

DAVIS & FLOYD

PLAN | DESIGN | ENGINEER

“Town-Wide Planning Strategy for Stormwater Improvements” for

The Town of Edisto Beach

September 2025

D|F Job No.: 031893.04

PREPARED FOR:

Town of Edisto Beach

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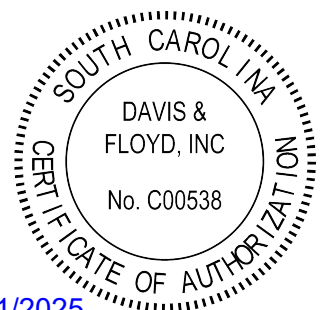
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11/11/2025

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1.0 Executive Summary

The Town-Wide Planning Strategy for Stormwater Improvements provides an overview of the Town's current and future drainage conditions. The main objective of the project is to develop an approach for inventorying and studying the Town's drainage system by identifying and prioritizing areas of concern. With areas identified, a strategy and approach for further study has been developed and prioritized. Task 1 of the Town-Wide Planning Strategy for Stormwater Improvements included a hydrologic assessment of the Town infrastructure and features for inclusion in the basin analysis. Task 2 included an analysis of all identified basins using hydrologic and hydraulic modeling. Task 3 used information provided by Task 2 to assess flood risk and prioritize study areas based on several criteria. Task 4 included preparation of fee and schedule estimates as well as a detailed proposal for one study area of the Town's choice.

2.0 Study Area Development

2.1 Hydrologic Assessment

Davis & Floyd, Inc. (D|F) performed a field assessment of the Town's infrastructure and features on April 2, 2025. During the assessment, D|F noted condition of stormwater infrastructure and identified significant hydraulic features, see Figure 1. The results of this assessment, along with a desktop GIS analysis, were utilized in performing the hydrologic and hydraulic modeling for Task 2, as shown in Table 1.



Figure 1 – Outfall north of Big Bay Drive

Table 1 – List of Tasks

Task	Description	Report Section
1	Hydrologic Assessment	2.1
2	Hydrologic and Hydraulic Modeling	2.2
3	Study Area Prioritization	3.3
4	Fee and Schedule Estimating	3.4

2.2 Hydrologic and Hydraulic Modeling

The study area development used data that was provided by the hydrologic assessment in Task 1, such as the location of existing structures and piping. Data regarding the Plantation Course at Edisto (golf course) was provided by the Town. Further, D|F used data from the South Carolina Department of Transportation (SCDOT) website for the location of existing stormwater infrastructure along roadways to the extent that was available. D|F made engineering assumptions where necessary in defining features where information was lacking.

Hydrologic and hydraulic models were constructed and used to identify flood risk throughout the Town. Simulated existing flood risk was then used to develop drainage study areas. Hydrologic and hydraulic modeling was completed using Computational Hydraulics Incorporated's (CHI's) PCSWMM software. This software uses version 5 of the Environmental Protection Agency stormwater management model (EPA SWMM). PCSWMM is a GIS integrated, highly advanced, comprehensive, hydrologic, hydraulic, and water quality simulation model used to analyze the management of urban stormwater, wastewater, and water distribution systems.

2.3 Hydrologic Analysis

Hydrologic analyses of the Town were completed to delineate basins and estimate corresponding hydrologic parameters for use in the hydraulic analysis. Colleton County 2007 LiDAR topographic data was analyzed and used in the delineation of basins and subbasins, see Exhibit 01. It can be noted that there are no basins delineated on the perimeter of Jungle Road, Docksite Road, and the ocean front due to occurrence of overland flow discharging into the tidal marsh without forming subbasins pertinent to the analysis. The Natural Resource Conservation Service (NRCS)/Soil Conservation Service (SCS) method was selected to estimate direct runoff.

