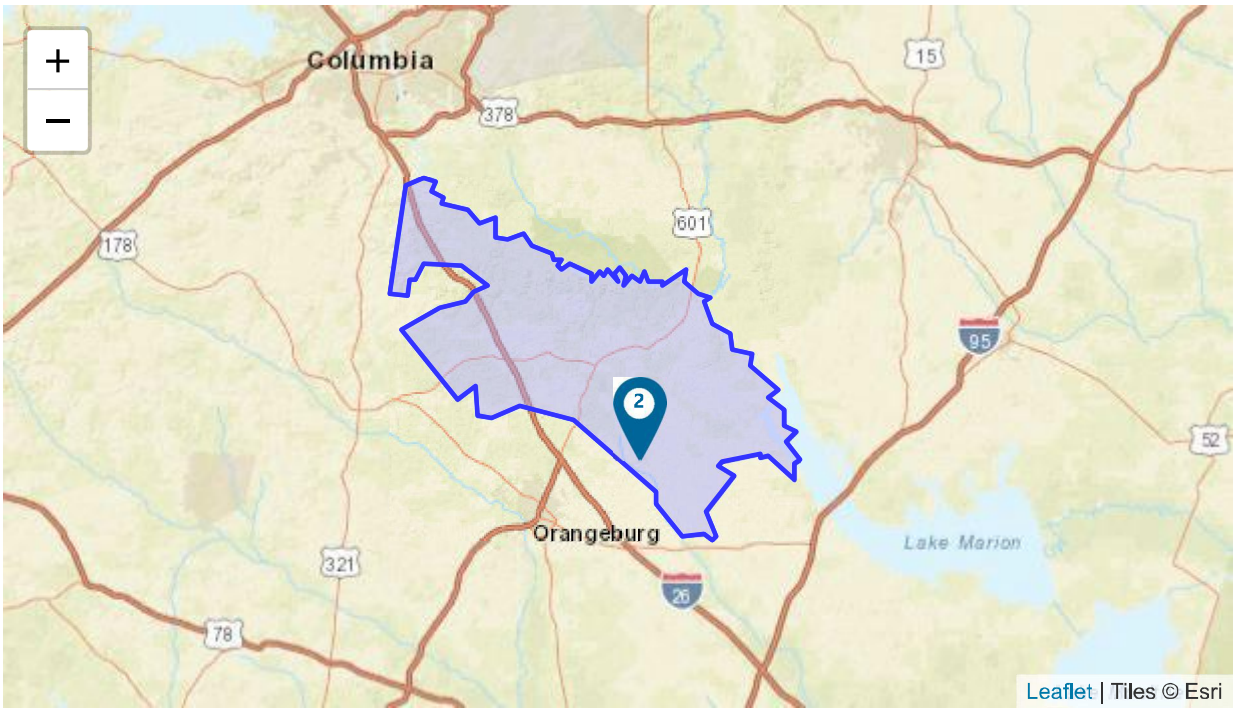
BENEFIT-COST ANALYSIS REPORTS

Benefit-Cost Calculator

V.6.0 (Build 20231108.2102 | Release Notes)

Benefit-Cost Analysis

Project Name: Project 1 (Town of Cameron Culverts) - ALT 1



				Using 7% Discount Rate			Using 3% Discount Rate (For BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Other @ Town of Cameron, South Carolina		DFA - Infrastructure Failure	$ 246,895	$ 1,410,401	0.18	$ 460,305	$ 1,434,260	0.32
2	Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030		DFA - Riverine Flood	$ 8,932,486	$ 0	0.00	$ 16,500,434	$ 0	0.00
TOTAL (SELECTED)				**$ 9,179,381**	**S 1,410,401**	**6.51**	**$ 16,960,739**	**$ 1,434,260**	**11.83**
TOTAL				**$ 9,179,381**	**S 1,410,401**	**6.51**	**$ 16,960,739**	**$ 1,434,260**	**11.83**

Property Configuration

Property Title:	Other @ Town of Cameron, South Carolina
Property Location:	29030, Calhoun, South Carolina
Property Coordinates:	33.55795000000006, -80.71502999999996
Hazard Type:	Infrastructure Failure
Mitigation Action Type:	Other
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ Town of Cameron, South Carolina

Project Useful Life (years):	50
Project Cost:	$1,382,800
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$2,000

Damage Analysis Parameters - Damage Frequency Assessment
Other @ Town of Cameron, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Roads and Bridges Properties
Other @ Town of Cameron, South Carolina

Estimated Number of One-Way Traffic Detour Trips per Day:	900
Additional Time per One-Way Detour Trip (minutes):	10.6
Number of Additional Miles:	3.6
Federal Rate ($):	0.655 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	8,083.11

Comments

-

Number of Trips:
Determined from SCDOT traffic data and the SCDOT Roadway Information System

-

Time per Trip:
Assumed/calculated using detour time and posted speed limits

-

Number of Miles:
Difference in distance of standard traffic route and detour route from a given point to another given point

Professional Expected Damages Before Mitigation
Other @ Town of Cameron, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	0	0	0	0	0	8,083
25	3	0	0	0	0	0	24,249
50	5	0	0	0	0	0	40,416
100	7	1,387,800	0	0	0	0	1,439,382

Comments

-

Damages Before Mitigation:
Assumed loss of function/road access based on storm event. Assumed the loss of function as well as complete infrastructure failure and cost to implement the proposed project in the 100-year event.

Annualized Damages Before Mitigation
Other @ Town of Cameron, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	8,083	840
25	24,249	626
50	40,416	2,412
100	1,439,382	14,394
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	1,512,130	18,272

Professional Expected Damages After Mitigation
Other @ Town of Cameron, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
50	1	0	0	0	0	0	8,083
100	3	0	0	0	0	0	24,249

Comments

-

Damages After Mitigation:

Assumed loss of function/road access based on storm event. Project is expected to provide 25-year LOS and reduce road flooding in larger events.

Annualized Damages After Mitigation
Other @ Town of Cameron, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
50	8,083	140
100	24,249	242
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	32,332	382

Benefits-Costs Summary
Other @ Town of Cameron, South Carolina

Total Standard Mitigation Benefits:	$246,895
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$246,895
Total Mitigation Project Cost:	$1,410,401
Benefit Cost Ratio - Standard:	0.18
Benefit Cost Ratio - Standard + Social:	0.18

Property Configuration

Property Title:	Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030
Property Location:	29030, Calhoun, South Carolina
Property Coordinates:	33.55773998590081, -80.71677195872961
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	13,199	0	0	0	0	0	13,199
50	65,995	0	0	0	0	0	65,995
100	131,990	0	0	0	0	0	131,990

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	13,199	590
50	65,995	933
100	131,990	1,320
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	211,184	2,843

Professional Expected Damages After Mitigation
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
50	23,758	0	0	0	0	0	23,758
100	47,516	0	0	0	0	0	47,516

Comments

-

Damages After Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties. Project is expected to provide 25-year LOS and reduce flooding in larger events.

Annualized Damages After Mitigation
Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
50	23,758	336
100	47,516	475
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	71,274	811

Standard Benefits - Ecosystem Services

Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Total Project Area (acres):	34
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	50.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$632,383

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Additional Benefits - Social

Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

Number of Workers:	13
Expected Annual Social Benefits:	$177,086

Comments

-

Number of Residents:

Determined by the number of parcel with residential structures impacted by the project improvements. Assumed 2 people per household with 1 person working.

Benefits-Costs Summary

Drainage Improvement @ 302 First St, Cameron, South Carolina, 29030

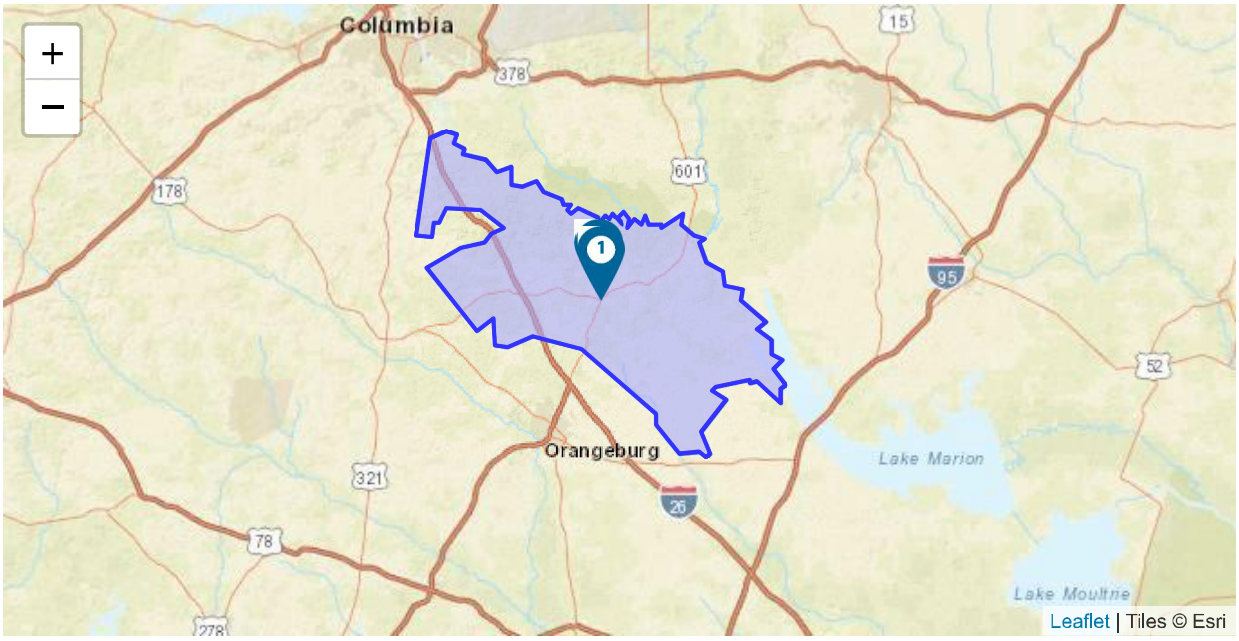
Total Standard Mitigation Benefits:	$8,755,400
Total Social Benefits:	$177,086
Total Mitigation Project Benefits:	$8,932,486
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Benefit-Cost Calculator

