Beach Preservation Ad Hoc Committee Report

January 2025

Committee Members:

Residents:

Tim Ahmuty

Dan Slotchiver

Cindi Solomon

Andrew Vega

City Council:

Katie Miars

Scott Pierce

Phillip Pounds

Beach Preservation Ad Hoc Committee Report

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City of Isle of Palms, SC
Beach Preservation Ad Hoc Committee Report

1-7-25

Introduction

The Beach Preservation Ad Hoc Committee was established by the City Council on January 23, 2024. Its members include Mayor Phillip Pounds, Councilmember Scott Pierce, Councilmember Katie Miars, and island residents Andrew Vega, Dan Slotchiver, Cindi Solomon, and Tim Ahmuty. Councilmember Elizabeth Campsen was also part of the committee before her resignation from the Isle of Palms City Council in August.

The committee's operations were supported by City Administrator Desirée Fragoso, Deputy City Administrator Douglas Kerr, and Steven Traynum from Coastal Science and Engineering.

Throughout the year, the committee convened 24 times, engaging with a range of stakeholders, including representatives from state and federal permitting agencies, as well as staff and elected officials from other beach communities facing similar challenges.

The goals and tasks of this committee were to

1) Review overall beach restoration policies,
2) Develop recommendations for a more proactive response to beach erosion, and
3) Develop new and consistent funding mechanisms for future needs and projects.

Recommendations

The following recommendations are being presented to City Council for consideration:

1) Beach Restoration Policies

Recommendation	**Consensus (75% +)**	**General Agreement (50%-75%)**	**Divided (Less than 50%)**
Establish a minimum healthy beach volume profile per Exhibit 1, Figure 5, page 10 of this report (approx. 600 cy per foot within the unstabilized inlet zones and 380 cy per foot elsewhere on the beach)	X		
Establish triggers for when Council should consider authorizing construction of mid-scale and large-scale projects (See Exhibit 2)	X		
Consider becoming a US Army Corps of Engineers (USACE) managed beach	X		
Repeal ordinance prohibiting hard erosion control structures 250' of mean high water		X	
Modify ordinance prohibiting hard erosion control structures 250' of mean high water			X

City performs emergency work (sand scraping, trucking in sand and/or placement of sandbags)		X	
Establish property owner's responsibilities for maintaining dune system within private property (Folly Beach model see Exhibit 5)	X		
Prohibit construction of new pools seaward of the maximum building line	X		
Consider seeking second opinion on emergency protective actions, future beach nourishment program and other beach protection options (groins, sandbag installation and review of emergency protective actions taken during the last 2 years)	X		

2) Proactive Response to Beach Erosion

Recommendation	Consensus	General Agreement	Divided
Accelerate and increase frequency of large-scale dredging beach nourishment projects from every 10 years to every 8 years	X		
Initiate permitting for large scale nourishment projects two years after completion of a large-scale nourishment project	X		
Coordinate construction of large-scale nourishment projects on both unstabilized inlet zones to occur at the same time	X		
Hire full time employee tasked with overseeing resilience efforts, including beach management	X		
Establish an ongoing Beach Preservation Committee made up of 5 Residents and 2 Council members	X		
Increase the frequency of beach monitoring surveying from annual to semi annual	X		

3) New and Consistent Funding Mechanisms for Future Needs and Projects

Recommendation	Consensus	General Agreement	Divided
Establish separate accounts for 1) emergency beach restoration work, and 2) large-scale beach nourishment projects and 3) other beach related projects	X		
Consider raising revenue to cover the proposed proactive beach nourishment schedule (See Exhibit 3 funding sheet)	X		
Engage state and federal lobbyists/legislators to secure funding for beach nourishment	X		

Engage state lobbyists/legislators to amend state law to allow beach nourishment to be added to Municipal Improvements Act (MID) to allow City to establish special purpose tax district	X		
Engage state lobbyists/legislators to amend state law to provide coastal communities ability/flexibility to raise revenue for beach nourishment (i.e. real estate transfer fees or additional atax)	X		
Establish a cost-sharing plan with Wild Dunes for projects along areas that do not meet public access requirements based on WD contributions to the Beach Preservation Fund (see Exhibit 4 for financial assumptions)	X		

Isle of Palms Beach Management Planning Scenarios

BACKGROUND

Isle of Palms (IOP) is a classic "drumstick" barrier island (Hayes 1979), with a bulbous updrift end at the northeast, and a narrow recurve spit on the southwest (Figure 1). Generally, sand comes to the island via shoal bypassing at Dewees Inlet and then migrates south, maintaining a historically stable shoreline along the central portion of the island. Sand eventually accumulates along the southern spit of the island and then into the shoals of Breach Inlet. The shorelines near the inlets are highly dynamic and are classified as "unstabilized inlet erosion zones" by SCDHEC–OCRM due to the episodic fluctuations in the shorelines. Figure 2 provides a map of the monitoring stations referenced herein.

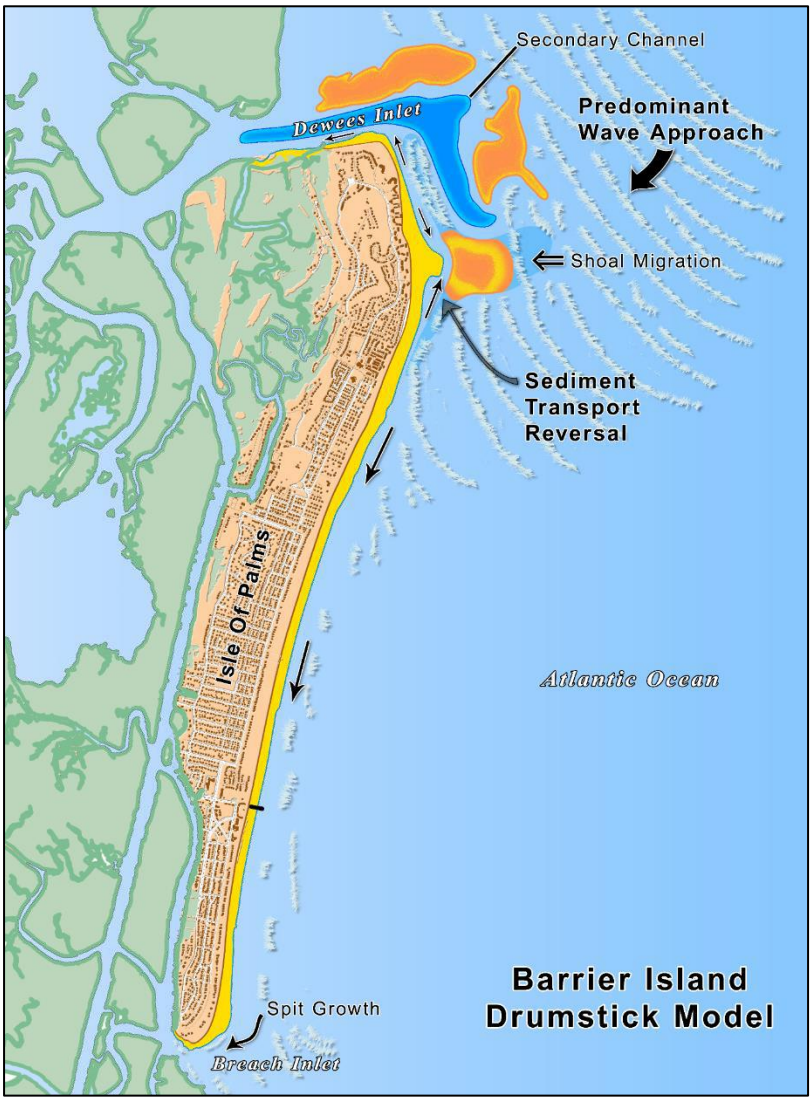


FIGURE 1. "Drumstick" barrier island model developed from Hayes (1979).

EXHIBIT 1

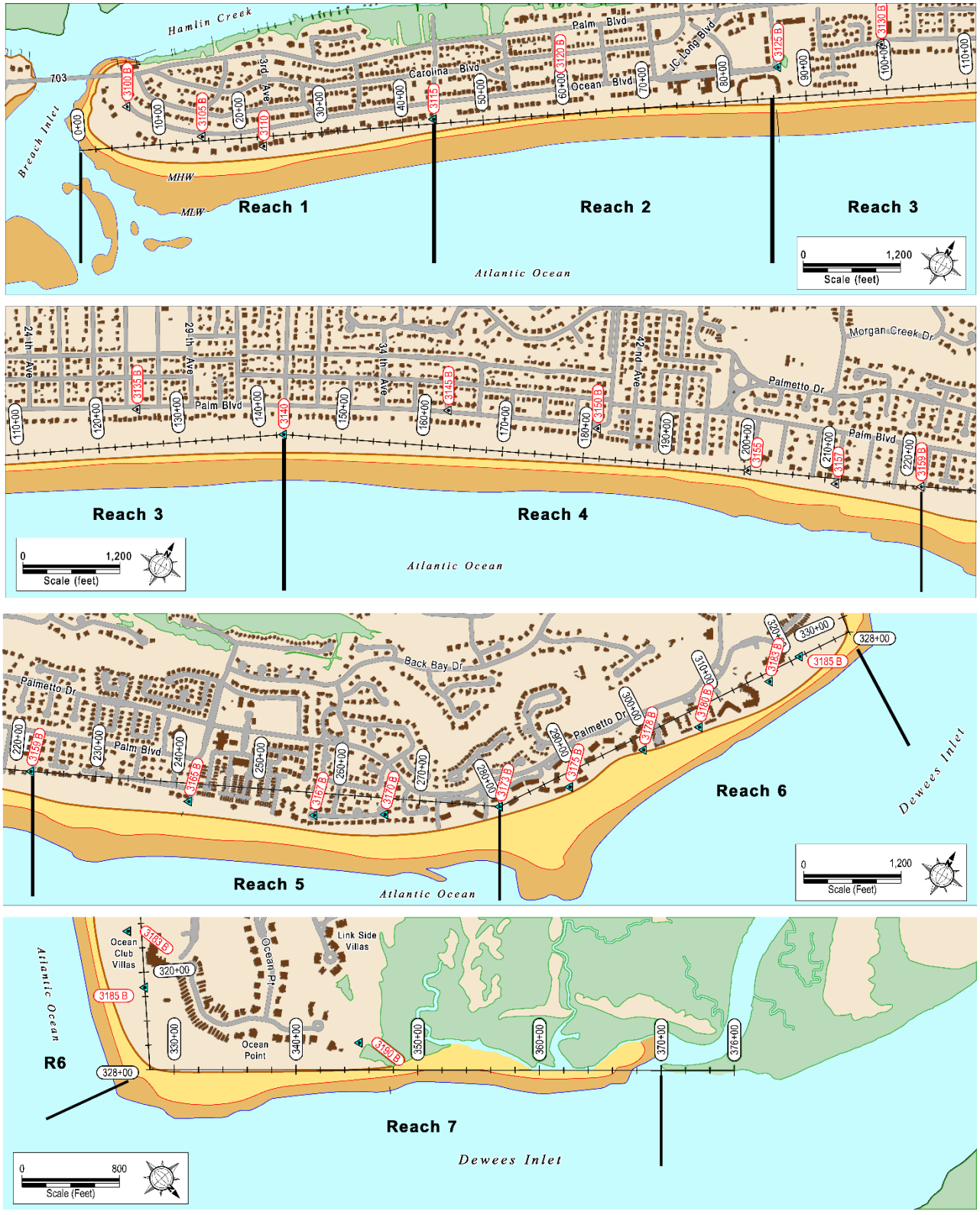


FIGURE 2. Station and reach map showing the monitoring profiles and reaches used in prior beach monitoring efforts.

Studies show that major shoal bypass events affect the eastern end of the island every ~7 years (Guadiano 1998); however, they can occur more frequently. Generally, smaller events occur on a more rapid timescale, while large events may impact the shoreline for ten years or more (ie, 1940–1950's attachment). These attachment events create localized areas of erosion and accretion that can see the shoreline change by up to 200 feet (ft) in one year. After attachment, the trend can reverse. The episodic nature of these events makes it difficult to predict shoreline trends and requires flexible solutions to deal with short-term erosion as well as long-term solutions for large-scale sand losses. While each shoal event adds sand to the system, monitoring efforts sponsored by the City of IOP show that there is a net loss of sand from the north end. This loss necessitates periodic additions of sand via offshore nourishment projects. Most of the sand added to the north end via shoals and nourishment projects shifts downcoast to maintain the remainder of the island, while the balance is eventually recycled back into Dewees Inlet to feed future shoals.

At the south end, the beach had accreted significantly in recent history despite minor fluctuations in volume from year to year and impacts from storms; however, erosion has accelerated over the past two years leaving portions of the beach critically eroded. While the condition appears to have largely stabilized in 2024, additional erosion is still a threat, and the existing beach condition is insufficient for storm protection. In CSE's opinion, the rapid erosion occurring in 2022–2023 is not likely to persist in the future. That being said, there has been a significant increase in storm activity since 2015, and sea level rise appears to be accelerating. These factors may increase the long-term erosion rate along the south end, turning the area from accretional to erosional. Until nature proves otherwise, the City should anticipate a need for projects to supplement the sand supply to the south end.