The analysis implemented United States Department of Agricultural (USDA) soil data from the soil survey geographic (SSURGO) database for Colleton County. In addition to hydrologic soil group classifications, the analyzed soil data contained estimates for surface infiltration rates utilized during the hydraulic analysis for assigning realistic estimates for 2D elements of the stormwater model. Land cover conditions were used to derive runoff potential for each basin/subbasin according to NRCS methodology. From basin area, USDA soils data (i.e., hydrologic soil group of each soil type), and land use/land cover, an area-weighted CN value was determined for each basin/subbasin.

The drainage study focused on potential flood conditions resulting from 24-hour rainfall depths for the 10 percent (10-year return period) and 4 percent (25-year return period) annual exceedance probabilities (AEPs). Current rainfall data were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation frequency estimates and are presented in Table 2. Additionally, 50-year estimated future rainfall data were prepared in accordance with the analysis performed by Hutton et al. (2015). Total precipitation depths were combined with the dimensionless Type III NRCS/SCS rainfall distribution to generate design rainfall hyetographs (intensity time series in inches per hour).

Table 2 – Current and Future 24-hour Precipitation Depths		
AEP (Recurrence Interval)	Precipitation Depth (inches)	
	Current	Future
10% (10-year)	6.10	6.87
4% (25-year)	7.50	8.37

Runoff time series were developed for each basin based on curve numbers and hyetographs. Runoff rates were estimated using the basin width, slope, area, depth, and roughness.

2.4 Hydraulic Analysis

A hydraulic analysis of the runoff from each basin/subbasin was completed to evaluate existing flood conditions using a combined 1D/2D stormwater model (PCSWMM; Computational Hydraulics International; version 7.7.3920). Piping and channels were represented as 1D links while overland flow was represented using 2D links. Results from the hydraulic model were then used to develop study areas.

Record drawings from the Town, SCDOT, and previous projects were used to establish horizontal/vertical elevations (i.e., inverts and top of banks/rim elevations) of pipelines, ditches, and inlets included in the hydraulic model. Hydraulic and geometric attributes (e.g., size, Manning's roughness, loss coefficients, infiltration rates, and restriction due to sediment) were also assigned to the stormwater network based on field notes or remotely sensed data.

Pipelines and channels were modeled in a 1D domain and corresponding basins/subbasins were connected to the 1D domain via modeled inlets or junctions in the stormwater network to provide input for runoff. Surface roughness (i.e., Manning's n) values were assigned to pipelines and channels based on the material of the conduit.

The 1D domain was then connected to an overland 2D domain to allow surcharged inlets and ditches to overflow to adjacent streets and properties (as would naturally occur). The 2D domain was developed using a 30-foot mesh wherein underlying elevations were based on 2007 Colleton County LiDAR. Homes and detached building footprints were obtained from Colleton County and aerial imagery and were considered in the 2D domain. Surface roughness (i.e., Manning's n) values were assigned to the 2D mesh based on 2021 NLCD classifications and modified to match land cover type. Representative infiltration rates were assigned to the 2D domain using the SSURGO soil data described in previous sections in conjunction with the land cover dataset to assign realistic infiltration rates for pervious surfaces.

Runoff was assigned to the hydraulic model by routing runoff hydrographs to their respective outlets, whether outfalls, storage, or inlet structures.

The outfalls for the drainage systems of the Town are tidally influenced and could cause varying flood conditions depending on when runoff occurs relative to the stage of the tide. Rather than exploring all possible tidal conditions, two tidal boundary conditions were established: normal tides and future tides. The global mean sea level (GMSL) projections developed by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force, provide six future tide scenarios: low, intermediate-low, intermediate, intermediate-high, high, and extreme (Sweet et al., 2022). For the analysis, the intermediate-low 50-year sea level rise projection scenario was adopted. Based on the Interagency Sea Level Rise Scenario Tool implementing findings of Sweet et al. (2022), the intermediate-low scenario for 50 years in the future was estimated to be 1.71 feet above current conditions for Fort Pulaski (NOAA Tidal Station 8670870). Accordingly, the current typical tide hydrograph was increased by a 1.71-foot constant to obtain future tides.