V.6.0 (Build 20231108.2102 | Release Notes)

Benefit-Cost Analysis

Project Name: Project 2 (Belleville-F R Huff-Harry C Raysor) - ALT 2



				Using 7% Discount Rate			Using 3% Discount Rate (For BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Other @ Town of Saint Matthews, South Carolina		DFA - Infrastructure Failure	$ 143,611	$ 523,801	0.27	$ 267,744	$ 535,730	0.50
2	Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135		DFA - Riverine Flood	$ 4,261,041	$ 0	0.00	$ 7,944,178	$ 0	0.00
3	Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135		DFA - Riverine Flood	$ 4,915,750	$ 0	0.00	$ 8,187,516	$ 0	0.00
TOTAL (SELECTED)				**$ 9,320,402**	**$ 523,801**	**17.79**	**$ 16,399,438**	**$ 535,730**	**30.61**
TOTAL				**$ 9,320,402**	**$ 523,801**	**17.79**	**$ 16,399,438**	**$ 535,730**	**30.61**

Property Configuration

Property Title:	Other @ Town of Saint Matthews, South Carolina
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.66405000000003, -80.77798999999999
Hazard Type:	Infrastructure Failure
Mitigation Action Type:	Other
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ Town of Saint Matthews, South Carolina

Project Useful Life (years):	50
Project Cost:	$510,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$1,000

Damage Analysis Parameters - Damage Frequency Assessment
Other @ Town of Saint Matthews, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Roads and Bridges Properties
Other @ Town of Saint Matthews, South Carolina

Estimated Number of One-Way Traffic Detour Trips per Day:	1,500
Additional Time per One-Way Detour Trip (minutes):	8.3
Number of Additional Miles:	5.5
Federal Rate ($):	0.655 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	13,182.92

Comments

-

Number of Trips:
Determined from SCDOT traffic data and the SCDOT Roadway Information System

-

Time per Trip:
Assumed/calculated using detour time and posted speed limits

-

Number of Miles:
Difference in distance of standard traffic route and detour route from a given point to another given point

Professional Expected Damages Before Mitigation
Other @ Town of Saint Matthews, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	0	0	0	0	0	13,183
25	3	0	0	0	0	0	39,549
50	5	0	0	0	0	0	65,915
100	7	510,000	0	0	0	0	602,280

Comments

-

Damages Before Mitigation:
Assumed loss of function/road access based on storm event. Assumed the loss of function as well as complete infrastructure failure and cost to implement the proposed project in the 100-year event.

Annualized Damages Before Mitigation
Other @ Town of Saint Matthews, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	13,183	1,370
25	39,549	1,021
50	65,915	1,992
100	602,280	6,023
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	720,927	10,406

Professional Expected Damages After Mitigation
Other @ Town of Saint Matthews, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Assumed loss of function/road access based on storm event. Project is expected to provide 25-year LOS and reduce road flooding in larger events.

Annualized Damages After Mitigation

Other @ Town of Saint Matthews, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Benefits-Costs Summary

Other @ Town of Saint Matthews, South Carolina

Total Standard Mitigation Benefits:	$143,611
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$143,611
Total Mitigation Project Cost:	$523,801
Benefit Cost Ratio - Standard:	0.27
Benefit Cost Ratio - Standard + Social:	0.27

Property Configuration

Property Title:	Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.67452898233874, -80.78188803083351
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Non-Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	17,119	0	0	0	0	0	17,119
50	85,595	0	0	0	0	0	85,595
100	171,190	0	0	0	0	0	171,190

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation

Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	17,119	766
50	85,595	1,210
100	171,190	1,712
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	273,904	3,688

Professional Expected Damages After Mitigation

Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
50	30,814	0	0	0	0	0	30,814
100	61,628	0	0	0	0	0	61,628

Comments

-

Damages After Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties. Project is expected to provide 25-year LOS and reduce flooding in larger events.

Annualized Damages After Mitigation

Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
50	30,814	436
100	61,628	616
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	92,442	1,052

Standard Benefits - Ecosystem Services

Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Total Project Area (acres):	16
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	40.00%
Percentage of Riparian:	40.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$306,118

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Benefits-Costs Summary

Drainage Improvement @ 2831 Old Belleville Rd, Saint Matthews, South Carolina, 29135

Total Standard Mitigation Benefits:	$4,261,041
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$4,261,041
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Property Configuration

Property Title:	Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.67364200934472, -80.7806930228978
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	12,169	0	0	0	0	0	12,169
50	60,845	0	0	0	0	0	60,845
100	121,690	0	0	0	0	0	121,690

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	12,169	544
50	60,845	860
100	121,690	1,217
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	194,704	2,621

Professional Expected Damages After Mitigation
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS

Annualized Damages After Mitigation
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Standard Benefits - Ecosystem Services
Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Total Project Area (acres):	30
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	25.00%
Percentage of Riparian:	15.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	10.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$271,649

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Additional Benefits - Social

Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

Number of Workers:	83
Expected Annual Social Benefits:	$1,130,626

Comments

-

Number of Residents:

Determined by the number of parcel with residential structures impacted by the project improvements. Assumed 2 people per household with 1 person working.

Benefits-Costs Summary

Drainage Improvement @ 125 Lakeview St, Saint Matthews, South Carolina, 29135

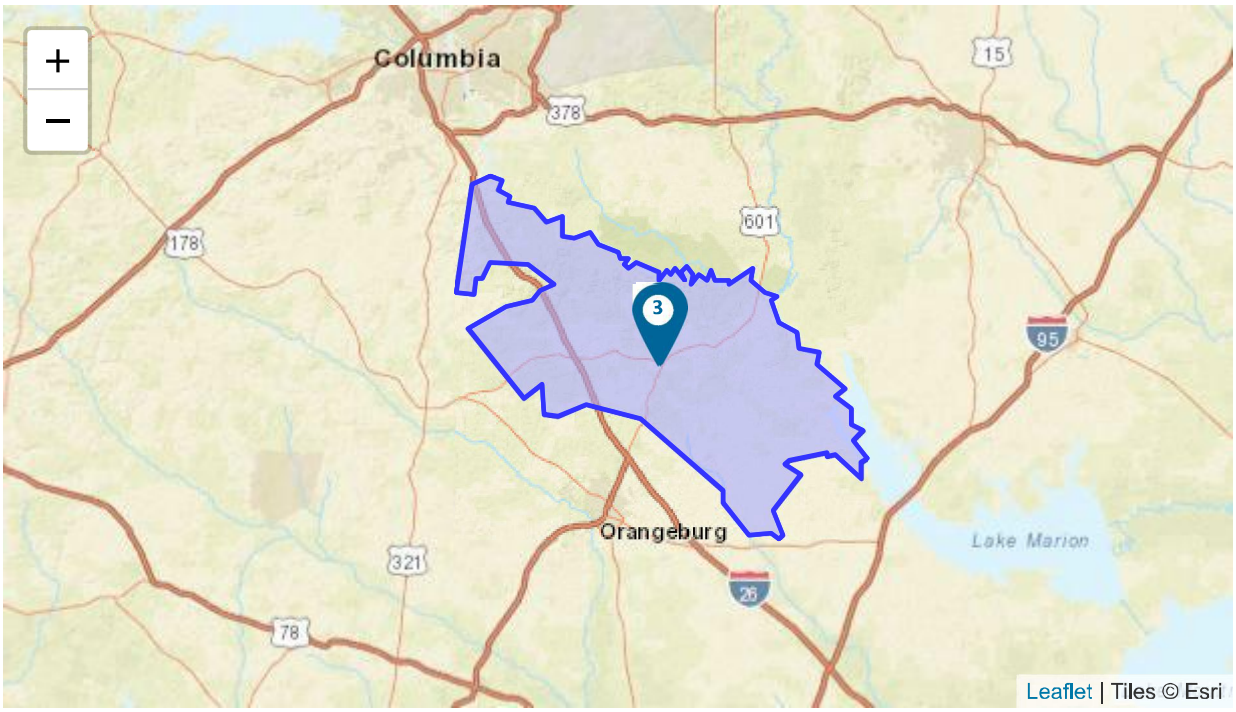
Total Standard Mitigation Benefits:	$3,785,124
Total Social Benefits:	$1,130,626
Total Mitigation Project Benefits:	$4,915,750
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Benefit-Cost Calculator