This summary of alternatives is prepared at the request of the City of Isle of Palms to outline information necessary to plan for long-term beach management along the beach. While the analysis focuses on the erosional areas at the ends of the island, the entire beach will be assessed. The summary outlines:

- Alternatives for a minimum healthy beach profile
- Determination of existing volume deficits
- Summary of recent erosion rates
- Discussion of triggers
- Cost opinion for restoration alternatives

The summary herein includes impacts of the beach restoration efforts at the east end including two large-scale nourishments, two shoal management projects, various emergency measures and a planned USACE project at the south end that is currently in the initial phase of construction.

BEACH VOLUME

The condition of the beach is determined by the volume of sand in the beach profile. This includes all sand between the reference line along the landward boundary and a point offshore where little or no measurable elevation change occurs. The landward boundary can be at the crest of the primary dune or from a point of significance, such as a structure. For developed beaches, the beach volume seaward of structures is typically the main interest. The seaward boundary is referred to as the "closure depth," and is a unique depth for every beach determined by sediment grain size, tide, and wave climate. Larger waves increase the depth of closure as the higher energy allows sand to be moved at greater depths. At Isle of Palms, the typical depth of closure is ~–13 ft NAVD (note 0 ft NAVD is approximately equal to mean sea level) (Figure 3).

Within the active beach profile, sand can shift in the cross-shore direction from varying weather conditions, with larger wave periods moving sand from the dune to underwater sandbars, and calmer weather moving sand higher in the profile. Generally, summertime weather conditions promote growth of the dry sand beach, while stormier winter conditions show narrower beaches with more gentle slopes and sandbars. Beach volumes are typically reported as cubic yards of sand per linear foot of beach (cy/ft), which is the total quantity of sand between the dunes and closure depth in every linear foot of alongshore beach. Repetitive surveys measure changes in profile volume from year to year, providing total beach volume change using the average-end-area method for quantifying sand volume between monitoring stations.

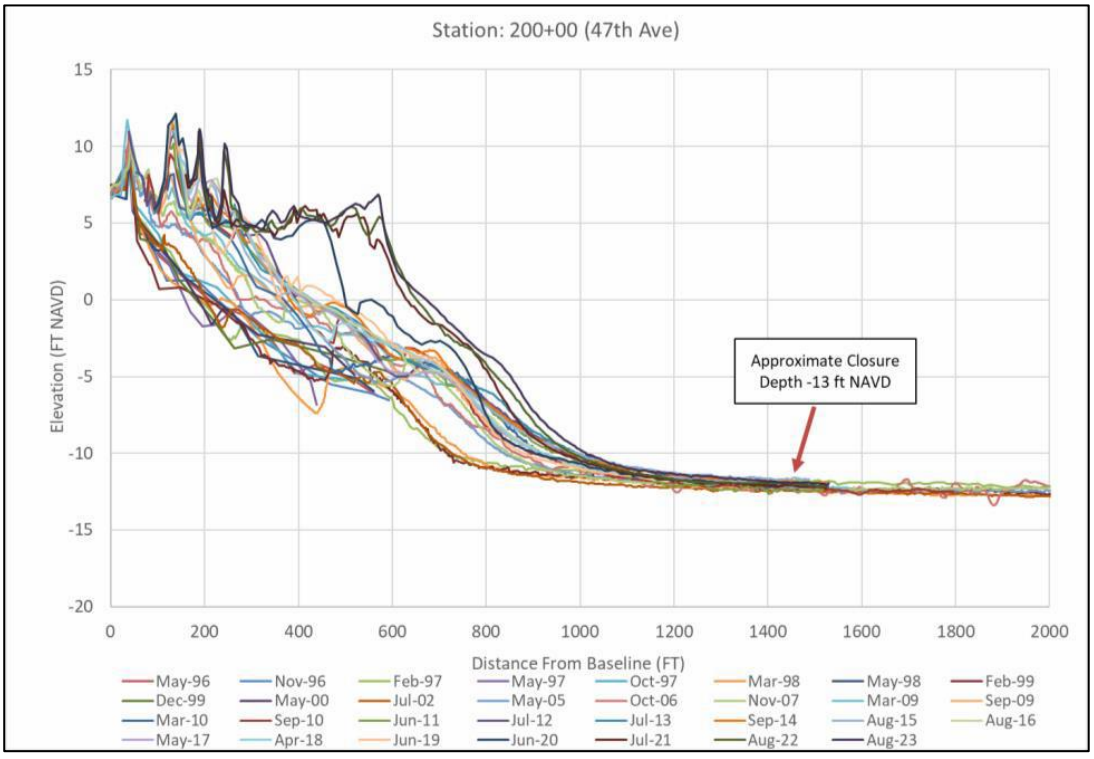


FIGURE 3. Example of "Closure Depth" at Isle of Palms. Repetitive surveys eventually overlap near –13 ft NAVD, which is considered the limit of measurable profile change.

Cross-shore movement of sand within a profile can occur without any net change in beach volume. Sand also moves alongshore due to currents and waves approaching the beach at an angle. This can result in net gains or losses of sand to a given area, resulting in accretion or erosion. Sediments arriving from adjacent sections of a shoreline often control whether a beach is gaining or losing sand, and changes to the sediment supply can create temporary or long-term changes in erosion rates. There are other mechanisms for changing beach volumes, including shoal bypassing, inlet dynamics, nourishment, and storms. When considering short and long-term changes to the beach volume, each of these factors need to be considered to determine the principal cause of erosion and identify appropriate alternatives for restoration.

Figure 4 shows a schematic of beach volumes for various beach conditions along the Isle of Palms in 2023. The profiles show the shape of the beach seaward of the structure line (0 ft on the x-axis). The beach conditions at the various locations represent areas that are eroded (Beachwood East), have a minimum healthy beach profile (9th Ave), and have an excess quantity of sand (Citadel House). The profile at Beachwood presently holds about 340 cy of sand per linear foot and is in a highly eroded condition. Note the volume would be even lower except for additional sand in the lower profile from an approaching shoal. The profile at 9th Ave holds ~380 cy/ft of sand, which is sufficient to hold a modest dune field and dry sand beach at this location. This volume can be considered the minimal healthy beach volume at this location. The profile at Citadel House holds over 700 cy/ft of sand, which is a surplus resulting from sand spreading from the nourishment projects and shoal attachments in Wild Dunes.

Comparison of beach profile volumes aids in beach management planning by providing quantitative erosion rates, determining the required volume to maintain a healthy beach profile, and providing forecasts of beach conditions. The minimum healthy beach volume is a measure of the required sand volume to maintain a healthy beach profile that includes a dune capable of withstanding a significant storm event and a dry sand beach that can accommodate seasonal weather changes without impacting the dune. This volume is site-specific based on beach slope, dune size, and closure depth. Regional closure depths are typically similar, but can be impacted by inlets and shoals, as these features alter the beach slope and wave climate reaching the beach.

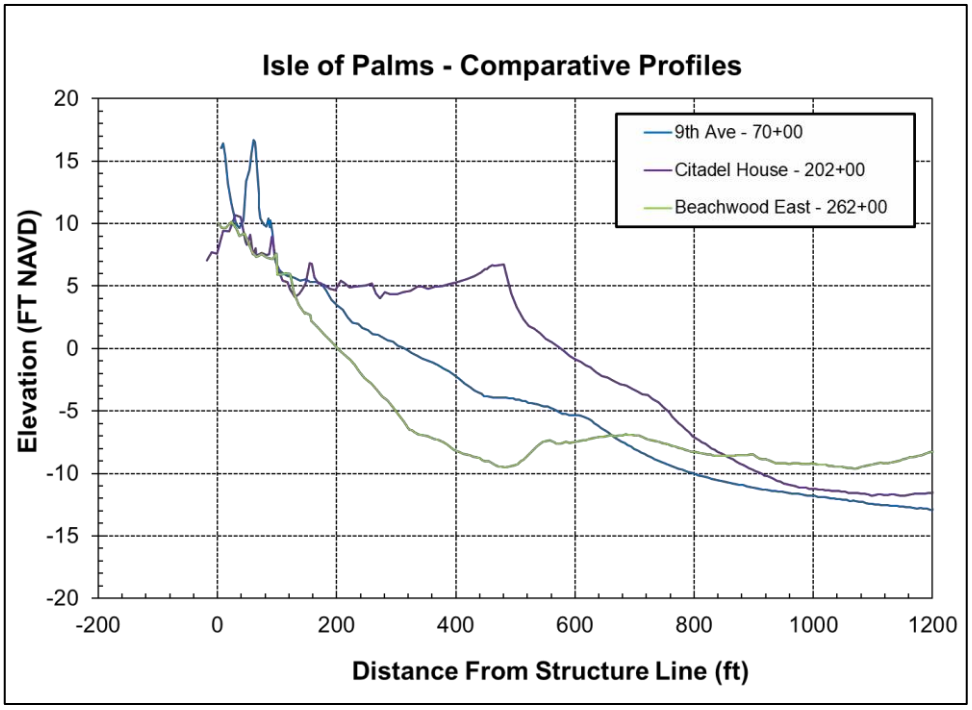


FIGURE 4. Comparative profiles along Isle of Palms showing eroded, healthy, and surplus sand volume conditions.

At Isle of Palms, the minimal healthy beach volume for the areas away from inlets is ~380–400 cy/ft when measured from the structure line to a depth of –13 ft NAVD. This value is based on the equilibrium shape of the beach, dune volume, and historical conditions.

Figure 5 shows the historical beach volume envelope for the Isle of Palms (not including the Dewees Inlet shoreline). The plot shows the maximum and minimum beach volumes measured since 2008, as well as the current volume and average volume between 2008 and 2023/2024. The plot shows the beach volume seaward of the structure line, which results in areas with greater setbacks having higher volumes, and structures that protrude beyond adjacent properties having lower volumes. This means that the volumes may not necessarily reflect erosion trends, but do show relative levels of dune protection across the island. In addition, it's important to note that the localized erosion patterns are highly dynamic near the inlets, and areas that are relatively healthy now may quickly change due to shoal-induced erosion.

The figure includes a line showing the minimum healthy beach volume across the island. At Breach Inlet, the value is higher due to the constant presence of sand in the shallow underwater profile from the northern shoal of Breach Inlet. This increases the total sand volume in the profile measured to –13 ft NAVD. The minimum profile volume decreases at the northern tip of the island, as the sheltering effects of the Dewees Inlet delta create a steeper beach slope, reducing the volume necessary to maintain a healthy profile. Away from the inlets, the minimum healthy profile is ~380 cy/ft.

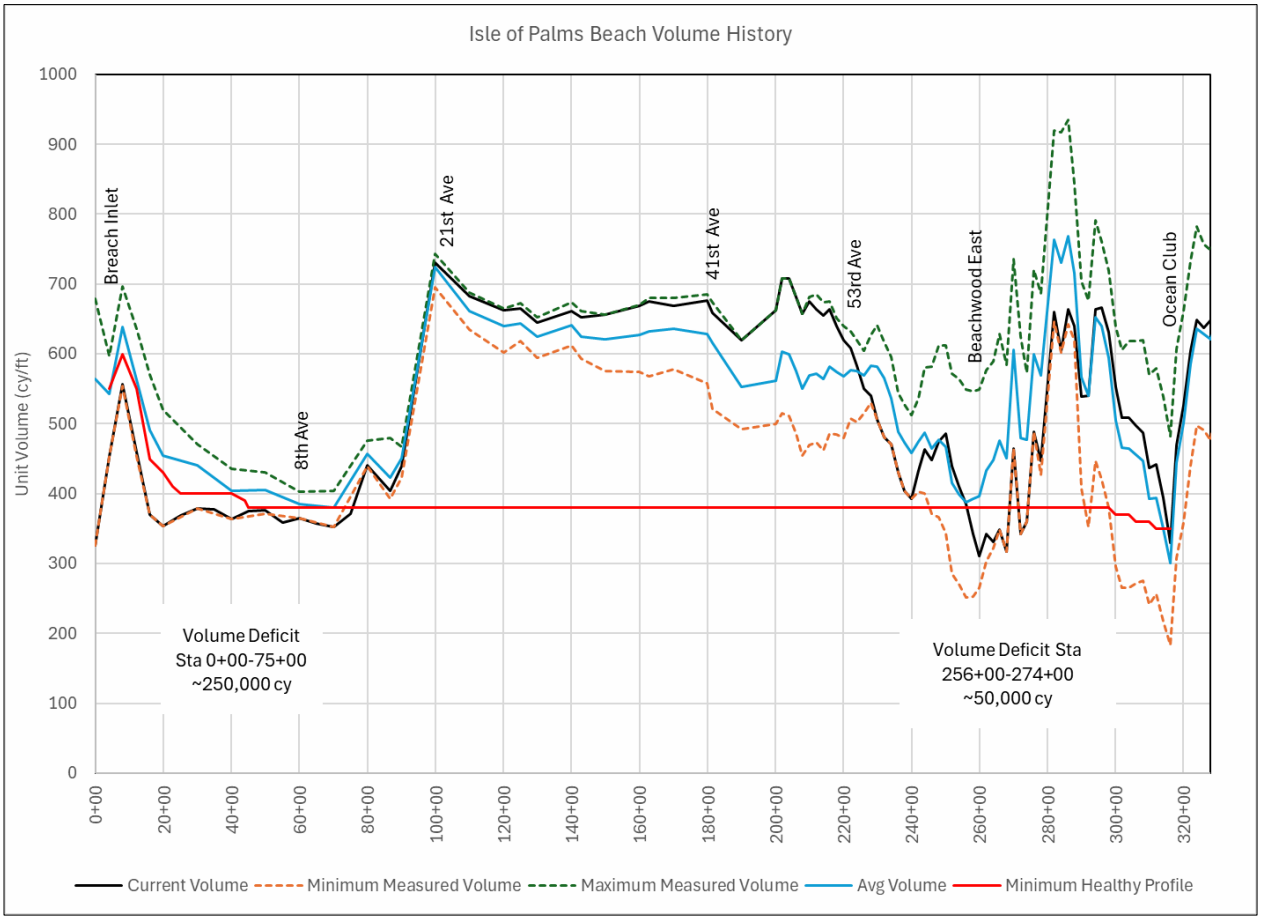


FIGURE 5. Volume summary for Isle of Palms 2009–2024. Note where the current condition (black line) is near the most eroded (orange line) or the healthiest (green line). The red line shows a site-specific minimum healthy beach volume.