3.0 Priority of Study Areas

3.1 Model Results

The results of the comparative modeling show the areas that are likely to experience flooding under existing conditions during the storm events analyzed, see Exhibits 02, 03, 04, and 05. These exhibits show flood depth for the current 10-year, future 10-year, current 25-year, and future 25-year storms respectively. These flood depth exhibits show all flooding that occurs over 0.5 ft. Areas surrounding south Palmetto Boulevard, south-west Myrtle Street, and Pompano Street are some of the many areas that exhibit flooding with significant depth. The flood mapping generated from the modeling analysis in Task 2 facilitated the Task 3 analysis of flood risk for supporting a planning strategy.

3.2 Delineation of Recommended Study Areas

Recommended study areas were developed to address simulated flood risk of the town-wide analysis. As a precursor, all drainage subbasins were grouped into outfall drainage basins according to their respective outfall as shown in Exhibit 06. The outfall drainage basins were grouped and divided in order to develop roughly equally-sized study areas as shown in Figure 2 and Exhibit 07. Recommended study areas are generally one outfall drainage basin, a pair of adjacent outfall drainage basins, or major subsystem of an outfall drainage basin. The approximate outline of the golf course is identified with a dashed purple line in Exhibit 07 to indicate the study areas that are largely within the bounds of the golf course development. The seven recommended study areas are individually depicted on Exhibit 07.1 through 07.7.