V.6.0 (Build 20231108.2102 | Release Notes)

Benefit-Cost Analysis

Project Name: Project 3 (Magnolia-Mill-F R Huff-Harry C Raysor) - ALT 1 & 3



				Using 7% Discount Rate			Using 3% Discount Rate (For BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Other @ St Matthews, South Carolina		DFA - Infrastructure Failure	$ 235,662	$ 1,596,301	0.15	$ 439,361	$ 1,620,160	0.27
2	Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135		DFA - Riverine Flood	$ 278,326	$ 0	0.00	$ 518,904	$ 0	0.00
3	Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135		DFA - Riverine Flood	$ 4,592,201	$ 0	0.00	$ 8,208,348	$ 0	0.00
TOTAL (SELECTED)				**$ 5,106,189**	**$ 1,596,301**	**3.20**	**$ 9,166,613**	**$ 1,620,160**	**5.66**
TOTAL				**$ 5,106,189**	**$ 1,596,301**	**3.20**	**$ 9,166,613**	**$ 1,620,160**	**5.66**

Property Configuration

Property Title:	Other @ St Matthews, South Carolina
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.664210000000026, -80.77690999999999
Hazard Type:	Infrastructure Failure
Mitigation Action Type:	Other
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ St Matthews, South Carolina

Project Useful Life (years):	50
Project Cost:	$1,568,700
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$2,000

Damage Analysis Parameters - Damage Frequency Assessment
Other @ St Matthews, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Roads and Bridges Properties
Other @ St Matthews, South Carolina

Estimated Number of One-Way Traffic Detour Trips per Day:	700
Additional Time per One-Way Detour Trip (minutes):	2
Number of Additional Miles:	1.1
Federal Rate ($):	0.655 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	1,379.12

Comments

-

Number of Trips:
Determined from SCDOT traffic data and the SCDOT Roadway Information System

-

Time per Trip:
Assumed/calculated using detour time and posted speed limits

-

Number of Miles:
Difference in distance of standard traffic route and detour route from a given point to another given point

Professional Expected Damages Before Mitigation
Other @ St Matthews, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	0	0	0	0	0	1,379
25	3	0	0	0	0	0	4,137
50	5	0	0	0	0	0	6,896
100	7	1,568,700	0	0	0	0	1,578,354

Comments

-

Damages Before Mitigation:
Assumed loss of function/road access based on storm event. Assumed the loss of function as well as complete infrastructure failure and cost to implement the proposed project in the 100-year event.

Annualized Damages Before Mitigation
Other @ St Matthews, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	1,379	143
25	4,137	107
50	6,896	1,043
100	1,578,354	15,783
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	1,590,766	17,076

Professional Expected Damages After Mitigation
Other @ St Matthews, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS

Annualized Damages After Mitigation
Other @ St Matthews, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Benefits-Costs Summary
Other @ St Matthews, South Carolina

Total Standard Mitigation Benefits:	$235,662
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$235,662
Total Mitigation Project Cost:	$1,596,301
Benefit Cost Ratio - Standard:	0.15
Benefit Cost Ratio - Standard + Social:	0.15

Property Configuration

Property Title:	Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.66312598980177, -80.78065102956288
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Non-Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Year of Analysis was Conducted:	2023
Year Property was Built:	1970
Analysis Duration:	54 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	369	0	0	0	0	0	369
50	1,845	0	0	0	0	0	1,845
100	3,690	0	0	0	0	0	3,690

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	369	17
50	1,845	26
100	3,690	37
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	5,904	80

Professional Expected Damages After Mitigation
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS

Annualized Damages After Mitigation
Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Standard Benefits - Ecosystem Services

Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Total Project Area (acres):	5.4
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	10.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$20,087

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Benefits-Costs Summary

Drainage Improvement @ 201 Mill St, Saint Matthews, South Carolina, 29135

Total Standard Mitigation Benefits:	$278,326
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$278,326
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Property Configuration

Property Title:	Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135
Property Location:	29135, Calhoun, South Carolina
Property Coordinates:	33.66355200003066, -80.78237703106477
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	19,468	0	0	0	0	0	19,468
50	97,340	0	0	0	0	0	97,340
100	194,680	0	0	0	0	0	194,680

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	19,468	871
50	97,340	1,377
100	194,680	1,947
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	311,488	4,195

Professional Expected Damages After Mitigation
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS.

Annualized Damages After Mitigation
Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Standard Benefits - Ecosystem Services

Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Total Project Area (acres):	25
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	25.00%
Percentage of Riparian:	25.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$298,944

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Additional Benefits - Social

Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

Number of Workers:	30
Expected Annual Social Benefits:	$408,660

Comments

-

Number of Residents:

Determined by the number of parcel with residential structures impacted by the project improvements. Assumed 2 people per household with 1 person working.

Benefits-Costs Summary

Drainage Improvement @ 211 Mill St, Saint Matthews, South Carolina, 29135

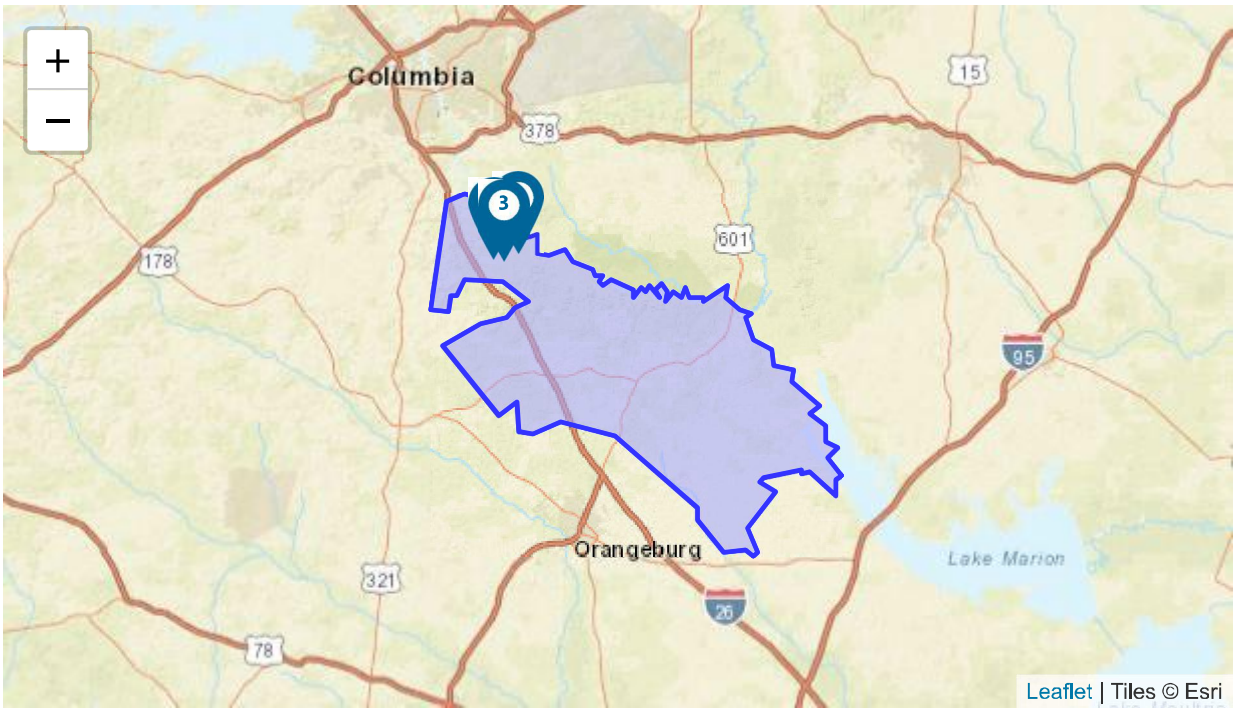
Total Standard Mitigation Benefits:	$4,183,541
Total Social Benefits:	$408,660
Total Mitigation Project Benefits:	$4,592,201
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Benefit-Cost Calculator

V.6.0 (Build 20231108.2102 | Release Notes)

Benefit-Cost Analysis

Project Name: Project 4 (Sandy Run - Old Swamp Road) - ALT 2



				Using 7% Discount Rate			Using 3% Discount Rate (For BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Other @ Sandy Run, South Carolina		DFA - Infrastructure Failure	$ 124,441	$ 745,301	0.17	$ 232,005	$ 757,230	0.31
2	Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160		DFA - Severe Storm	$ 574,249	$ 0	0.00	$ 1,070,615	$ 0	0.00
3	Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160		DFA - Riverine Flood	$ 13,482,923	$ 0	0.00	$ 24,842,860	$ 0	0.00
TOTAL (SELECTED)				**$ 14,181,613**	**$ 745,301**	**19.03**	**$ 26,145,480**	**$ 757,230**	**34.53**
TOTAL				**$ 14,181,613**	**$ 745,301**	**19.03**	**$ 26,145,480**	**$ 757,230**	**34.53**