The graph shows that the current beach condition is near the minimum measured volume south of the county park. The volume is near the maximum measured volume from the county park to 53rd Ave, and varies north of 53rd Ave as a result of shoal processes. Presently, ~7,500 linear feet (lf) of beach between Breach Inlet and 9th Ave is at or below the minimum ideal volume, as well as ~1,600 lf around Seagrove and Beachwood East in Wild Dunes. The station fronting the Ocean Club building is also just below the threshold volume.

Within the southern erosional area, there is a total sand deficit of ~250,000 cy to reach the minimum healthy condition at all stations. Along the northern erosional area, the current deficit is ~51,000 cy. These volumes would be required to bring the affected beach areas to the minimum healthy volume (this is commonly referred to as the “deficit volume” or “base volume”). Additional volume is required to account for future erosion over the design life of a project to protect this minimally healthy beach. This additional volume is generally referred to as “advance fill.” A beach nourishment project volume is the sum of the deficit volume and advance fill volume.

Figure 6 shows unit volumes for monitoring stations along the southern end of IOP since 2015. The bars show the beach volume for each year at each station, and the variability in erosion and accretion trends is apparent through 2021. Beginning in 2022, an erosional event was beginning, decreasing beach volumes at stations south of 50+00. The erosion accelerated from 2022–2023, leaving stations 8+00–50+00 (Breach Inlet to 6th Ave) below the healthy beach condition. Additional erosion was present in many stations as of March 2024.

The data in Figure 6 are useful in trying to predict future volume change where erosional patterns are generally consistent. It is more difficult to predict when a beach may reach the minimum healthy volume when erosion patterns vary, as in the case of the south end of IOP. Volumes fluctuate up and down from year to year before falling off dramatically in 2023. Figure 7 shows a similar graphic from beach monitoring at Edisto Beach, SC. Here, the areas represented by Reaches 1–4 are the main project area and show relatively consistent erosion trends since the last nourishment was constructed in 2017. This makes forecasting future beach conditions easier, as annual losses can be projected with more confidence.

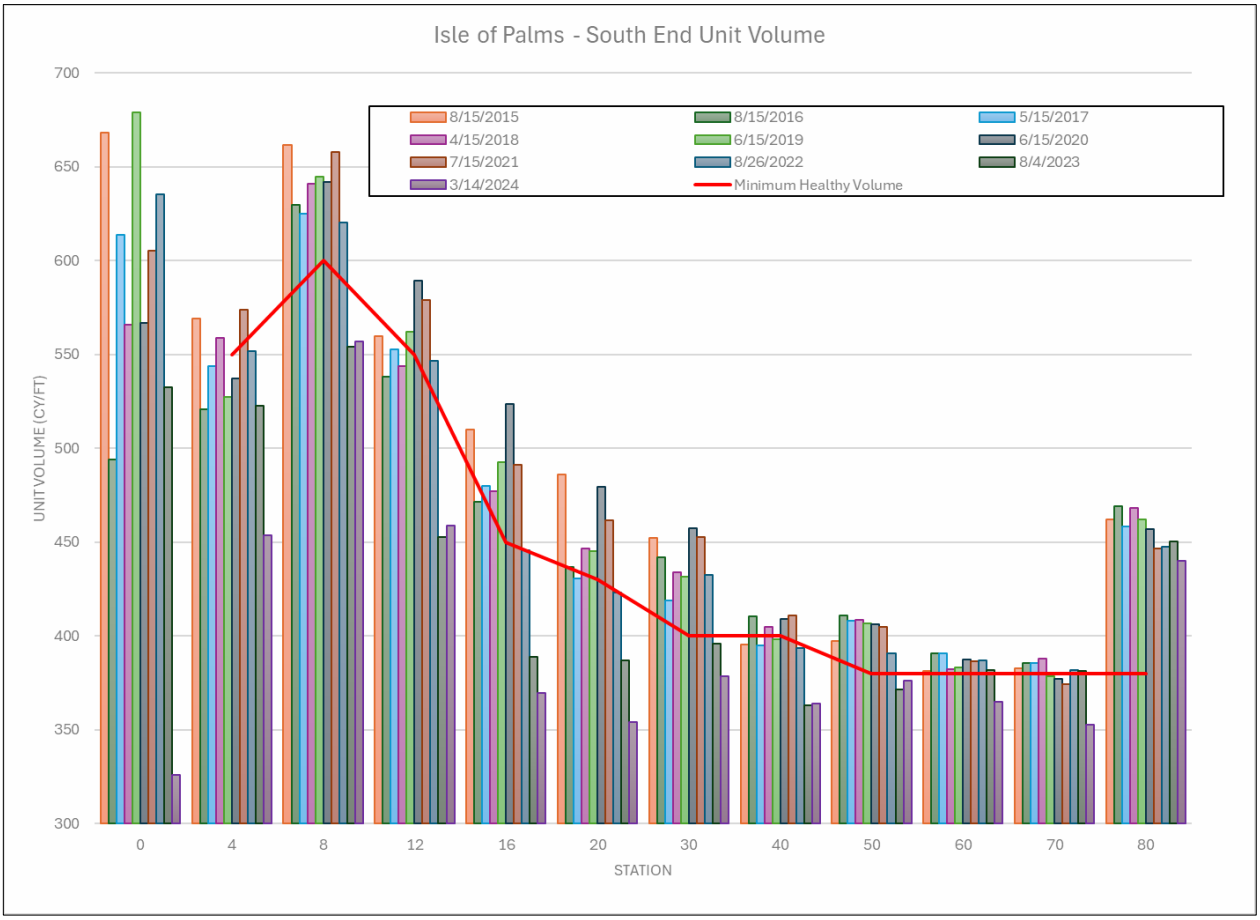


FIGURE 6. Beach Unit Volumes for the southern area of Isle of Palms. The local minimum healthy beach condition is shown in red. Note the dynamic trend south (left) of station 50 due to effects of Breach Inlet. Volume trends become more consistent away from the inlet (Stations 50–80).

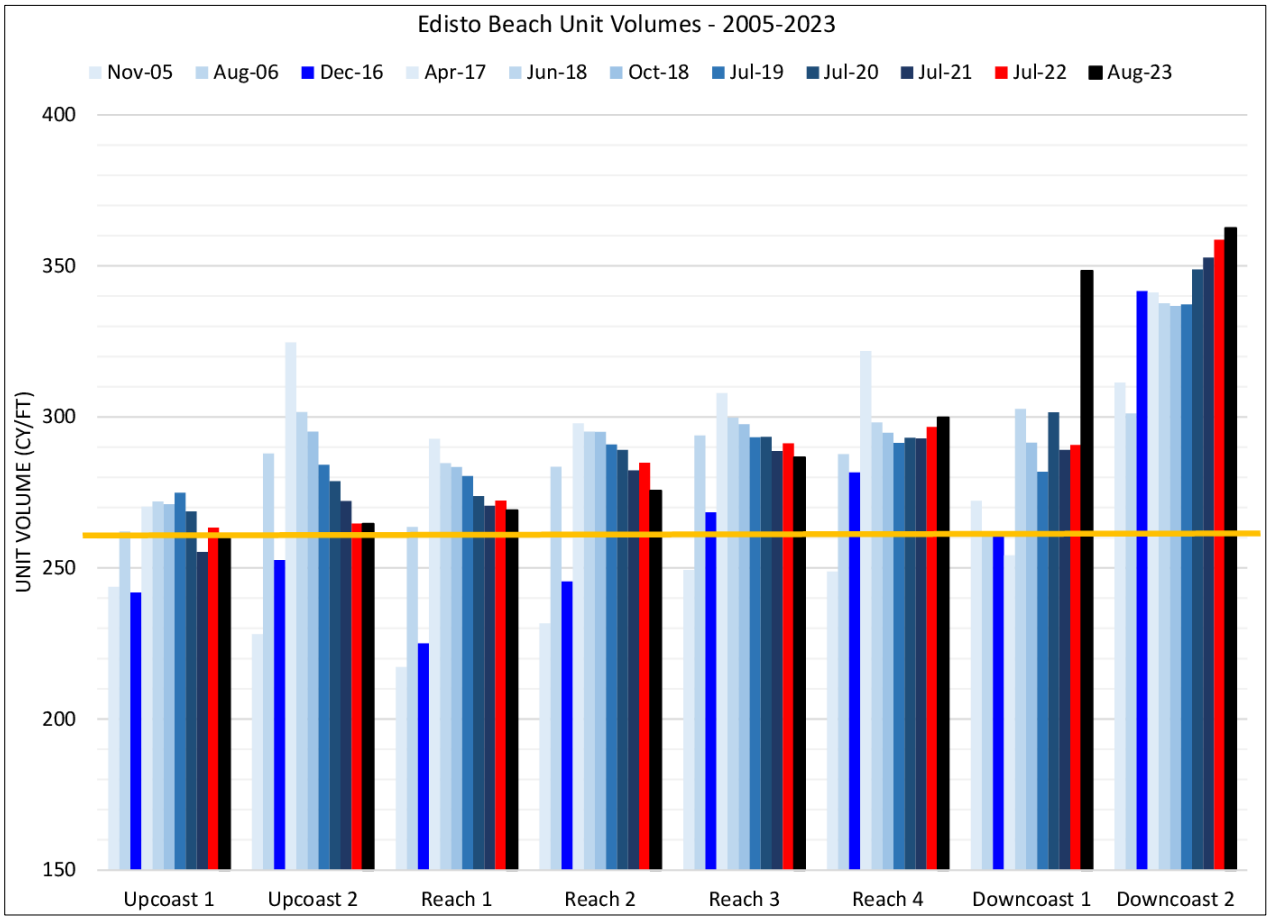


FIGURE 7. Beach Unit Volumes along Edisto Beach. Here, Reaches Upcoast 2 - Reach 3 represent the shoreline away from inlets and erosional trends are fairly consistent and predictable.

Figure 8 shows beach volumes combined into monitoring reaches used in prior reports to the City. The plot includes the minimum healthy beach volume for each reach. Assessing beach volumes by reach simplifies volume trends by eliminating highly localized spatial and temporal changes, but can mask erosional hotspots if the reaches include areas of varying beach condition. For example, Reach 5 includes healthy sections of beach north of 53rd Ave, as well as eroded sections near Beachwood East. The total volume may indicate a healthy beach, but areas within the reach may have less volume. The plot shows that Reach 1 is well under the minimum healthy volume, and Reach 2 is trending towards the minimum volume from 2018 to 2023, with a substantial decrease observed from August 2023 to March 2024, bringing the volume to below the minimum healthy condition. Along the center portions of the island (Reaches 3 and 4), the volumes have trended up since 2007, with only a few instances of annual decreases observed. At reaches 5 and 6 (north of 53rd Ave), the beach volumes decrease rapidly, then increase with nourishment (2008 and 2018). Note the volume increase from 2014 to 2016 in Reach 6 resulting from a large shoal attachment. For these reaches, a review of individual station volumes provides a better assessment of volume deficits.