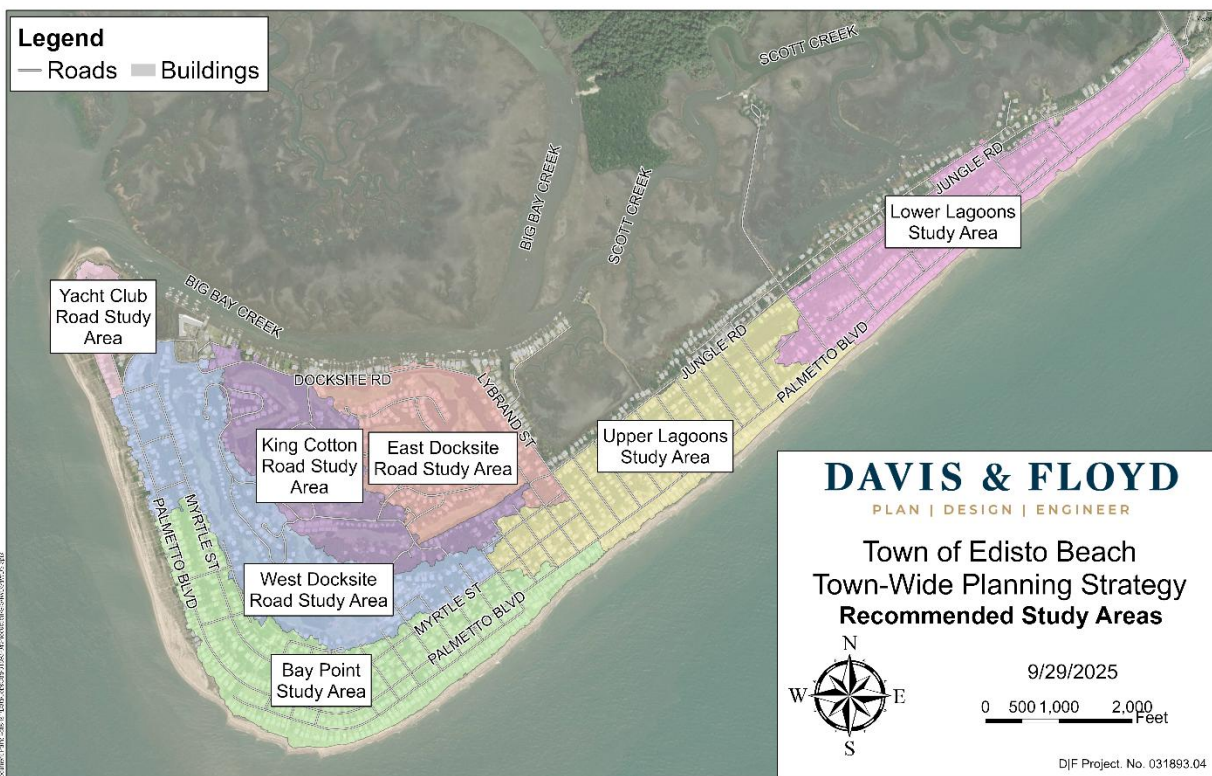


Figure 2 – Recommended Study Areas

3.3 Prioritization of Recommended Study Areas

The Yacht Club Road Study Area is omitted from the prioritization as the study area has already received a detailed study. The six remaining study areas, prioritized according to the aforementioned risk ratings and described by area and respective outfall drainage basin, are listed in Table 3. The flood risk ratings for each study area were based on several criteria, consisting of the maximum flood depth, number of flooded buildings, length of flooded roadways, and affected flood area. According to the risk rating used by D|F, Bay Point Study Area is the highest priority because it is rated with the highest flood risk.

Table 3 – Prioritization of Recommended Study Areas

Priority	Drainage Basin	Study Area	Area (acre)
1	2b	Bay Point	163
2	6b	Upper Lagoons	136
3	6a & 7	Lower Lagoons	128
4	2a	West Docksite Road	158
5	3	King Cotton Road	108
6	4 & 5	East Docksite Road	108

3.4 Recommended Study Sequencing

Utilizing the prioritization by flood risk, D|F sequenced the recommended studies according to the progression necessary for detailed analysis as shown in Table 4. The Yacht Club Road Study is listed first according to owner request. As Bay Point Study Area is upstream and therefore dependent on the drainage system of the West Docksite Road Study Area, the downstream West Docksite Road Study is sequenced preceding the Bay Point Study to allow for an accurate detailed analysis of both study areas. Similarly, Upper Lagoons Study Area is upstream and dependent on Lower Lagoons Study Area; therefore, the Lower Lagoons Study is sequenced preceding the Upper Lagoons Study. The remaining study sequencing follows the priority of study areas by flood risk.

Table 4 – Sequencing of Recommended Studies

Sequence	Study	Fee Estimate	Duration
1	Yacht Club Road	---	---
2	West Docksite Road	\$ 35,000	16 Wks.
3	Bay Point	\$ 55,000	24 Wks.
4	Lower Lagoons	\$ 30,000	16 Wks.
5	Upper Lagoons	\$ 25,000	14 Wks.
6	King Cotton Road	\$ 25,000	12 Wks.
7	East Docksite Road	\$ 30,000	16 Wks.

It can be noted that previous D|F study of the lower and upper lagoons is focused on the lagoons solely and does not assess flood risk of the surrounding areas/roads; however, all findings from the previous Interior Lagoon Study, and all other previous studies performed by D|F shall be applicable to providing a detailed analysis of the recommended studies.

3.5 Fee and Schedule Estimating

Fee and schedule estimates, according to Task 4, are presented for the recommended studies in Table 4. The fee estimates were approximated according to D|F previous experience with comparably scoped projects and previous background information on the stormwater management infrastructure of the Town. The duration estimates were approximated according to similar project experience and typical capacity and workload of D|F. Tasks associated with the fee estimates include a drainage system inventory of the area, further analysis of existing conditions, development of improvements, hydrologic and hydraulic analysis of existing and improved conditions, estimation of project design and construction costs, a technical memorandum presenting improvements, and coordination with the Town.

4.0 References

- Hutton, D., N.B. Kaye, and W.D. Martin. 2015. "Analysis of Climate Change and 24-Hour Design Storm Depths for a Range of Return Periods Across South Carolina." *J. of South Carolina Water Resources*. 2(1), 70-79.
- Sweet, W., B. Hamlington, R.E. Kopp, C. Weaver, P.L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A.S. Genz, J.P. Krasting, E. Larour, D. Marcy, J.J. Marra, J. Obeysekera, M. Osler, M. Pendleton, and C. Zuzak. 2022. Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines.
- U.S. Sea Level Rise Interagency Task Force. 2023. "Interagency Sea level Rise Scenario Tool." Accessed August 14, 2024. <https://sealevel.nasa.gov/task-force-scenario-tool/>.