Property Configuration

Property Title:	Other @ Sandy Run, South Carolina
Property Location:	29053, Calhoun, South Carolina
Property Coordinates:	33.80464000000006, -80.97150999999997
Hazard Type:	Infrastructure Failure
Mitigation Action Type:	Other
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ Sandy Run, South Carolina

Project Useful Life (years):	50
Project Cost:	$731,500
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$1,000

Damage Analysis Parameters - Damage Frequency Assessment
Other @ Sandy Run, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Roads and Bridges Properties
Other @ Sandy Run, South Carolina

Estimated Number of One-Way Traffic Detour Trips per Day:	200
Additional Time per One-Way Detour Trip (minutes):	9.1
Number of Additional Miles:	5
Federal Rate ($):	0.655 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	1,792.2

Comments

-

Number of Trips:
Determined from SCDOT traffic data and the SCDOT Roadway Information System

-

Time per Trip:
Assumed/calculated using detour time and posted speed limits

-

Number of Miles:
Difference in distance of standard traffic route and detour route from a given point to another given point

Professional Expected Damages Before Mitigation
Other @ Sandy Run, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	0	0	0	0	0	1,792
25	3	0	0	0	0	0	5,377
50	5	0	0	0	0	0	8,961
100	30	731,500	0	0	0	0	785,266

Comments

-

:
Assumed loss of function/road access based on storm event. Assumed the loss of function as well as complete infrastructure failure and cost to implement the proposed project in the 100-year event.

Annualized Damages Before Mitigation
Other @ Sandy Run, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	1,792	186
25	5,377	139
50	8,961	839
100	785,266	7,853
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	801,396	9,017

Professional Expected Damages After Mitigation
Other @ Sandy Run, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS

Annualized Damages After Mitigation
Other @ Sandy Run, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Benefits-Costs Summary
Other @ Sandy Run, South Carolina

Total Standard Mitigation Benefits:	$124,441
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$124,441
Total Mitigation Project Cost:	$745,301
Benefit Cost Ratio - Standard:	0.17
Benefit Cost Ratio - Standard + Social:	0.17

Property Configuration

Property Title:	Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160
Property Location:	29160, Calhoun, South Carolina
Property Coordinates:	33.81105899522596, -80.94006099781956
Hazard Type:	Severe Storm
Mitigation Action Type:	Other
Property Type:	Critical Facility Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Critical Facilities Properties
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Critical Facility Type:	Other

Comments

-

Service Budget List:

SCDE current (2023) budget allocation for Calhoun County Public Schools is $6,802,150 Assumed 1/3 of the budget goes to Sandy Run K-8. Assumed average staff salary is $55,000 and there are 48 staff members.

Critical Facilities - Other
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Service Name	Annual Operating Budget ($)
Sandy Run K-8	4,907,716

Professional Expected Damages Before Mitigation
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	120,548	0	0	0	0	133,994
25	3	361,644	0	0	0	0	401,981
50	5	602,740	0	0	0	0	669,969
100	7	843,836	0	0	0	0	937,957

Comments

-

Damages Before Mitigation:

Assumed cost for school to be closed for one day is equal to the daily pay for one guardian who has to stay home with a student. Assumed average adult salary in Sandy Run is $80,000 and there are 550 students at the school. $219/day/student.

Annualized Damages Before Mitigation
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	133,994	13,925
25	401,981	10,379
50	669,969	7,927
100	937,957	9,379
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	2,143,901	41,610

Professional Expected Damages After Mitigation
Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Comments

-

Damages After Mitigation:

Project is expected to provide 100-year LOS

Annualized Damages After Mitigation

Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Benefits-Costs Summary

Other @ 450 Old Swamp Rd, Swansea, South Carolina, 29160

Total Standard Mitigation Benefits:	$574,249
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$574,249
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Property Configuration

Property Title:	Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160
Property Location:	29160, Calhoun, South Carolina
Property Coordinates:	33.80190101163551, -80.95849799968232
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Annualized Damages Before Mitigation
Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Professional Expected Damages After Mitigation

Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Annualized Damages After Mitigation

Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Standard Benefits - Ecosystem Services

Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Total Project Area (acres):	64
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	40.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$952,294

Comments

-

Total Project Area:

Project area determined from parcels that will likely benefit from close proximity to improvements.

Additional Benefits - Social

Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

Number of Workers:	25
Expected Annual Social Benefits:	$340,550

Comments

-

Number of Residents:

Determined by the number of parcel with residential structures impacted by the project improvements. Assumed 2 people per household with 1 person working. Primarily properties located along Old Swamp Road that will be impacted by a road failure.

Benefits-Costs Summary

Drainage Improvement @ 88 Old Swamp Rd, Swansea, South Carolina, 29160

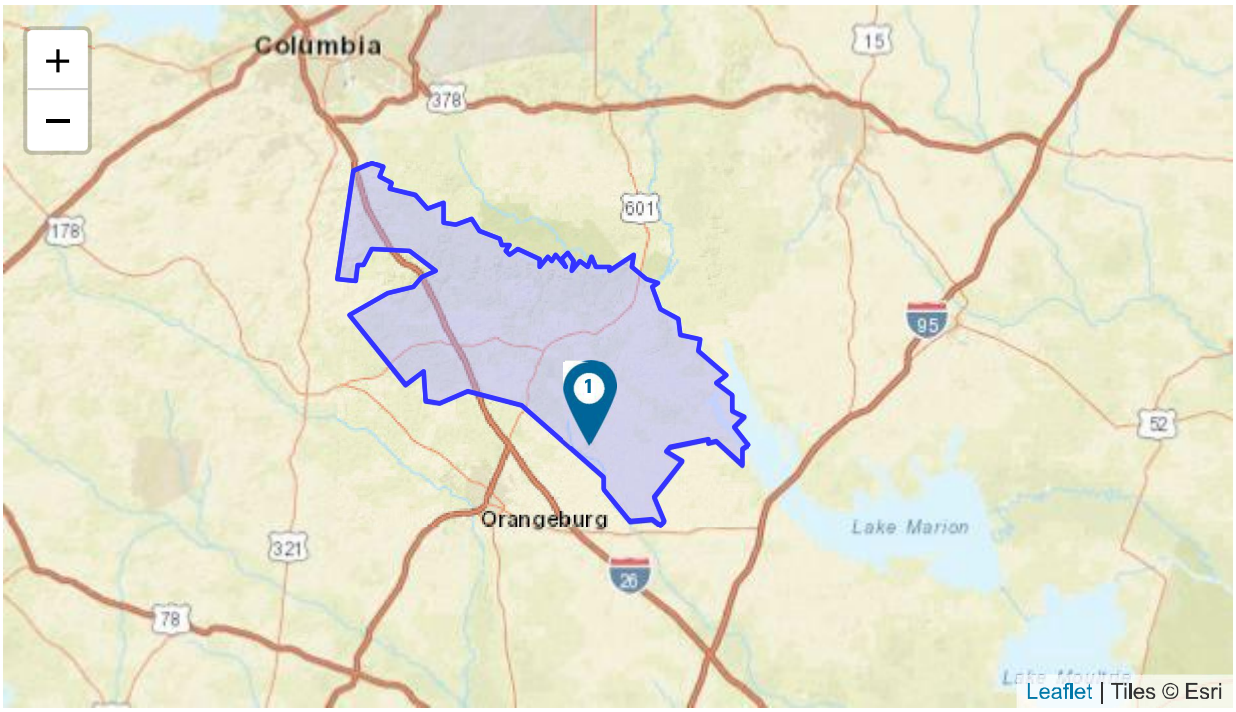
Total Standard Mitigation Benefits:	$13,142,373
Total Social Benefits:	$340,550
Total Mitigation Project Benefits:	$13,482,923
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

Benefit-Cost Calculator

V.6.0 (Build 20231108.2102 | Release Notes)

Benefit-Cost Analysis

Project Name: Project 9 (Cameron Closed System) - ALT 2



				Using 7% Discount Rate			Using 3% Discount Rate (For BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Other @ Town of Cameron, South Carolina		DFA - Infrastructure Failure	$ 1,522,319	$ 1,093,401	1.39	$ 2,838,173	$ 1,117,260	2.54
2	Other @ 8122 Old State Rd, Cameron, South Carolina, 29030		DFA - Severe Storm	$ 258,819	$ 0	0.00	$ 482,536	$ 0	0.00
TOTAL (SELECTED)				**$ 1,781,138**	**$ 1,093,401**	**1.63**	**$ 3,320,709**	**$ 1,117,260**	**2.97**
TOTAL				**$ 1,781,138**	**$ 1,093,401**	**1.63**	**$ 3,320,709**	**$ 1,117,260**	**2.97**