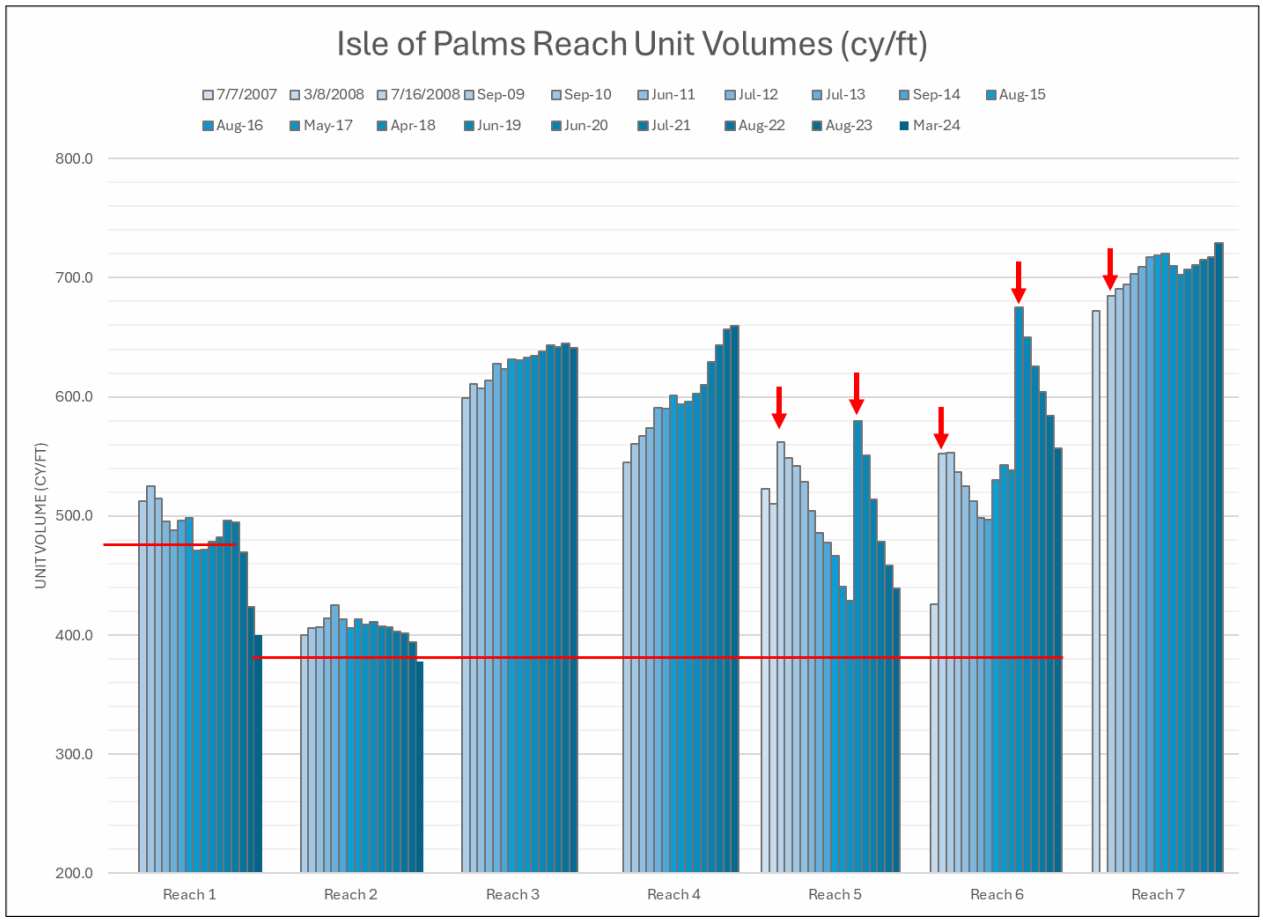


FIGURE 8. Reach Unit Volumes at Isle of Palms. Minimum healthy beach volumes are shown in the red line.

Table 1 shows erosion measures for the south end of Isle of Palms, covering the time period from 2018–2024. As mentioned previously, erosion has accelerated over the past two years, which has significantly increased erosion rates compared to historical averages. Collectively, the area south of station 80+00 has lost an average of 68,000 cy each year since 2018. This compares to a loss of 13,500 cy per year between 2009 and 2018. Should this level of erosion persist, artificial nourishment of 680,000 cy every ten years would be required to maintain the shoreline position. CSE believes the recent rates will return closer to the historical average, but with additional sea-level rise, there is a probability that future rates will be greater than the 2009–2018 rate.

At the north end, erosion has averaged ~250,000 cy per year since nourishment in 2018. This has been a very high rate of loss; however, much of the volume loss is attributable to the loss of shoal sand as well as nourishment, and much of the 2018 project area remains in good condition. A new shoal is nearing attachment, which will reduce erosion rates over the next two years. A better indication of long-term changes that include periodic shoal attachments can be estimated by comparing losses occurring from 2008–2017. This period represents the post-2008 nourishment to the pre-2018 condition and includes erosion of project sand and attachment of multiple shoal events. Over that time, reaches 5–6 lost a total of 865,000 cy of sand, or ~98,000 cy per year. This is a more realistic long-

term erosion rate for the north end; however, the variability and dependence on shoals cannot be understated.

Presently, the area between the northern end of the Grand Pavilion and Dunecrest Lane has lower volumes than the minimum healthy beach volume. The City is pursuing a shoal-management permit to mitigate erosion in this area.

TABLE 1. Volume change measures for the south end of Isle of Palms.

Station	Deficit Vol (cy/ft)	Erosion Rate 2018-2023/24 (cy/ft per year)	Annual Losses (cy/yr)	Total Deficit Vol (cy)	10-yr erosion volume (cy)
3100					
3105					
0					
4	−96.3	−17.78	−6,398	−27,860	63,976
8	−43	−14.21	−5,708	−26,820	57,082
12	−91.1	−14.33	−6,492	−34,280	64,923
16	−80.3	−18.13	−6,749	−31,260	67,491
20	−76	−15.61	−6,153	−26,875	61,535
25	−31.5	−9.00	−4,582	−13,225	45,819
30	−21.4	−9.33	−4,332	−10,825	43,319
35	−21.9	−8.00	−3,732	−14,500	37,321
40	−36.1	−6.93	−3,607	−10,375	36,071
45	−5.4	−7.50	−3,248	−2,325	32,480
50	−3.9	−5.49	−2,373	−6,225	23,730
55	−21	−4.00	−1,735	−9,050	17,351
60	−15.2	−2.94	−1,735	−9,600	17,351
65	−23.2	−4.00	−2,483	−12,650	24,828
70	−27.4	−5.93	−2,733	−9,200	27,328
75	−9.4	−5.00	−2,450	−2,350	24,498
80		−4.80	−1,608	0	16,077
Total			**−67,993**	**−247,420**	**679,927**

NOURISHMENT REQUIREMENTS

Beach monitoring efforts show that the total sand quantity along the Isle of Palms increased by 854,000 cy between 2008 (pre-nourishment) and 2023. This includes the placement of ~900,000 cy in 2008 and 1.6 million cy in 2018. Without these two projects, the volume change along IOP would be a net loss of ~1.7 million cy. Reaches 3, 4, (Sea Cabins Pier to 53rd Ave), and 6 and 7 (north of WD Property Owners Beach House) currently have more sand than the pre-2008 condition, while reaches 1–2 (south of Sea Cabins Pier) show a net loss of ~736,000 cy and Reach 5 (53rd Ave to Property Owners Beach House) has lost 424,000 cy.

The values above show that localized erosion trends within certain areas of the Isle of Palms can be distinct from total island changes. While the north end is more dynamic, with periods of erosion and accretion and high spatial variability within the reaches, the south end has had high erosion rates over the past two years. Despite the gains in the upcoast areas, insufficient sand has moved south from the central part of the island to compensate for losses to Breach Inlet.

To keep pace with erosion rates observed since 2018, the City will need to supplement an average of ~68,000 cy of sand per year along the south end, and ~100,000 cy of sand per year at the north end. Over a 10-year period, these loss rates translate into 680,000 and 1,000,000 cy projects, assuming there is a minimal healthy beach volume at the start of the project. Any deficit volume would be added to these values to bring all sections of the beach up to the same condition at project completion.

CSE recommends the City plan for nourishment projects at 8–10 year intervals based on current erosional trends, the performance of prior projects, and a general desire to limit the number of mobilizations and construction impacts. The City can establish triggers to aid in decision-making on when to move forward with a project; however, CSE recommends that any trigger allow for flexibility to accommodate the unique beach condition at the time, stage of shoal attachments, dredger availability, and storm impacts. Example triggers could be when a certain length of beach is projected to reach the minimum healthy beach condition within the next 12–24 months, a project would be considered. This could include separate triggers to aid in determining whether to move forward with a shoal management project, or a large-scale project at the north end.

A shoal project could be triggered by a smaller length of affected beach (on the order of 1,500–2,000 ft), with a caveat that the beach and shoal conditions meet permit conditions for buffers. A large-scale project could be triggered by a larger length of beach reaching a set volume above the minimum healthy profile. One example would be if 5,000 ft of beach at the east end averaged less than 430 cy/ft (50 cy/ft above minimum), then a large-scale project could be pursued (again, with a caveat that the specific conditions at the time would need to be considered).

The pending USACE project will add ~500,000 cy of sand to the southern end of IOP, restoring the deficit volume and providing an additional ~4 years' worth of erosion at recent rates. CSE is optimistic that this project will restore a dry sand beach to all areas south of the pier and allow for future dune growth following the City's supplemental efforts in connection with the USACE project. For cost projections, CSE assumes that the USACE project will accomplish restoring the existing deficit volume at the south end.

Nourishment costs are driven by several factors, summarized below:

1) Mobilization – Mobilization of an ocean-certified dredge can range from $3–5 million or more depending on the amount of pipe required (distance to borrow area and length of shore pipe), dredge proximity, fleet availability, season, and local factors such as equipment access
2) Efficiency of borrow area – closer borrow areas with deeper available cuts, high-quality sand, and efficient layout can reduce costs. Reduced uncertainties about sediment quality and weather allow for better confidence and lower costs
3) Fill density – Larger fill volumes are typically more efficient to construct on the beach
4) Season – Typically, the summer season provides better weather conditions and more fleet availability; however, sea turtle concerns may impact permitting
5) Contract requirements – Insurance, wage, tolerances, or other requirements placed on contractors may increase costs

At Isle of Palms, prior nourishment projects have generally been bid at lower unit volumes compared to other projects in the state. For example, the unit cost for the 2018 project was $6.15 per cy, along with mobilization of ~$3.5 million. Comparable projects at nearby areas have cost $11–12 per cy (Pawleys Island 2020, Edisto Beach 2017, DeBordieu Beach 2022). For planning purposes, and with considerations for inflation and higher construction prices over the past few years, CSE anticipates unit pumping costs for the next five years at IOP to be $10–12 per cy with mobilization of $4–5 million.

CSE recommends the City pursue a plan that allows for concurrent nourishment of the north and south ends (if necessary) to greatly reduce mobilization costs compared to separate projects. A joint project would require the dredge equipment to shift from one end of the island to the other, and would likely require a separate borrow area for the south end; however, these types of shifts are common to offshore dredging projects and would not result in a significant increase in mobilization costs. Constructing the projects separately would require full mobilization costs for each project.

Table 2 provides a 30-year example of a nourishment scenario, assuming the erosion losses discussed above. It includes a 3% inflation factor for mobilization and sand placement. CSE would recommend a contingency volume to account for storm events or higher-than-normal erosional periods to modify any particular project. In addition, should a major storm impact the beach, FEMA may reimburse the City to replace losses caused by the storm. For a combined project, CSE estimates that an initial project for both ends of the island would cost ~22 million dollars. Future project costs are shown assuming the 3% inflation.

TABLE 2. Example cost scenario for joint offshore projects at the north and south end over a 30-year period. A 3% inflation factor is assumed.

	Unit Cost	Volume (cy)	Total Cost - Year	Year 10	Year 20	Year 30
Mobilization	$ 5,000,000.00		$ 5,000,000.00	$ 6,719,581.90	$ 9,030,556.17	$ 12,136,312.36
North End Placement	$ 10.00	1,000,000	$ 10,000,000.00	$ 13,439,163.79	$ 18,061,112.35	$ 24,272,624.71
South End Placement	$ 10.00	680,000	$ 6,800,000.00	$ 9,138,631.38	$ 12,281,556.40	$ 16,505,384.80
Total Project		1,680,000	$ 21,800,000.00	$ 29,297,377.07	$ 39,373,224.92	$ 52,914,321.87

Funding plans should consider potential partnerships with the state, as all the south end, and a portion of the north end would qualify for state beach nourishment assistance, if available. Note that presently, there are little remaining funds in the state's beach nourishment fund. Additionally, private funding from the Wild Dunes community may be available for cost-sharing of work completed within Wild Dunes.

Nourishment via offshore dredge with placement at both ends of the island provides the most cost-effective, large-scale alternative for long-term beach management. These projects allow for predictable planning schedules, costs, and outcomes (with the caveat that periodic maintenance shoal projects may be required at the east end). The only other alternative for large-scale nourishment (>400,000 cy) at the south end is a project that would dredge sand from the shoals of Breach Inlet. This project could have lower pumping costs due to a shorter pump distance; however, it would still require high mobilization costs for an "ocean-certified" dredge. While altering the inlet could alleviate some of the present morphologic conditions that are drawing sand off the south end, there may be unintended consequences of large-scale alterations of the inlet to both Isle of Palms and Sullivan's Island. Also, after permitting and funding are secured, natural changes in the inlet system may create conditions where relocating a channel is not as effective as if it were constructed today.