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Legend

Roads	Outfalls
Buildings	Flow Paths
Subbasins	

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 01 - Drainage Patterns

9/25/2025

0 250 500 1,000 Feet

D\F Project. No. 031893.04

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Legend

Roads

Buildings

Lagoons

Flood Depth

4.5 ft

0.5 ft

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Town of Edisto Beach
Stormwater Planning Strategy

Exhibit 02 - Flood Depth
Current 10-year Storm
9/25/2025

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Legend

Roads

Buildings

Lagoons

Flood Depth

5.1 ft

0.5 ft

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 03 - Flood Depth
Future 10-year Storm
9/25/2025

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Feet

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Legend

Roads

Buildings

Lagoons

Flood Depth

4.7 ft

0.5 ft

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 04 - Flood Depth
Current 25-year Storm
9/25/2025

N

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0 250 500 1,000 Feet

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Legend

Roads

Buildings

Lagoons

Flood Depth

5.2 ft

0.5 ft

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Town of Edisto Beach

Stormwater Planning Strategy

Exhibit 05 - Flood Depth

Future 25-year Storm

9/25/2025

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500

1,000

Feet

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Legend

- | | |
|-----------|----------|
| Roads | Lagoons |
| Buildings | Outfalls |

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 06 - Outfall Drainage Basins

9/25/2025



0 250 500 1,000
Feet

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Legend

- Roads
- Buildings
- Lagoons

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Town of Edisto Beach
Stormwater Planning Strategy
**Exhibit 07 - Recommended
Study Areas**

9/25/2025



0 250 500 1,000
Feet

D\F Project. No. 031893.04



Legend

Roads	Lagoons
Buildings	Outfalls

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Town of Edisto Beach
Stormwater Planning Strategy
**Exhibit 07.1 - Yacht Club Road
Study Area**
9/25/2025

0 75 150 300 Feet

D\F Project. No. 031893.04

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Legend

-  Roads
-  Buildings
-  Lagoons
-  Outlet Pipe

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Town of Edisto Beach
Stormwater Planning Strategy
**Exhibit 07.2 - Bay Point
Study Area**

9/25/2025



0 125 250 500
Feet

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Legend

Roads

Buildings

Lagoons

Outfalls

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Town of Edisto Beach

Stormwater Planning Strategy

Exhibit 07.3 - West Docks Road

Study Area

9/25/2025

0

125

250

500

Feet

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Legend

Roads

Buildings

Lagoons

Outfalls

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 07.4 - King Cotton Road
Study Area