Property Configuration

Property Title:	Other @ Town of Cameron, South Carolina
Property Location:	29030, Calhoun, South Carolina
Property Coordinates:	33.55795000000006, -80.71502999999996
Hazard Type:	Infrastructure Failure
Mitigation Action Type:	Other
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ Town of Cameron, South Carolina

Project Useful Life (years):	50
Project Cost:	$1,065,800
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$2,000

Damage Analysis Parameters - Damage Frequency Assessment
Other @ Town of Cameron, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Roads and Bridges Properties
Other @ Town of Cameron, South Carolina

Estimated Number of One-Way Traffic Detour Trips per Day:	1,800
Additional Time per One-Way Detour Trip (minutes):	8.6
Number of Additional Miles:	3
Federal Rate ($):	0.655 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	13,209.42

Comments

-

Number of Trips:
Determined from SCDOT traffic data and the SCDOT Roadway Information System

-

Time per Trip:
Assumed/calculated using detour time and posted speed limits

-

Number of Miles:
Difference in distance of standard traffic route and detour route from a given point to another given point

Professional Expected Damages Before Mitigation
Other @ Town of Cameron, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	1,065,800	0	0	0	0	1,079,009
25	3	1,065,800	0	0	0	0	1,105,428
50	5	1,065,800	0	0	0	0	1,131,847
100	7	1,065,800	0	0	0	0	1,158,266

Comments

-

Damages Before Mitigation:
Assumed loss of function/road access based on storm event. Due to the system being surcharged in the 10-year event, loss of function was assumed as well as complete infrastructure failure and cost to implement the proposed project in all storm events.

Annualized Damages Before Mitigation
Other @ Town of Cameron, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	1,079,009	65,528
25	1,105,428	22,371
50	1,131,847	11,450
100	1,158,266	11,583
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	4,474,551	110,932

Professional Expected Damages After Mitigation
Other @ Town of Cameron, South Carolina

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
50	1	0	0	0	0	0	13,209
100	3	0	0	0	0	0	39,628

Comments

-

Damages After Mitigation:

Assumed loss of function/road access based on storm event. Project is expected to provide 25-year LOS and reduce road flooding in larger events.

Annualized Damages After Mitigation
Other @ Town of Cameron, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
50	13,209	229
100	39,628	396
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	52,838	625

Benefits-Costs Summary
Other @ Town of Cameron, South Carolina

Total Standard Mitigation Benefits:	$1,522,319
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$1,522,319
Total Mitigation Project Cost:	$1,093,401
Benefit Cost Ratio - Standard:	1.39
Benefit Cost Ratio - Standard + Social:	1.39

Property Configuration

Property Title:	Other @ 8122 Old State Rd, Cameron, South Carolina, 29030
Property Location:	29030, Calhoun, South Carolina
Property Coordinates:	33.56022501064474, -80.71199703994766
Hazard Type:	Severe Storm
Mitigation Action Type:	Other
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

Project Useful Life (years):	50
Project Cost:	$0
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	217,440	0	0	0	0	0	217,440
50	543,600	0	0	0	0	0	543,600
100	1,087,200	0	0	0	0	0	1,087,200

Comments

-

Damages Before Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties.

Annualized Damages Before Mitigation
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	217,440	6,876
50	543,600	7,688
100	1,087,200	10,872
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	1,848,240	25,436

Professional Expected Damages After Mitigation
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0
50	195,696	0	0	0	0	0	195,696
100	391,392	0	0	0	0	0	391,392

Comments

-

Damages After Mitigation:

Assumed damages based on percentage of property flooded in different events and combined property value/sqft for impacted properties. Project is expected to provide 25-year LOS and reduce flooding in larger events.

Annualized Damages After Mitigation
Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	0	0
50	195,696	2,768
100	391,392	3,914
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	587,088	6,682

Benefits-Costs Summary

Other @ 8122 Old State Rd, Cameron, South Carolina, 29030

Total Standard Mitigation Benefits:	$258,819
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$258,819
Total Mitigation Project Cost:	$0
Benefit Cost Ratio - Standard:	0
Benefit Cost Ratio - Standard + Social:	0

APPENDIX F

EXISTING CONDITIONS SURVEY

INDEX:

1 TITLE PAGE AND SURVEY NOTES
2-6 DETAIL SHEETS

SURVEY DATA

HORIZONTAL DATUM - BASED UPON THE SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD83, 2011. SAID BEARINGS ORIGINATED FROM SAID COORDINATE SYSTEM BY GPS OBSERVATIONS AND OBSERVATIONS OF SELECTED STATIONS IN THE NATIONAL GEODETIC SURVEY CONTINUOUSLY OPERATING REFERENCE STATION (NGS CORS) NETWORK.

VERTICAL DATUM - GEOID 18, NAVD 88, INTERNATIONAL FEET, BASED UPON GNSS STATIC OBSERVATIONS PERFORMED JUNE AND JULY 2023, UTILIZING TRIMBLE R-10 GPS

CALHOUN COUNTY
WATER STUDY SURVEY

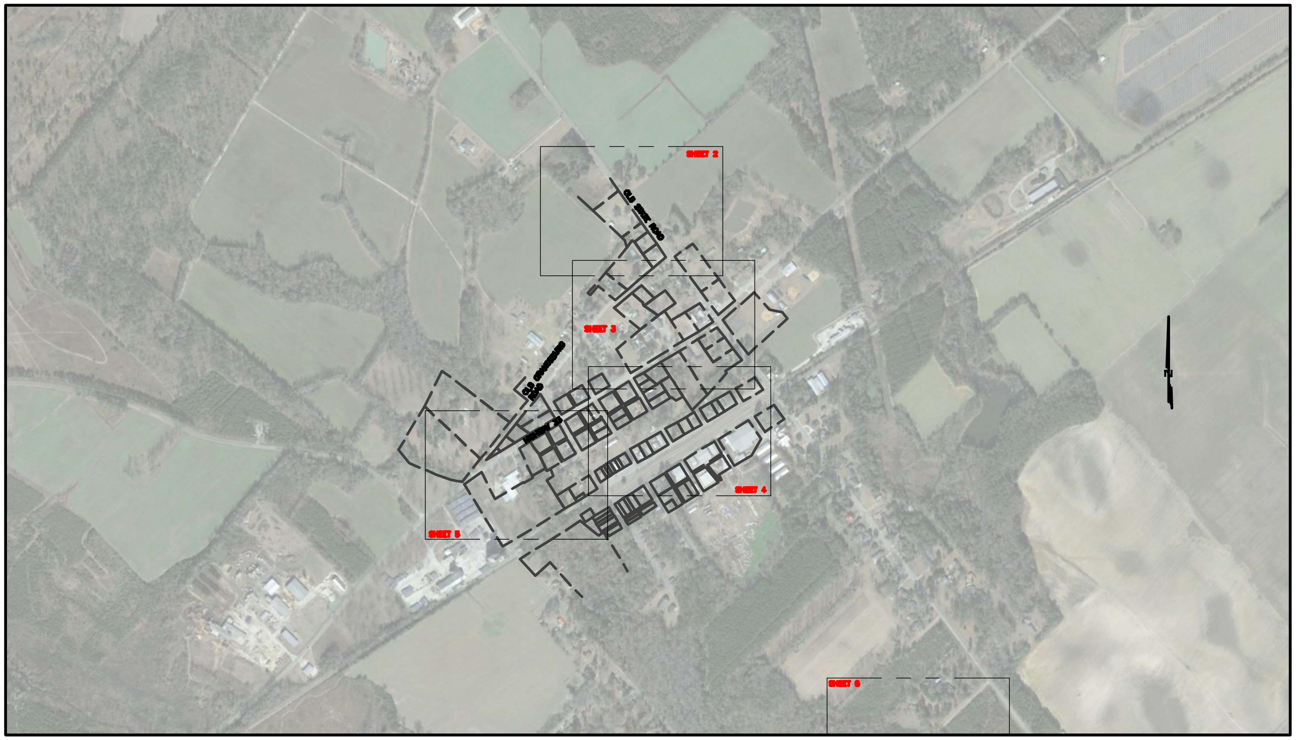
LEGEND AND ABBREVIATIONS:

CURB INLET
DROP INLET
STORM MANHOLE
CONCRETE INLET WITH LID
CONCRETE INLET WITHOUT LID

HDPE	HIGH DENSITY POLYETHYLENE PIPE
RCP	REINFORCED CONCRETE PIPE
CONC.	CONCRETE

GIS PARCEL LINE
STORM PIPE

SITE MAP
NOT TO SCALE



SURVEY NOTES

1. THIS MAP PREPARED FOR CALHOUN COUNTY, REPRESENTS A SPECIFIC SCOPE OF SERVICES, THERE MAY BE OTHER MATTERS OF TITLE, BURDENING, OR FAVORING PARCELS THAT ARE SHOWN HEREON.
2. THE FIELD MEASUREMENTS FOR THE ESTABLISHMENT OF PROJECT CONTROL AND COLLECTION OF DATA POINTS IS BASED ON USING THE VRS NETWORK WITH A ROOT MEAN SQUARE ERROR OF 0.07 FEET AT A 95% CONFIDENCE INTERVAL.
3. THE HORIZONTAL DATUM FOR THIS PROJECT IS THE NORTH AMERICAN DATUM OF 1983, 2011 (NAD83 (2011), SOUTH CAROLINA.
4. UNITS OF MEASURE FOR THIS SURVEY ARE IN INTERNATIONAL FEET.
5. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY THE SURVEYOR.
6. LAND SURVEYORS, AS LICENSED PROFESSIONALS BY THE STATE OF SOUTH CAROLINA, ARE NOT EXPERTS IN THE IDENTIFICATION OF WETLANDS, CEMETERIES OR BURIAL GROUNDS, ITEMS OF HISTORICAL OR CULTURAL SIGNIFICANCE; THEREFORE EXCEPTION IS TAKEN TO ANY SUCH MATTERS WHICH MAY EXIST ON THIS PROPERTY.
7. FIELD SURVEY DATA COLLECTED JUNE AND JULY 2023.
8. SURVEY IS VALID ONLY IF PRINT HAS ORIGINAL SEAL & SIGNATURE OF SURVEYOR.
9. THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE PERSON, PERSONS, OR ENTITY NAMED IN THE TITLE BLOCK. THIS SURVEY DOES NOT EXTEND TO ANY UNNAMED PERSON, PERSONS, OR ENTITY WITH THE EXPRESS CERTIFICATION BY THE SURVEYOR NAMING SAID PERSON, PERSONS OR ENTITY.

TO CALHOUN COUNTY:

I HEREBY STATE THAT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STANDARDS OF PRACTICE MANUAL FOR SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN.

JAMES D. WILLSON — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 17230 - STATE OF SOUTH CAROLINA

SHEET 1 OF 6

WATER AND STORM STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H STUDY

PROJECT: WATER AND STORM STUDY
FIGURE 3.4

1023080645
08-28-2023
1"=100'
JAMES D. WILLSON
CHRISTIAN D. CARSWELL
CR AND GL

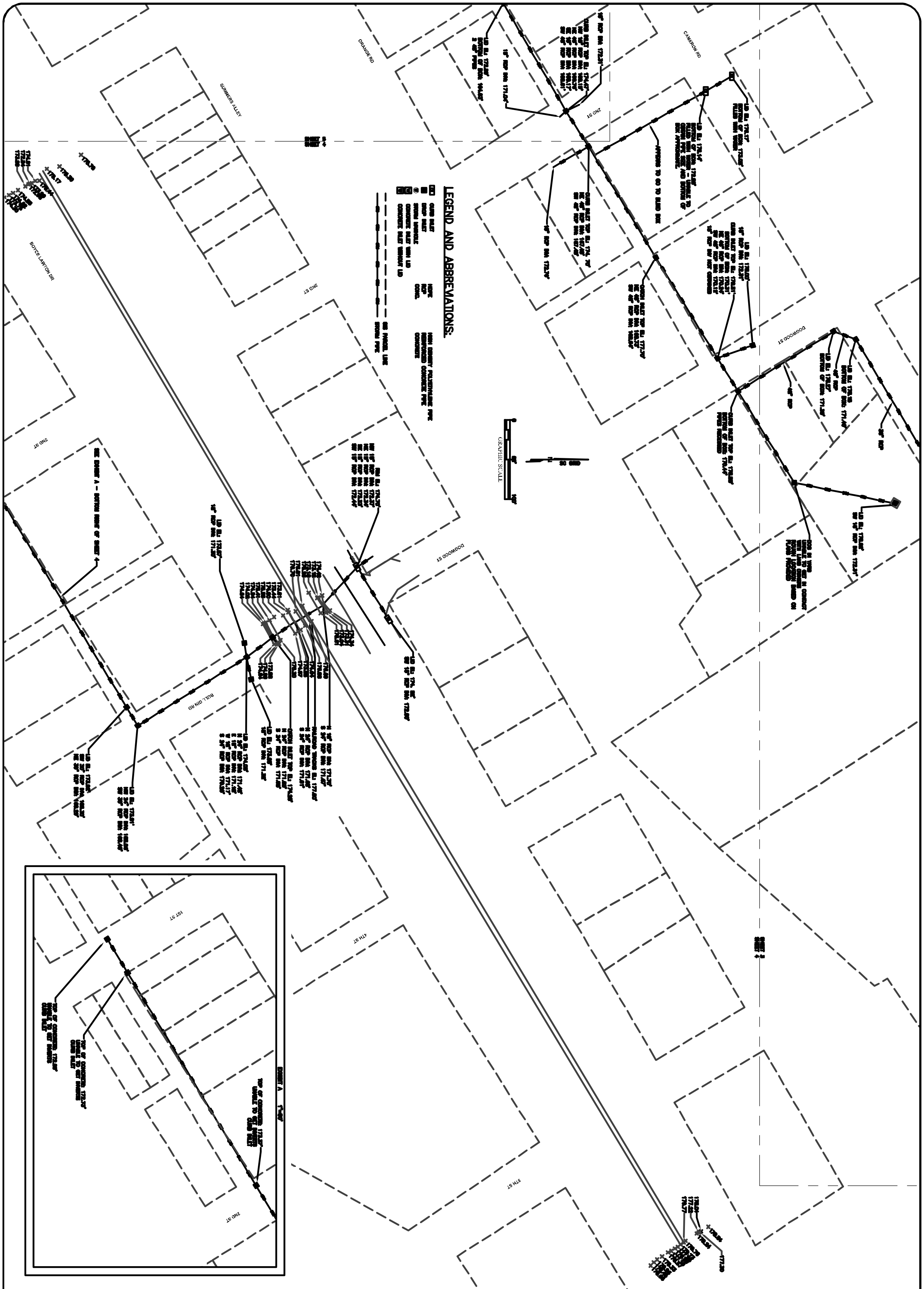
SAM™

SAM

WATER AND STORM STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY

SHEET 2 OF 6

SAM
WATER AND STORM
STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY
SHEET 3
OF 6
PROJECT: WATER AND STORM STUDY
LEGEND AND ABBREVIATIONS:
OLD STATE RD
CHANDLER RD
OLD OWENDALE RD
DOGWOOD ST



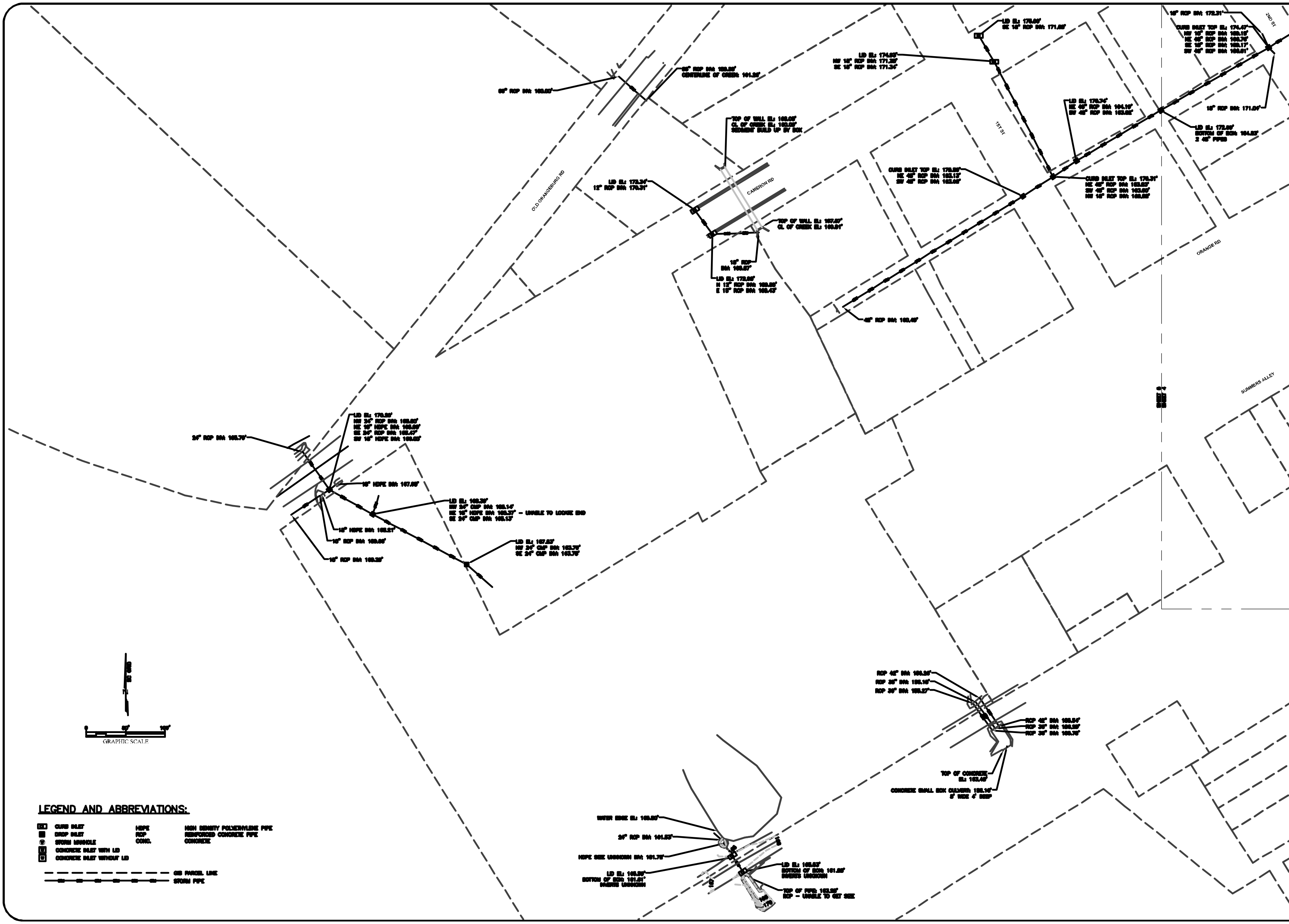
8604 N. Main Street
Suite 102
Columbia, SC 29203
Ofc: 803.754.1902
email: info@sam.biz