There may be several opportunities for modest-scale projects via beneficial use projects from the Intracoastal Waterway and/or adjacent creeks, especially at the south end. The USACE intends to place sand directly from the waterway in future years if the upcoming project proves successful and the

material is beach-compatible. This may add several hundred thousand yards of sand whenever the waterway is dredged. If federal funds are not available, the City can partner with the USACE to sponsor a project for the benefit of IOP. A modest-scale waterway project may cost $3–6 million, with the high range due to variable volume scenarios. The upcoming USACE project will be constructed for just under $10 million, but involves a larger volume than typical waterway dredging and involves clearing deposition basins and the double handling of material. More typical waterway dredging projects would cost less.

Should the erosion rate along the south end return to historical trends, it's likely that the beach can be maintained with infrequent smaller-scale projects. Future monitoring will be critical for determining the necessary mitigation plan. Ultimately, analysis of the unit cost for the different alternatives should be considered. Due to economies of scale, and mobilization being required for offshore projects at the east end, nourishment via offshore dredging likely has similar or lower unit cost as smaller-scale beneficial use projects (if not paid for by the USACE).

CSE recommends that the City seek permits well in advance of potential construction windows to allow for as much flexibility as possible. Permits can take 12–18 months to receive after submission of all necessary documentation. Engineering and sand searches may take 6–12 months prior to submission of an application. Initial planning for an offshore dredging permit should start 3–4 years after the last project is completed so that a permit is issued in year 5 or 6. With a 5-year life, the permit would allow for construction to occur anytime between years ~6 and 11, which allows for flexibility to account for unexpected changes in erosion trends, storm impacts, shoal attachments, and contractor availability.

REFERENCES

Gaudiano, DJ. 1998. Shoal bypassing in South Carolina tidal inlets: geomorphic variables and empirical predictions for nine inlets. Technical Report, Dept. Geol., Univ. South Carolina, Columbia, 182 pp.

Hayes, MO. 1979. Barrier island morphology as a function of tidal and wave regime. In S Leatherman (ed), Barrier Islands, Academic Press, New York, NY, pp 1-26.

North End Annual Erosion Rate	150,000	cy/yr								
South End Annual Erosion Rate	70,000	cy/yr								
Inflation Rate	1.03									
		Interval (yr)	**Volume (cy)**	**Cost Year 0**	**Year 8**	**Year 16**	**Year 24**	**Year 32**	**Total Cost ($)**	**Total Sand Volume Placed**
Mobilization	5,000,000	8		5,000,000	6,333,850	8,023,532	10,163,971	12,875,414	42,396,767	
North End Placement	10	8	1,200,000	12,000,000	15,201,241	19,256,477	24,393,529	30,900,993	101,752,241	6,000,000
South End Placement	10	8	560,000	5,600,000	7,093,912	8,986,356	11,383,647	14,420,463	47,484,379	2,800,000
Total Project		Total	1,760,000	22,600,000	28,629,004	36,266,366	45,941,147	58,196,870	191,633,386	8,800,000

North End Annual Erosion Rate	150,000	cy/yr								
South End Annual Erosion Rate	70,000	cy/yr								
Inflation Rate	1.03									
		Interval (yr)	**Volume (cy)**	**Cost Year 0**	**Year 10**	**Year 20**	**Year 30**		**Total Cost ($)**	**Total Sand Volume Placed**
Mobilization	5,000,000	10		5,000,000	6,719,582	9,030,556	12,136,312		32,886,450	
North End Placement	10	10	1,500,000	15,000,000	20,158,746	27,091,669	36,408,937		100,159,351	6,000,000
South End Placement	10	10	700,000	7,000,000	9,407,415	12,642,779	16,990,837		46,741,031	2,800,000
Total Project		Total	2,200,000	27,000,000	36,285,742	48,765,003	65,536,087		179,786,832	8,800,000

Note volume requirements are based on the annual loss rate multiplied by the time interval between nourishments.

City of Isle of Palms, SC
Beach Preservation Ad Hoc Committee
Recommended Triggers to Initiate Consideration by Council

EXHIBIT 2

The Beach Preservation Ad Hoc Committee suggested City Council consider implementing different scale projects as follows:

1. City Council should consider implementing midscale projects (sand recycling, shoal management or other):

    a. when beach monitoring forecasts show 1500 linear feet of beach is projected to reach the Minimum Healthy Beach Volume within the next 12 months (see Figure 5, page 10 of this report)

    b. when beach monitoring forecasts show 1500 linear feet of beach is projected to have a dune width of 75’ within the next 12 months.

    c. always have permits in hand when this need arises

2. City Council should consider implementing large-scale offshore dredging renourishment projects:

    a. when beach monitoring forecasts show one mile of beach is projected to reach the Minimum Healthy Beach Volume within the next 12 months

    b. when beach monitoring forecasts show the beach is projected to have a dune width of 50’ within the next 12 months.

    c. always have permits in hand when this need arises

EXHIBIT 2

Isle of Palms Beach Nourishment
Potential Revenue Opportunity Summary
Draft for Discussion Only
As of September 26, 2024

Summary of Beach Nourishment Revenue Sources by Category
EXHIBIT 3

Net Revenue from Beach Nourishment Fund @ 1% of ATAX (excludes Grant)		$ 732,595			$ 732,595	Based on FY2024 Revenue Forecast
= Input		FY24 Forecast Baseline	Assumption	Input	Potential Revenue	Notes/Comments
Sub-Total Existing IOP Funding		$ 732,595			$ 732,595	
	ARPU / Units					
Increase Parking Lot Fees	$ 1,485 / 493	$ 732,003	15% Increase	15%	$ 109,800	Based on FY2024 Forecast, Units from LBMP
Increase Parking Meter Fees	$ 4,049 / 155	$ 627,594	15% Increase	15%	$ 94,139	Based on FY2024 Forecast, Units from LBMP
Charge for Parking in Beach District		$ -	Add New Spots	300	$ 222,719	Uses 50% of ARPU In Parking Lots (not meter)
Property Tax Increase		$ 4,336,509	Rollback Assumption (3yr)	$ 782,000	$ 782,000	$91 increase for 4%, $166 increase for 6% per $1M Assessment - IOP
Increase Building Permit Fees		$ 569,519	15% Increase	15%	$ 85,428	Based on FY2024 Revenue Forecast
Increase Business License Fees (2048 Licenses)		$ 2,581,385	15% Increase	15%	$ 387,208	Based on FY2024 Revenue Forecast
Increase Short Term Rental License Fees (1,800 Licenses)		$ 1,869,052	15% Increase	15%	$ 280,358	Based on FY2024 Revenue Forecast
On-Beach Business Franchise Fees		$ -			$ 50,000	
Establish Beach Service or User Fee per Sec 6-1-330	4610		$150 fee per dwelling	150	$ 691,500	4,610 dwellings per Charleston County records 2023
Sub-Total IOP City Council Controllable - New Revenue		$ 10,716,062			$ 2,011,652	Assumes all new revenue increases are allocated to future beach projects
Re-allocation of existing tourism revenue for beach projects						
Allocation % of State ATAX (Non-30% $) to Beach Preservation Fund		$ 2,371,945	5% Allocation	5%	$ 118,597	Based on FY2024 Revenue Forecast
Allocation % of Muni ATAX to Beach Preservation Fund		$ 2,455,590	5% Allocation	5%	$ 122,780	Based on FY2024 Revenue Forecast
Allocation % of Hospitality Tax to Beach Preservation Fund		$ 1,551,058	5% Allocation	5%	$ 77,553	Based on FY2024 Revenue Forecast
Sub-Total of Re-allocation of existing tourism revenue for beach projects		$ 6,378,593			$ 318,930	
Wild Dunes Beach Nourishment Funding		$ -	TBD	0	$ -	No formal cost share agreement in place. City covered 18% in 2008 and 14% in 2018.
Sub-Total Wild Dunes Controllable		$ -			$ -	
REQUIRES CHANGES TO STATE LAW. SOURCES NOT CURRENTLY AVAILABLE						
Establish Statewide Beach Nourishment Fund		$ 850,000	Replenish Fund/Spend	$ 850,000	$ 850,000	Requires change to state law. Based on SCPRT grant received in FY24.
Cap % state atax used for tourism promo (currently 30%)		$ 1,094,744	Capped at 30% Share	70%	$ 766,321	Requires change to state law
Request Specific State Funds for IOP (PRT/Campsen $)		$ -	Same Every Year	$ 1,000,000	$ 1,000,000	Based on FY2025 approved state budget allocation. Requires state action during budget process.
Additional 1% local ATAX	$ 1,758,152 (FY25 Budget 1% Muni Atax)	$ -	1%	$ 1,758,152	$ 1,758,152	Based on FY25 Muni ATAX. Increase requires change to state law
Establish Municipal Improvement District (MID)		$ -	TBD	TBD		Requires change to state law
Real Estate Transfer Fee (Total RE sales 2023 $457,563,099)		$ -	0.25%	$ 457,563,099	$ 1,143,908	Requires change to state law. Currently, Hilton Head only community w real estate trasfer fee
Sub-Total State Controllable		$ 1,944,744			$ 5,518,381	
REQUIRES FEDERAL GOVMT. APPROVAL. SOURCES NOT CURRENTLY AVAILABLE						
Pursue USACE Federal Assistance		$ -	TBD	TBD	$ -	Depend on either becoming federal funded beach or receiving FEMA funds after named storm (Cat. G eligibility)
Federal Beach Nourishment Assistance - Federal Lobbyists/Legislature		$ -	TBD	TBD	$ -	Need House/Senate Rep Assistance
Sub-Total Federal Controllable		$ -				
Total of Potential Revenue Opportunity Categories - Short/Long Term		$ 19,771,994			$ 7,848,962	

EXHIBIT 3

City of Isle of Palms, SC
Beach Preservation Ad Hoc Committee
Beach Nourishment Planning Model Assumptions

EXHIBIT 4

The Beach Preservation Ad Hoc Committee suggested City Council consider using the following assumptions in the financial planning for future nourishment projects:

- The Beach Preservation Fee Fund nets about $700K annually
- Frequency of large-scale nourishment projects - every 8 years for 32 years
- City's cost share of projects in Wild Dunes should equal WD's contribution to the Beach Preservation Fund (45% in 2024)
- No state or federal grants
- Revenue growth assumption 2% and expenses growth assumption at 3%.
- Project cost assumes 3% increase
- Does not include cost or frequency of small-scale shoal management projects
- Maintain $2M in Fund Balance

EXHIBIT 4

Financial Model Assumptions – Pages 2-4

1. Project timing & frequency – 2026 through 2050, 8-year cadence
2. Project funding type – Cash
3. Project cost growth rate – 3% annual
4. Beach preservation fund expenditures growth rate – 3% annual
5. Beach Preservation fund revenue growth rate – 2% annual
6. Wild Dunes/City cost share (mobilization/demobilization and north end project)– 55% (WD), 45% (Cit)
7. Beach Preservation Fund Balance – $2M target
8. No state or federal funding/grants
9. No additional city revenue.

   *Pages 29-30 show fund balance projections with assumption of additional city revenue of $1M starting in 2026 with a 2% growth rate starting in 2028 +

City of Isle of Palms, SC

Beach Renourishment Planning Model

Dashboard

Projects Under Consideration

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
On/Off	Description	Current Amount	Timing (FY)	Inflation Rate	Inflated Amount	City %	Wild Dunes %	Grant %	Net City Funding Amount	Funding Type	Structure	Term	Principal Deferral	Rate
On	**Project 1**								-					
On	Large Offshore Beach Inlet	5,600,000	2026	0.00%	5,600,000	100.00%	0.00%	0.00%	5,600,000	Cash	Level D/S	8	0	4.00%
On	Large Offshore MOB / DEMOB	5,000,000	2026	0.00%	5,000,000	45.00%	55.00%	0.00%	2,250,000	Cash	Level D/S	8	0	4.00%
On	Wild Dunes Offshore	12,000,000	2026	0.00%	12,000,000	45.00%	55.00%	0.00%	5,400,000	Cash	Level D/S	8	0	4.00%
Off									-					
On	**Project 2**								-					
On	Large Offshore Beach Inlet	5,600,000	2034	3.00%	7,093,912	100.00%	0.00%	0.00%	7,093,912	Cash	Level D/S	8	0	4.00%
On	Large Offshore MOB / DEMOB	5,000,000	2034	3.00%	6,333,850	45.00%	55.00%	0.00%	2,850,233	Cash	Level D/S	8	0	4.00%
On	Wild Dunes Offshore	12,000,000	2034	3.00%	15,201,241	45.00%	55.00%	0.00%	6,840,558	Cash	Level D/S	8	0	4.00%
Off									-					
On	**Project 3**								-					
On	Large Offshore Beach Inlet	5,600,000	2042	3.00%	8,986,356	100.00%	0.00%	0.00%	8,986,356	Cash	Level D/S	8	0	4.00%
On	Large Offshore MOB / DEMOB	5,000,000	2042	3.00%	8,023,532	45.00%	55.00%	0.00%	3,610,589	Cash	Level D/S	8	0	4.00%
On	Wild Dunes Offshore	12,000,000	2042	3.00%	19,256,477	45.00%	55.00%	0.00%	8,665,415	Cash	Level D/S	8	0	4.00%
Off									-					
On	**Project 4**								-					
On	Large Offshore Beach Inlet	5,600,000	2050	3.00%	11,383,647	100.00%	0.00%	0.00%	11,383,647	Cash	Level D/S	8	0	4.00%
On	Large Offshore MOB / DEMOB	5,000,000	2050	3.00%	10,163,971	45.00%	55.00%	0.00%	4,573,787	Cash	Level D/S	8	0	4.00%
On	Wild Dunes Offshore	12,000,000	2050	3.00%	24,393,529	45.00%	55.00%	0.00%	10,977,088	Cash	Level D/S	8	0	4.00%
Off									-					
Off									-					
Off									-					
Off									-					
Off									-					
Off									-					