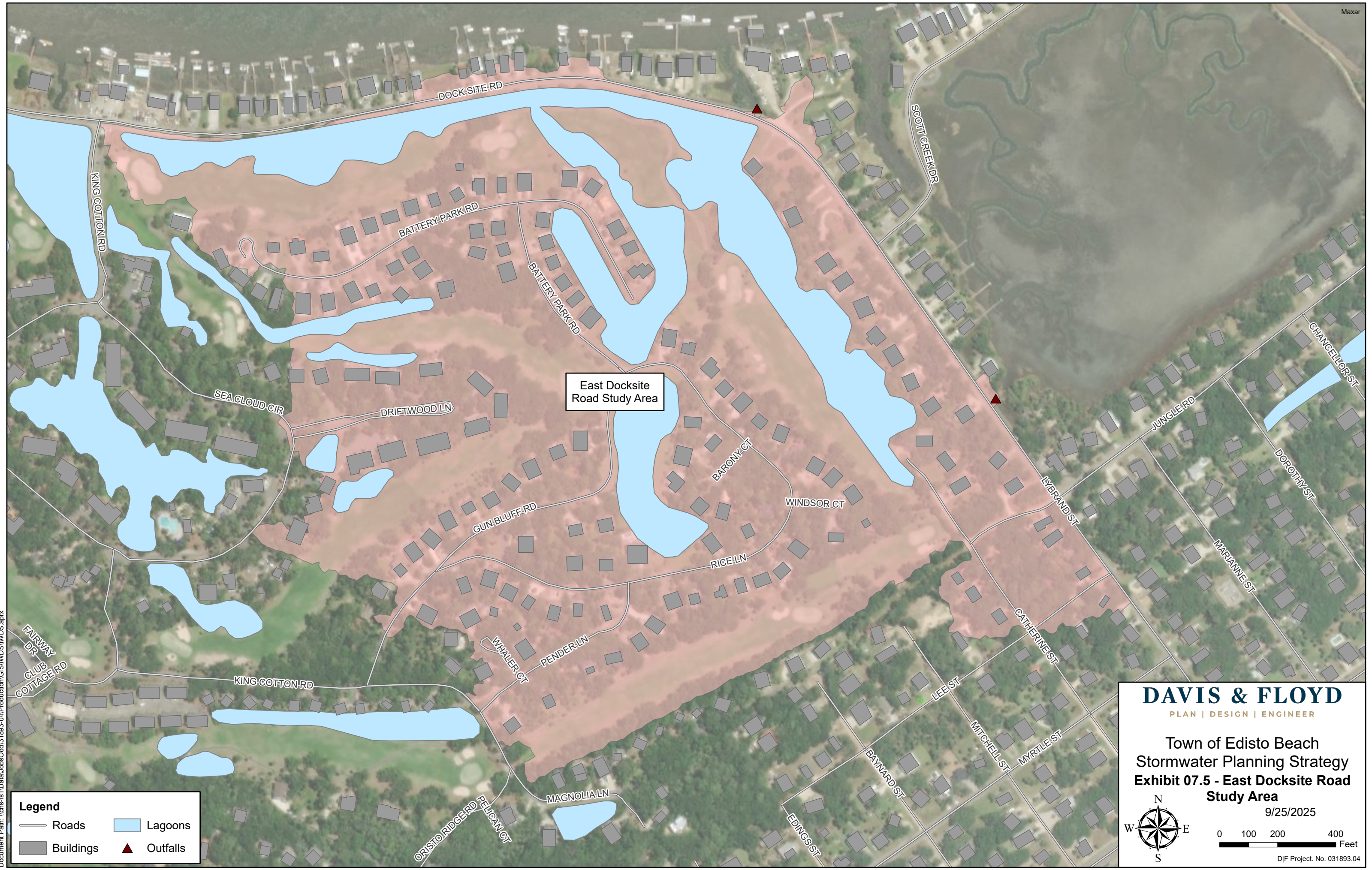
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Legend

Roads

Buildings

Lagoons

Outfalls

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Town of Edisto Beach
Stormwater Planning Strategy
Exhibit 07.5 - East Docks Road
Study Area

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Legend

Roads

Buildings

Lagoons

Outlet Pipe

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Town of Edisto Beach

Stormwater Planning Strategy

Exhibit 07.6 - Upper Lagoons

Study Area

9/25/2025

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
Legend




Roads



Buildings



Lagoons



Outfalls

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Town of Edisto Beach

Stormwater Planning Strategy

Exhibit 07.7 - Lower Lagoons

Study Area


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Legend

Roads

Buildings

Lagoons

Private

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PLAN | DESIGN | ENGINEER

Town of Edisto Beach

Stormwater Planning Strategy

Exhibit 08 - Privately

Managed Areas

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10/14/2025

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Legend

Roads	Lagoons
Buildings	Private

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Town of Edisto Beach
Stormwater Planning Strategy
**Exhibit 09 - Privately Managed
Areas & Study Areas**
10/14/2025

0 250 500 1,000 Feet

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