PROJECT: WATER AND STORM STUDY
FIGURE 3.4

1023080645
08-28-2023
1"=100'
JAMES D. WILLSON
CHRISTIAN D. CARSWELL
CR AND GL

WATER AND STORM
STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY

SHEET 4
OF 6



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6904 N. Main Street
Suite 102
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Ofc: 803.764.1902
email: info@sam.biz

PROJECT: WATER AND STORM STUDY
FIGURE 3.4
1023080645
08-28-2023
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WATER AND STORM
STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY

SHEET 5
OF 6

WATER AND STORM STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY

SHEET 6 OF 6

INDEX:

1 TITLE PAGE AND SURVEY NOTES
2-5 DETAIL SHEETS

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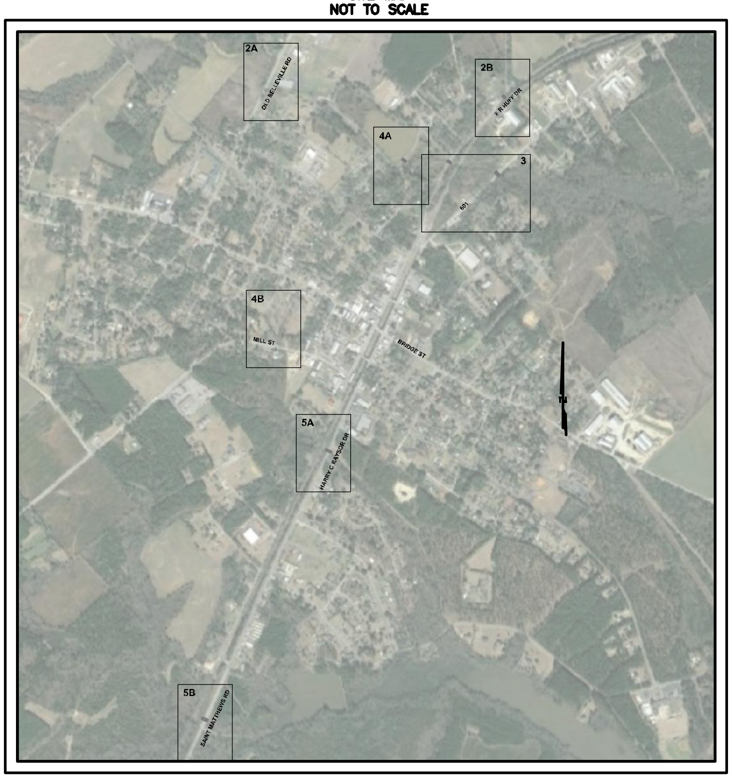
CALHOUN COUNTY
WATER STUDY SURVEY



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JAMES D. WILLSON DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 17230 - STATE OF SOUTH CAROLINA

WATER AND STORM
STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H
STUDY

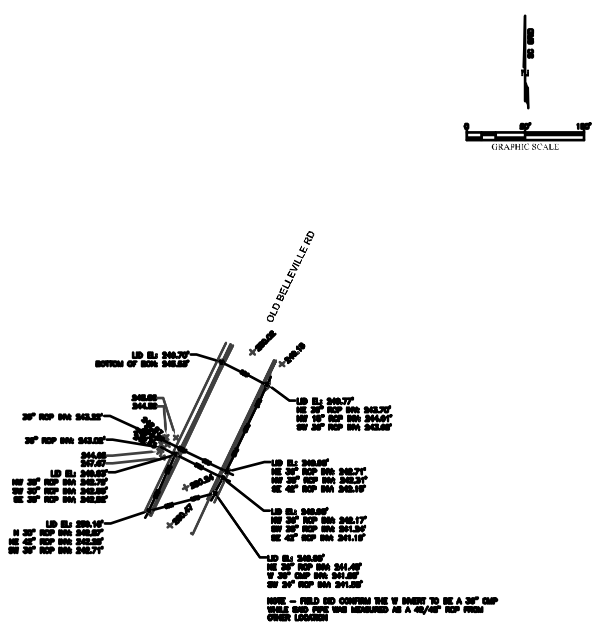
SHEET 1
OF 5

PROJECT: WATER AND STORM STUDY
FIGURE 3.4

1023080645
08-08-2023
1"=50'
JAMES D. WILLSON
CHRISTIAN D. CARSWELL
CR AND GL

8604 N. Main Street
Suite 102
Columbia, SC 29203
Ofc: 803.764.1902
email: info@sam.biz

2A



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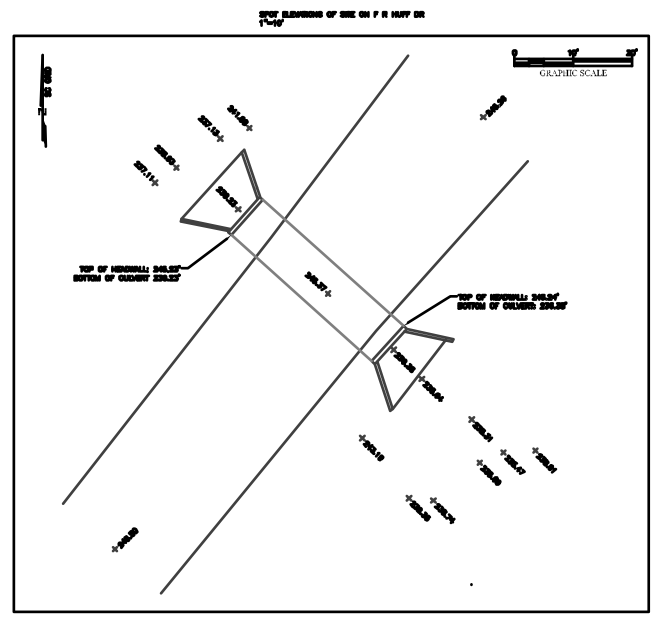