FIRST TRYON ADVISORS

City of Isle of Palms, SC

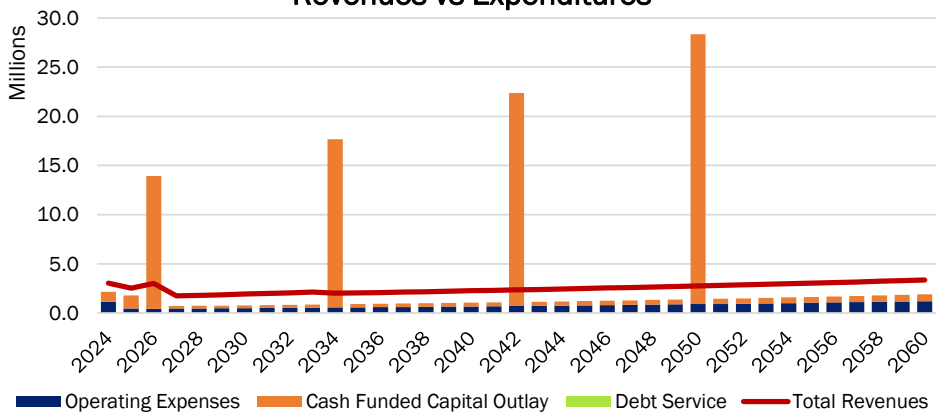
Beach Renourishment Planning Model

Dashboard

	Fund Balances		Debt Service Coverage
Target		**2,000,000**	**1.00x**
16	17	18	19
FY	Annual Surplus (Deficit)	Fund Balance	Debt Service Coverage
Total			
2024	868,787	9,214,510	-
2025	732,596	9,947,106	-
2026	(10,947,055)	(999,948)	-
2027	1,033,338	33,389	-
2028	1,060,799	1,094,188	-
2029	1,101,086	2,195,275	-
2030	1,142,433	3,337,708	-
2031	1,184,861	4,522,569	-
2032	1,228,390	5,750,959	-
2033	1,273,042	7,024,000	-
2034	(15,655,580)	(8,631,580)	-
2035	1,142,942	(7,488,638)	-
2036	1,156,773	(6,331,865)	-
2037	1,170,610	(5,161,255)	-
2038	1,184,446	(3,976,809)	-
2039	1,198,270	(2,778,539)	-
2040	1,212,075	(1,566,464)	-
2041	1,225,851	(340,613)	-
2042	(20,022,771)	(20,363,383)	-
2043	1,253,279	(19,110,105)	-
2044	1,266,909	(17,843,196)	-
2045	1,280,468	(16,562,728)	-
2046	1,293,946	(15,268,782)	-
2047	1,307,329	(13,961,453)	-
2048	1,320,604	(12,640,849)	-
2049	1,333,760	(11,307,089)	-
2050	(25,587,742)	(36,894,831)	-
2051	1,359,652	(35,535,179)	-
2052	1,372,358	(34,162,821)	-
2053	1,384,885	(32,777,936)	-
2054	1,397,214	(31,380,722)	-
2055	1,409,329	(29,971,393)	-
2056	1,421,211	(28,550,182)	-
2057	1,432,842	(27,117,340)	-
2058	1,444,201	(25,673,139)	-
2059	1,455,269	(24,217,870)	-
2060	1,466,024	(22,751,846)	-

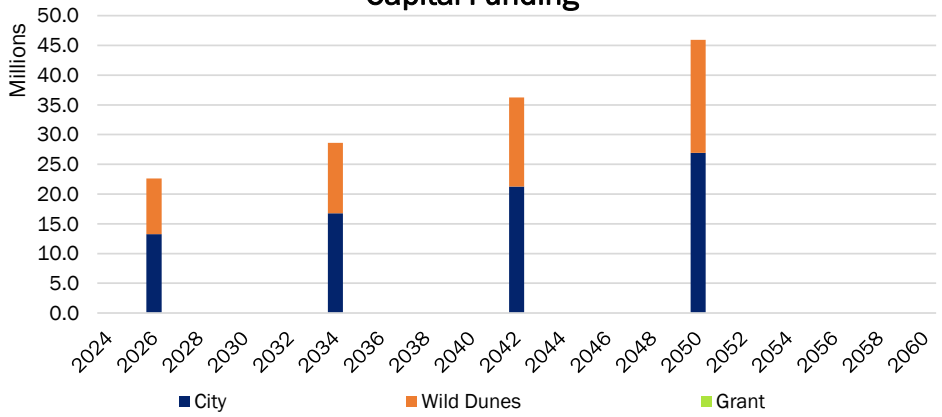
Start Year	2024
End Year	2060

Revenues vs Expenditures



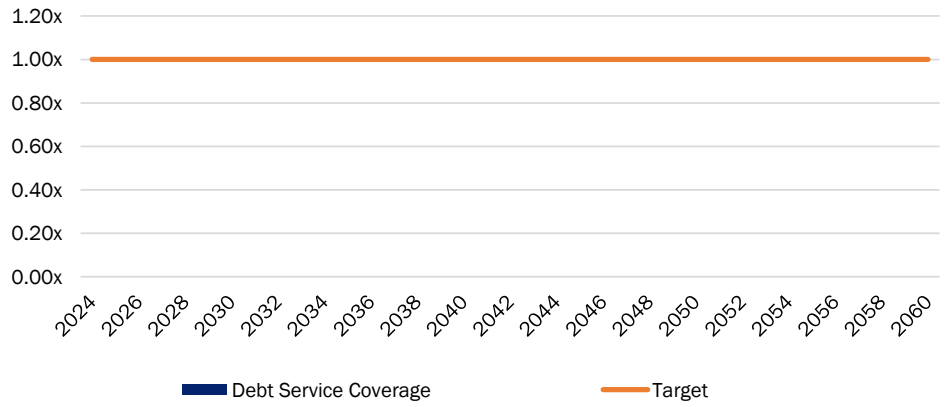
Start Year	2024
End Year	2060

Capital Funding



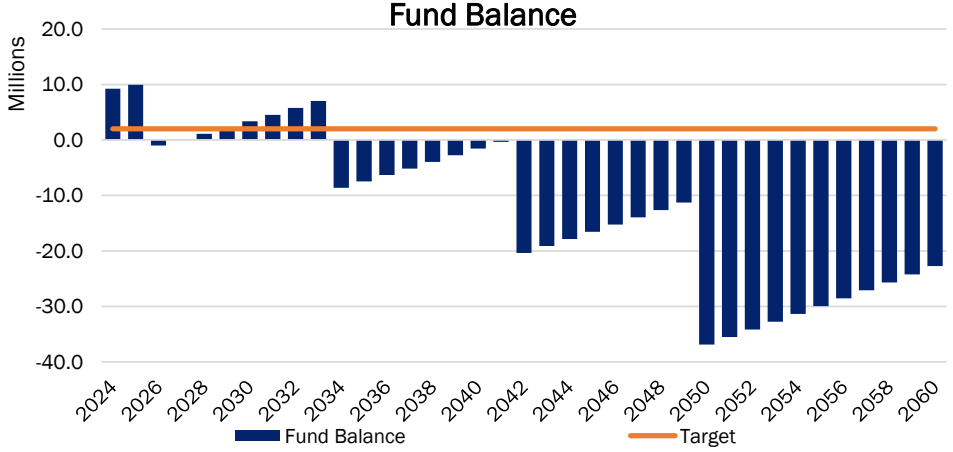
Start Year	2024
End Year	2060

Projected Debt Service Coverage



Start Year	2024
End Year	2060

Fund Balance



FIRST TRYON ADVISORS

City of Isle of Palms, SC

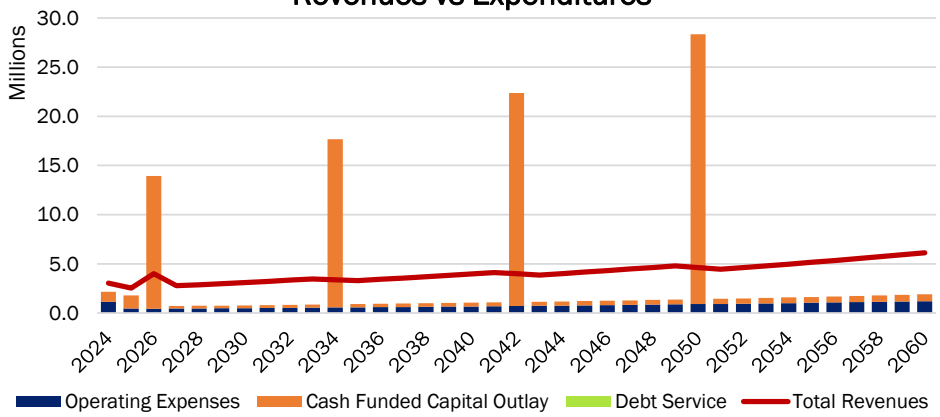
Beach Renourishment Planning Model

Dashboard

	Fund Balances		Debt Service Coverage
Target		**2,000,000**	**1.00x**
16	17	18	19
FY	Annual Surplus (Deficit)	Fund Balance	Debt Service Coverage
Total			
2024	868,787	9,214,510	-
2025	732,596	9,947,106	-
2026	(9,947,055)	52	-
2027	2,058,756	2,058,807	-
2028	2,144,184	4,202,992	-
2029	2,232,211	6,435,203	-
2030	2,322,905	8,758,108	-
2031	2,416,333	11,174,441	-
2032	2,512,569	13,687,010	-
2033	2,611,682	16,298,692	-
2034	(14,280,763)	2,017,929	-
2035	2,393,982	4,411,911	-
2036	2,491,562	6,903,472	-
2037	2,592,062	9,495,534	-
2038	2,695,556	12,191,090	-
2039	2,802,120	14,993,210	-
2040	2,911,833	17,905,043	-
2041	3,024,773	20,929,816	-
2042	(18,387,118)	2,542,698	-
2043	2,722,458	5,265,156	-
2044	2,832,118	8,097,274	-
2045	2,945,005	11,042,279	-
2046	3,061,198	14,103,478	-
2047	3,180,779	17,284,257	-
2048	3,303,831	20,588,087	-
2049	3,430,438	24,018,526	-
2050	(23,710,515)	308,011	-
2051	3,012,890	3,320,901	-
2052	3,133,649	6,454,550	-
2053	3,257,895	9,712,445	-
2054	3,385,713	13,098,158	-
2055	3,517,186	16,615,344	-
2056	3,652,403	20,267,747	-
2057	3,791,450	24,059,197	-
2058	3,934,417	27,993,614	-
2059	4,081,398	32,075,012	-
2060	4,232,484	36,307,496	-

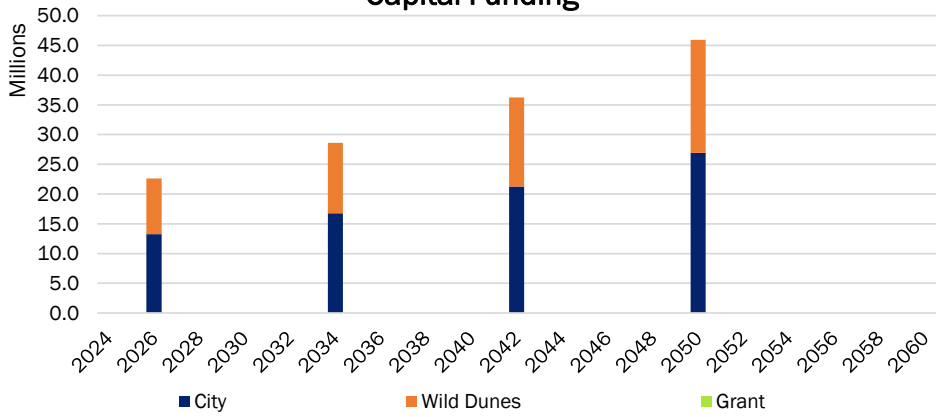
Start Year	2024
End Year	2060

Revenues vs Expenditures



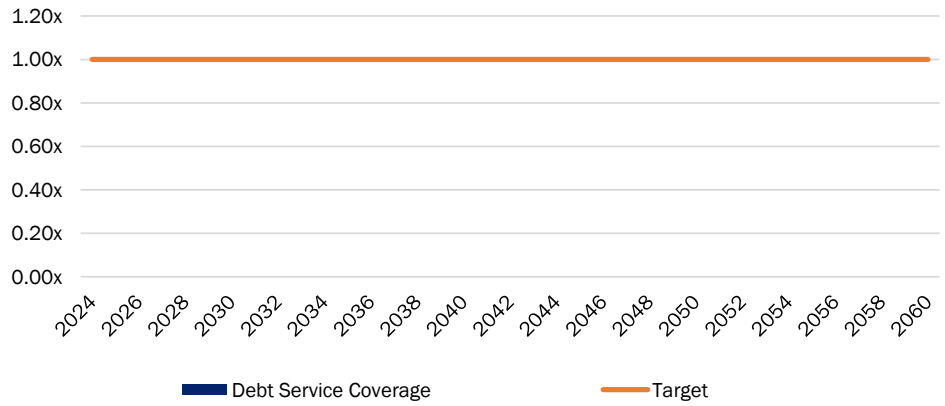
Start Year	2024
End Year	2060

Capital Funding



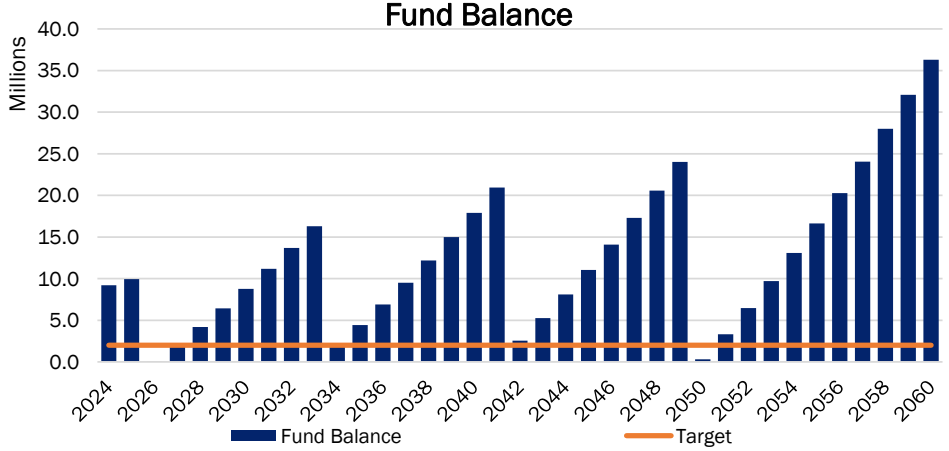
Start Year	2024
End Year	2060

Projected Debt Service Coverage



Start Year	2024
End Year	2060

Fund Balance



FIRST TRYON ADVISORS

§ 151.20 ACCESS TO BEACH DURING CONSTRUCTION; PROTECTION.

(A) Any individual or contractor who desires to use an access to the beach will place in the access portable metal or wood mats for the purpose of moving equipment or material on the beach.

(B) The contractor or individual will remove the mats as soon as he or she no longer needs them to move equipment or material.

(`95 Code, § 5-3-19) (Ord. 78-8, passed 7-18-78)

§ 151.21 BEACH PROTECTION; EROSION CONTROL LINE.

Upon approval of the erosion control line by the State Coastal Council, permits for erosion control structures will be provisioned so that structures will be located at the erosion control line as shown on the maps, hereby incorporated by reference and available at the Coastal Council office and at City Hall.

(`95 Code, § 5-3-20) (Ord. 83-10, passed 8-2-83)

§ 151.22 ALTERATIONS IN LINE.

(A) The erosion control line may be extended or modified as conditions warrant. Any change must be approved by the city and the State Coastal Council after a public notice period of 30 days.

(B) Changes will then be recorded on the base maps.

(`95 Code, § 5-3-21) (Ord. 83-10, passed 8-2-83)

§ 151.23 CONSTRUCTION STANDARDS FOR BERMS, BULKHEADS, RIPRAP, SEAWALLS, REVETMENTS, AND RETAINING WALLS WITHIN 15 FEET OF THE CRITICAL LINE.

(A) For the purposes of this section, the following definitions shall apply:

BERM. A compacted mound of earth, soil, or sand, which may be used independently or to cover riprap, constructed to protect against flooding.

BULKHEAD. A vertical erosion control device installed on high ground which is adjacent to the marsh front critical line as defined by OCRM.

RETAINING WALL. A vertical erosion control or stabilization device installed on high ground within 15 feet of the OCRM critical line.

REVETMENT. Sloping material installed seaward of a seawall facing the oceanfront baseline as defined by OCRM.

RIPRAP. Sloping material installed in front of a bulkhead on the side of the bulkhead facing the marsh front critical line as defined by OCRM or as the foundation of a berm.

SEAWALL. A vertical erosion control device installed on high ground which is adjacent to the oceanfront baseline as defined by OCRM.

(B) The following minimum construction standards are enacted.

(1) All erosion control structures placed wholly or partly within the Dune Management Area or the setback from the critical line must be maintained in an intact usable condition or removal may be sought at the owners expense.

(2) New or substantially improved seawalls and associated revetments on the beach constructed after March 1, 2019 and placed wholly or partly within the Dune Management Area must be constructed so that the top of the vertical seawall is at an elevation of eight feet NAVD 88. Any portion of the Dune Management Area disturbed for the repair of an existing seawall or the construction of a new or substantially improved seawall after March 1, 2019 shall be filled such that the finished grade of the area of disturbance is at an elevation of ten feet NAVD 88 and planted with appropriate vegetation as designated by the Building Official.

(3) New or substantially improved bulkheads, retaining walls, or associated riprap constructed within 15 feet of the critical line after March 1, 2019 and placed wholly or partly within the required setback from the critical line must be constructed so that the top of the vertical structure is no higher than the adjacent grade on the landward face. Any portion of the critical line setback disturbed for the repair of an existing bulkhead or the construction of a new or substantially improved bulkhead after March 1, 2019 shall be filled such that the finished grade of the area of disturbance is at an elevation similar to the grade on the landward side and planted with appropriate vegetation as designated by the Building Official.

(4) New or substantially improved berms constructed within 15 feet of the critical line after March 9, 2021 and placed wholly or partly within the required setback from the critical line must be constructed so that the highest point of the berm is no more than three feet above the highest adjacent grade.

(5) New or substantially improved erosion control methods cannot be combined in a manner that would compound flooding, significantly impair drainage, cause adjacent shoreline impacts, or cause any negative impacts to marsh growth. However, mix use of erosion control methods dictated by site conditions on homeowner property can be permissible in the same contiguous linear plane.

EXHIBIT 5

(6) Construction of bulkheads, seawalls, retaining walls and berms within 15 feet of the critical line, and revetments as well as the placement of riprap shall require a permit from the city and proof of location behind the SCDHEC OCRM critical line or baseline in the form of a pre-construction survey with an OCRM certified critical line or baseline location and an as-built survey showing as-built improvement and the certified baseline or critical line as applicable.

(7) No portion of a bulkhead, riprap, seawall, retaining wall, revetment, or berm shall be placed seaward of the baseline or beyond the critical line without approval of SCDHEC OCRM.

(8) Bulkhead, riprap, seawalls, retaining walls, berms and revetments shall be designed by a certified design professional, registered in the state and shall meet the following minimum standards:

(a) *Bulkhead, retaining walls and seawall requirements.*

1. *Materials.*

i. Reinforced concrete six inches thick designed with adequate reinforcement to achieve a 3,000 psi 28-day strength.

ii. Pressure treated wood three inches by ten inches or three inches by 12 inches tongue and groove, or a double thickness of two inches sheeting with staggered joints is acceptable for walls with a standing height of under four feet.

2. *Depth of embedment.* The depth of embedment of a bulkhead shall be at least equal the height of the wall above the ground. An allowance should be made to account for erosion scour after construction.

3. *Tiebacks.* Tiebacks shall be located at a spacing of eight feet or less and attached to secure anchors capable of withstanding a 2,000- pound pull. Tiebacks may be deleted if a revetment is placed seaward of the bulkhead.

4. *Backfill.* The bulkhead will be backfilled with a compacted clean granular material to provide adequate support. “Clean” shall mean no metal, wood or glass.

5. *Protection from flanking.* Bulkheads will either tie into adjacent bulkheads or will have an adequate return wall meeting the same requirements as the seaward wall.

6. *Seawalls.* No new vertical unfaced seawall shall be allowed on the ocean front. Any new vertical seawall surface must be faced with a sloping revetment.

(b) *Revetments.*

1. *Materials.* Broken pavement, blocks or bricks are not acceptable materials for the outer layer of a revetment. However, they may be used for under layers. The outside of a revetment shall consist of at least two layers of armor stones whose pieces shall range in weight from a minimum of ten pounds to a maximum of 250 pounds; at least 60% shall weigh more than 150 pounds.

2. *Construction.* Revetments shall be underlain with a commercial grade porous filter cloth designed for ocean erosion control and approved by the Building Official (i.e. Phillips 66 stock or equal), and placed on a slope no steeper than one vertical to two horizontal. The toe at the revetment shall extend at least two feet below the existing beach elevation and the ends shall be protected from flanking.

(c) *Riprap.*

1. *Materials.* Broken pavement, blocks or bricks are not acceptable.

2. *Design.* Riprap placement, including when used as the foundation of a berm, must be designed by a licensed marine contractor or a certified designed professional registered in the State of South Carolina so as to prevent movement into the critical area.

(d) Berms within 15 feet of the critical line shall be designed by a certified design professional registered in the State of South Carolina and shall meet the following minimum standards:

1. Berms shall be designed to prevent shedding of storm, flood and tide waters onto adjacent properties and a no adverse impact statement in congruence with other city ordinances including floodplain shall be included on designs provided during permitting.

2. Berms shall be tied into existing grades along the entire length of their perimeter to ensure that berms are naturally appearing, and floodwaters are not impacting surrounding properties.

3. Berms shall be compacted prior to planting, landscaping, or revegetation.

4. Berms shall be landscaped along the landward side with appropriate native vegetation such that at least 50% of the surface of the berm is covered by plant material when calculated using the average mature size of the proposed plantings. In the case of damage or erosion resulting in the loss of required vegetation, berms must be repaired and replanted to meet the requirements of this section.

5. Naturally occurring, protected trees shall not be "buried" or incorporated within the berm so as to cause the trees to die unnaturally from piling up and stacking of soils above and around the natural ground level surrounding the tree trunks. Boxing of protected trees is acceptable.

6. Any riprap used as the foundation of a berm must be completely covered by compacted earth so that no riprap is visible. In the case of damage or erosion resulting in the exposure or disturbance of riprap, berms must be repaired to meet the requirements of this section.

(C) Adherence to these minimum standards will not guarantee that the bulkhead, riprap, seawall or revetment will withstand wave or tide forces or that it will protect against erosion. These standards are to prevent unsightly and inferior structures that would have little or no chance of success, and could possibly become a hazard or nuisance.

(D) Seawall construction activity from May 1 through October 31 is subject to the following requirements.

(1) The permit holder must contact the Folly Beach Turtle Watch Permit Holder each day prior to the commencement of work. The Folly Beach Turtle Watch Permit Holder will provide verification that there are no active turtle nests in the work area. Verification will be provided prior to 8:00 a.m.

(2) If an active nest is located in the work area, work must stop until the nest is relocated. If a turtle nest located in the work area is established before permitted work begins and can't be relocated, construction cannot begin until the nest hatches.

(3) The ***WORK AREA*** shall be defined as the area within 25 feet of the location of the seawall or the path used to access the site.

(`95 Code, § 5-3-22) (Ord. 83-10, passed 8-2-83; Am. Ord. 83-18, passed 1-3-84; Am. Ord. 84-29, passed 12-18-84; Am. Ord. 02-05, passed 1-25-05; Am. Ord. 10-15, passed 8-11-15; Am. Ord. 09-19, passed 2-11-19; Am. Ord. 26-19, passed 8-13-19; Am. Ord. 04-20, passed 6-9-20; Am. Ord. 03-21, passed 3-10-2021)

§ 151.24 SPECIAL REQUIREMENTS FOR CONSTRUCTION SEAWARD OF THE BASELINE.

If an applicant requests to build or rebuild a structure, including an erosion control structure or device, seaward of the proposed baseline that is not allowed otherwise, the city may issue a special permit to the applicant authorizing the construction or reconstruction upon verification from SCDHEC OCRM that the structure has received approval from the state. The structure shall not be constructed or reconstructed on a primary oceanfront sand dune or on the active beach. If the beach erodes to the extent the permitted structure becomes situated on the active beach, the permittee agrees to remove the structure from the active beach. However, the use of the property authorized under this provision, in the determination of the city, must not be detrimental to the public health, safety, or welfare.

(Ord. 28-98, passed - - 98; Am. Ord. 09-19, passed 2-11-19)

§ 151.25 DUNE WALKOVERS.

To protect the integrity of the front dune and to mitigate intrusion into ocean views from adjacent beachfront property, the following standards shall apply to the construction of new and replacement dune walkovers. These standards shall apply in addition to any and all regulations promulgated by the State Office of Ocean and Coastal Resources Management for dune walkovers incidental to residential uses on Folly Beach.

(A) Dune walkovers shall not be wider than six feet.