WATER AND STORM STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H STUDY

SHEET 2 OF 5

PROJECT: WATER AND STORM STUDY
FIGURE 3.4

JOB NUMBER: 1023080645
08-08-2023
1"=50'
JAMES D. WILLSON
CHRISTIAN D. CARSWELL
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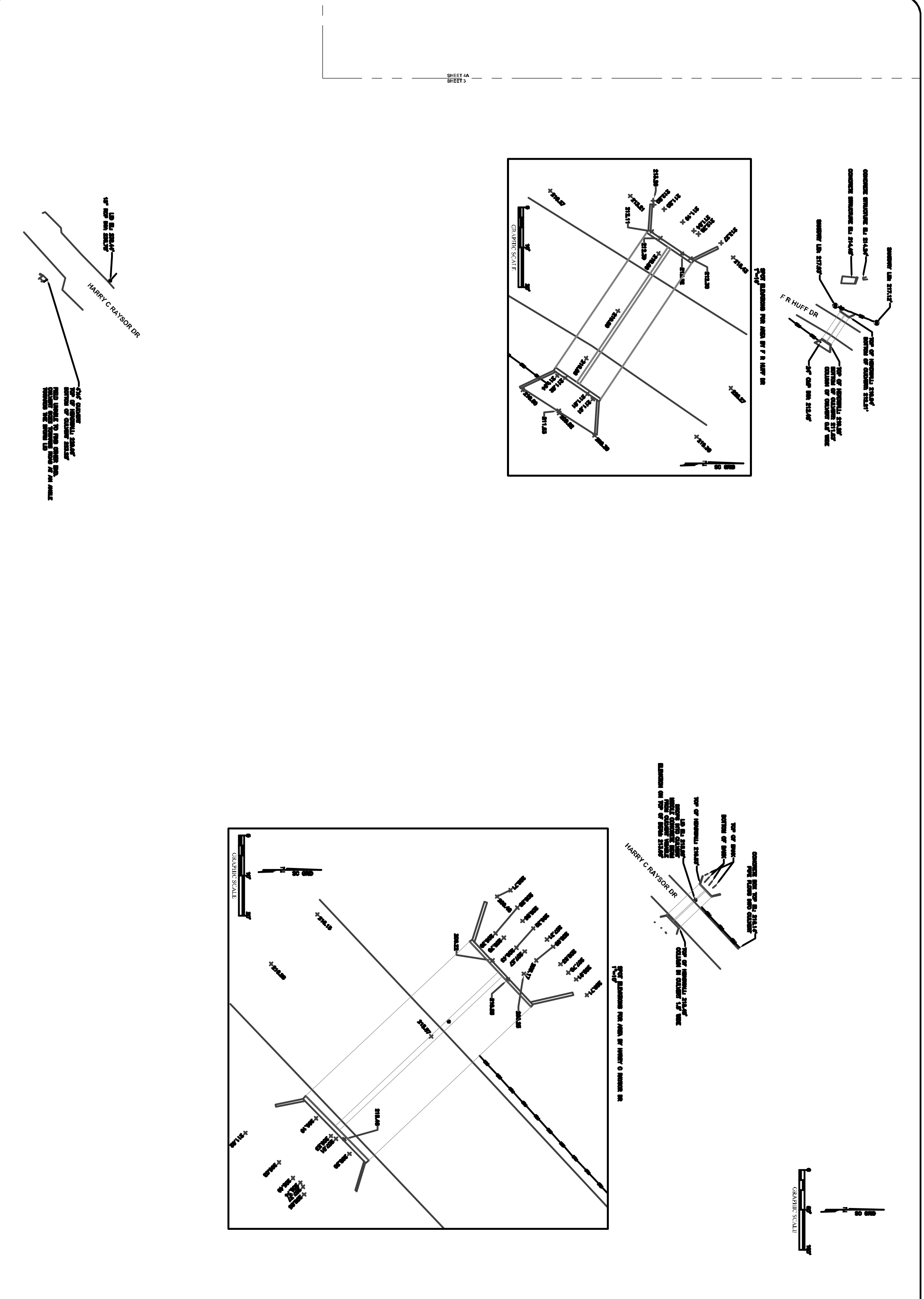

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PROJECT: WATER AND STORM STUDY
FIGURE 3.4

JOB NUMBER: 1023080645
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WATER AND STORM
STRUCTURE SURVEY
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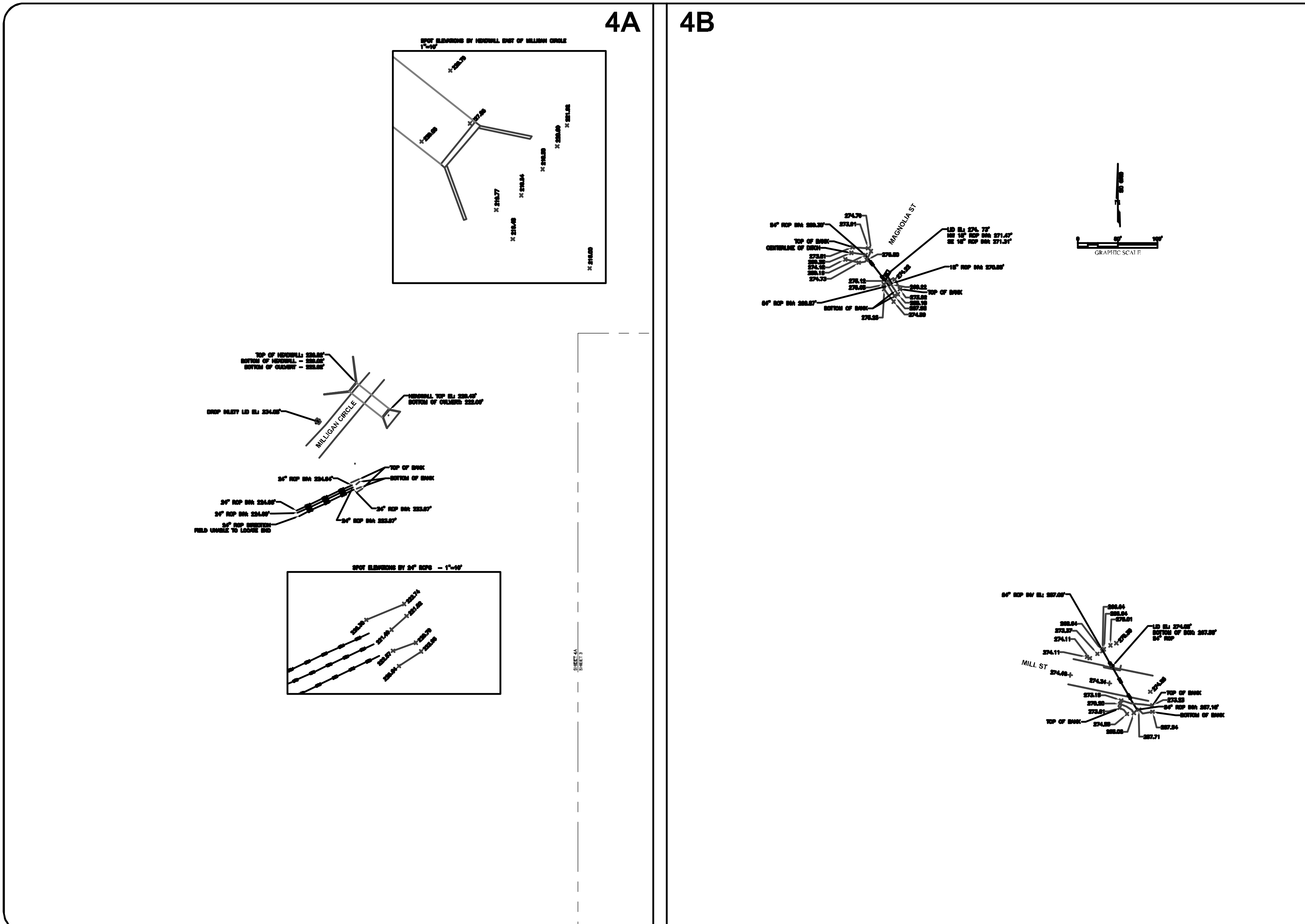
STUDY

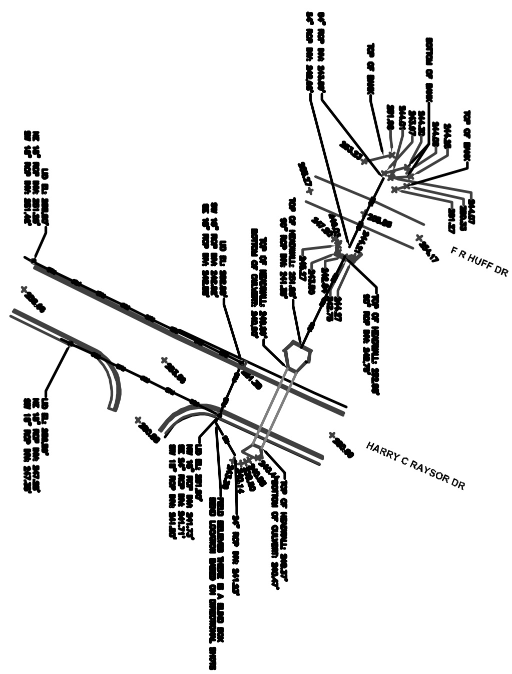
SHEET 3
OF 5



WATER AND STORM STRUCTURE SURVEY
PREPARED FOR
CALHOUN COUNTY, SC H&H STUDY

SHEET 4 OF 5

PROJECT: WATER AND STORM STUDY
FIGURE 3.4



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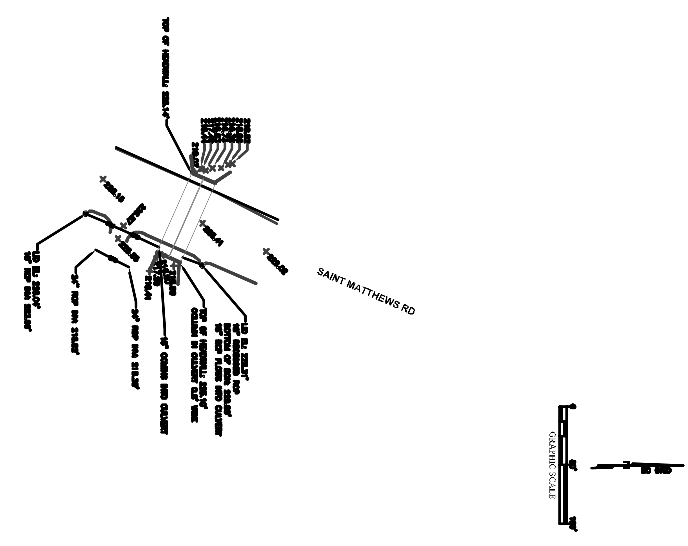

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PROJECT: WATER AND STORM STUDY
FIGURE 3.4

1023080645
08-08-2023
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WATER AND STORM
STRUCTURE SURVEY
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STUDY

SHEET 5
OF 5