(B) Dune crossovers shall not be built more than three feet higher than required by beachfront management regulations, floodplain management standards, or other applicable requirements, or, in the absence of such requirements, no more than three feet above grade, excepting stairs and handicap access ramps leading to the first heated floor of the primary structure on the lot.

(C) Dune walkovers shall be constructed to extend beyond the toe of the seaward most dune.

(D) Observation decks shall be limited to 35 square feet in area. These may include benches, light storage, and other appurtenant features in accordance with OCRM and/or city floodplain management standards.

(E) Observation decks shall not be covered, roofed, or provided with any overhead structure.

(Ord. 05-06, passed 1-24-06; Am. Ord. 07-19, passed 2-11-19)

BEACH PRESERVATION

§ 151.35 AREAS OF PRESERVATION.

All portions of the city extending from the mean high water line to the primary dune through or to the first manmade object, whichever comes first, on property now platted on Folly Island and controlled by the city or the state shall be retained and preserved by the city in trust as an area of conservation for the purpose of protecting the ecology of the property, the adjoining property, and of the beaches of Folly Island, for enhancing the environment, and for the health, safety and welfare of the residents of the state.

(`95 Code, § 5-10-1)

§ 151.36 MAINTENANCE AND PRESERVATION.

(A) Any sand mined from the beach proper and placed on properties above defined shall henceforth and hereinafter be subject to the administration and police power of the City Council and shall not be subdivided into building lots.

(B) They shall be maintained and preserved for the benefit of all people in their natural state for the purpose of protecting the environment, ecology and health, safety and welfare of the city, property owners and residents of the state.

(`95 Code, § 5-10-2)

§ 151.37 CONSTRUCTION PROHIBITED IN CERTAIN AREAS.

No structure of any kind shall be constructed in the above defined area which is hereby established for conservation and preservation without the expressed written permission of the city and, where applicable, from Coastal Council.

(`95 Code, § 5-10-3) Penalty, see § 151.99

§ 151.38 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

AREA OF CONSERVATION. Any sand placed on the above defined properties will remain in its natural state with no manmade, artificial changes other than additional sand dunes or approved dune walkover structures. City Council will promulgate regulations defining approved dune walkovers.

MAINTAINED AND PRESERVED. The city will utilize its administrative powers to prevent altering of this area in any way.

MEAN HIGH WATER. The line established by survey on a series of plats titled *Plat Showing Perpetual Easement for Beach Renourishment*, dated June 1, 1992, and as recorded in the RMC Office.

RETAINED AND PRESERVED. Property subject of this chapter shall not be subdivided in any manner into lots and that the city will utilize all legal means to guarantee that this natural habitat will be undisturbed.

TRUST. The city shall act as custodian of the natural habitat in an effort to maintain it as protection against erosion caused by the sea, and for the health, safety and welfare of the public.

(`95 Code, § 5-10-4)

§ 151.39 BEACH PRESERVATION FEE.

(A) The Beach Preservation Act of 2014 authorizes qualifying coastal municipalities to impose a beach preservation fee not to exceed 1% of the gross proceeds derived from the rental or charges for accommodations furnished to transients.

(B) The City of Folly Beach is a qualifying coastal municipality with shoreline on the Atlantic Ocean, a public beach, and a local accommodations tax not exceeding 1½%.

(C) An additional 1% beach preservation fee is hereby added to the accommodations tax for the purpose of nourishment, renourishment, maintenance, erosion mitigation, monitoring of beaches, dune restoration and maintenance, including planting of sea grass, sea oats or other vegetation useful in preserving the dune system, and maintenance of public beach accesses within the corporate limits of the City of Folly Beach.

(Ord. 12-14, passed 7-8-14)

Cross-reference:

Funding of Beach Preservation Fund, see §§38.03, 113.04 and 113.05

Municipal accommodations fee, see § 113.03

PROTECTION OF LOGGERHEAD SEA TURTLES

§ 151.45 DEFINITIONS.

For the purpose of this subchapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

ARTIFICIAL LIGHT. Any source of light emanating from a manmade device, including but not limited to, incandescent mercury vapor, metal halide, or sodium lamps, flashlights, spotlights, street lights, vehicular lights, construction or security lights.

BEACH. The area of unconsolidated material that extends landward from the mean low water line to the place where there is a marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of storm waves).

FLOODLIGHTS. Reflector type light fixture, attached directly to a building and is unshielded.

LOW PROFILE LUMINARIES. Light fixtures set on a base which raises the source of the light no higher than 48 inches off the ground, and designed in such a way that light is directed downward from a hooded light source.

NEW DEVELOPMENT. New construction and remodeling of existing structures when the remodeling includes alteration of exterior lighting.

PERSON. Any individual, firm, association, joint venture, partnership, estate, trust, syndicate, fiduciary, corporation, group

or unit or federal, state, county or municipal government.

POLE LIGHTING. Light fixture set on a base or pole which raises the source of the light higher than 48 inches off the ground.

SOLAR SCREEN. Screens which are fixed installations and permanently project shade over the entire glass area of the window. The screens must be installed outside of the glass and must have:

(1) Visible light transmittance value of 45% or less (inside to outside;

(2) A minimum five-year warranty; and

(3) Performance claims supported by approved testing procedures and documentation.

TINTED OR FILMED GLASS. Window glass which has been covered with window tint or film such that the material has:

(1) Visible light transmittance value of 45% or less (inside to outside);

(2) A minimum five-year warranty;

(3) Adhesive as an integral part; and

(4) Performance claims which are sup- ported by approved testing procedures and documen- tation.

VISIBLE LIGHT TRANSMITTANCE. A measurement of the amount of light in the visible portion of the spectrum that passes through a glazing material.

(Ord. 8-92, passed 4-21-92; Am. Ord. 11-97, passed 7-1-97; Am. Ord. 18-99, passed 7-13-99; Am. Ord. 007-23, passed 4-11-23)

§ 151.46 PURPOSE.

The purpose of this subchapter is to protect the threatened loggerhead sea turtles which nest along the beaches of the city, by safeguarding the hatchlings from sources of artificial light.

(Ord. 8-92, passed 4-21-92; Am. Ord. 11-97, passed 7-1-97; Am. Ord. 18-99, passed 7-13-99; Am. Ord. 31-08, passed 12-30-08)

§ 151.47 NEW DEVELOPMENT.

(A) It is the policy of the city that no artificial light illuminate any area of the beaches of the city.

(B) To meet this intent, if lighting associated with construction or development can be seen from the beach, all building and electrical plans for construction of single family or multi-family dwellings, commercial or other structures, including electrical plans for parking lots, dune walkovers or other outdoor lighting for real property shall be in compliance with the following:

(1) Floodlights shall be prohibited. Wall mounted light fixtures shall be fitted with hoods so that no light illuminates the beach.

(2) Pole lighting shall be shielded in a way that light will be contained within arc of three to 73 degrees on the seaward side of the pole. Outdoor lighting shall be held to the minimum necessary for security and convenience.

(3) Low profile luminaries shall be used in parking lots and the lighting shall be positioned so that no light illuminates the beach.

(4) Dune crosswalks shall utilize low profile shielded luminaries. Only mushroom-type light fixtures, which direct light downward, shall be permitted. Such lighting shall also meet the following requirements:

(a) Fixtures shall be installed at least 25 feet apart and not more than one foot above the surface of the walkovers.

(b) Illumination shall be limited to 25 watts through the use of "bug" type bulbs.

(5) Lights on balconies shall be fitted with hoods so that lights will not illuminate the beach.

(6) Tinted or filmed glass shall be used in windows facing the ocean beginning at the first floor level of multi-story structures. Shade screens can be substituted for this requirement.

(7) (a) Temporary security lights at construction sites shall not be mounted more than 15 feet above the ground.

(b) Illumination from the lights shall not spread beyond the boundary of the property being developed, and in no case shall those lights illuminate the beach.

(C) The provisions of this section shall not apply to any structure for which a building permit has been issued by the Building Official, prior to the effective date of this subchapter.

(Ord. 8-92, passed 4-21-92; Am. Ord. 11-97, passed 7-1-97; Am. Ord. 18-99, passed 7-13-99; Am. Ord. 31-08, passed 12-30-08) Penalty, see § 151.99

§ 151.48 EXISTING DEVELOPMENT.

(A) It is the policy of the city that no artificial light illuminate any area of the beaches of the city.

(B) To meet this intent, lighting of existing structures which can be seen from the beach shall be in compliance with the following.

(1) Lights illuminating buildings or associated grounds for decorative, security, or recreational purposes shall be shielded or screened such that they are not visible from the beach and will be turned off after 10:00 p.m. until dawn during the period of May 1 to October 31 of each year.

(2) Lights illuminating dune crosswalks of any areas oceanward of the dune line shall be turned off from dusk to dawn during the period of May 1 to October 31 of each year.

(3) Motion detecting security lighting shall be permitted throughout the night so long as low profile luminaries are used and screened in a way that those lights do not illuminate the beach.

(4) Window treatments in windows facing the ocean at the first floor of single-story or multi-story structures are required so that interior lights do not illuminate the beach. The use of blackout draperies or shade screens are preferred. The addition of tint or film to windows or awnings is also encouraged, as is turning off unnecessary lights if the lights illuminate the beach.

(Ord. 8-92, passed 4-21-92; Am. Ord. 11-97, passed 7-1-97; Am. Ord. 18-99, passed 7-13-99; Am. Ord. 31-08, passed 12-30-08) Penalty, see § 151.99

§ 151.49 PUBLICLY OWNED LIGHTING.

Street lights and lighting at parks and other publicly owned beach access areas shall be subject to the following:

(A) Whenever possible, street lights shall be located so that the bulk of their illumination will travel away from the beach. These lights shall be equipped with shades or shields that will prevent backlighting and render them not visible from the beach.

(B) Lights at parks or other public beach access points shall be shielded or shaded or shall not be utilized during the period May to October 31 of each year.

(Ord. 8-92, passed 4-21-92; Am. Ord. 11-97, passed 7-1-97; Am. Ord. 18-99, passed 7-13-99) Penalty, see § 151.99

§ 151.50 PENALTIES AND ENFORCEMENT.

Any person violating any provision of this subchapter shall be deemed guilty of a civil offense and shall be subject to a fine of up to $500 upon conviction. Each day of violation shall be considered a separate offense.

(Ord. 029-22, passed 9-13-22)

PROPERTY OWNER ELEVATION MAINTENANCE

§ 151.60 PURPOSE.

Public beach renourishment projects, including maintenance of adjacent private property, benefit and constitute an improvement for the entire city and also provide a significant and direct benefit to owners of the adjacent, private beachfront property. The purpose of this subchapter is:

(A) To safeguard the city's critical and significant commitment to and investment in beach renourishment and preservation;

(B) To abate any nuisance that might be created on private property by beach renourishment including ponding, or areas significantly lower than the elevation of the renourishment that could threaten the integrity of the renourished beach;

(C) To ameliorate and prevent public hazards, detrimental environmental impacts, adverse effects on the quality of a coastal resource, and disruption of access to a public coastal resource that might be created when private property adjacent to a renourishment is not also renourished or is otherwise maintained in a manner that is not compatible with the renourishment or compromises the integrity of the renourishment;

(D) To protect, preserve, restore, and enhance the beach/dune system that protects life and property; and

(E) To comply with requirements imposed by the U.S. Army Corps of Engineers or any other entity conducting beach renourishment.

(Ord. 31-17, passed 12-12-17)

§ 151.61 DUTY OF BEACHFRONT PROPERTY OWNERS.

It shall be the duty of every beachfront property owner to ensure that:

(A) The property is maintained in a manner that does not compromise the integrity of the public beach renourishment; and

(B) Any eroded areas of the beach that are on private property and landward of the perpetual easement line are brought into compliance with local, state, and Federal requirements if directed by the city. A property is considered to be compliant

when the seaward most elevation of the property matches the elevation of the renourishment. Any action by the owner that compromises the integrity of the renourishment or failure of the property owner to maintain adequate elevation landward of the renourished beach is hereby deemed a nuisance. It is within the discretion of the Code Enforcement Officer, in consultation with the U.S. Army Corps of Engineers or any other entity conducting beach renourishment, to determine affected properties, the permissible options for eliminating the nuisance (which may include sand fill, dune restoration, or structural solutions), the necessary elevation, or any other necessary actions the owner must take to preserve the integrity of the public beach seaward of their property. Once the Code Enforcement Officer has made a determination that a property is in violation, the property owner has the burden of showing that the property has been brought into compliance through an elevation survey or through other action required by the Code Enforcement Officer.

(Ord. 31-17, passed 12-12-17)

§ 151.62 NOTICE TO PROPERTY OWNERS.

The Code Enforcement Officer will provide notice to property owners by certified mail or personal delivery of any upcoming renourishment for which they are expected to comply with this subchapter. The notice will provide the following information:

(A) That the property is subject to this subchapter;

(B) The anticipated date or date range of the renourishment of the beach adjacent to the property;

(C) A deadline, not less than 60 days from the date of the notice, for when the property must be brought into compliance;

(D) The minimum action that must be taken by the property owner to bring the property into compliance with the renourishment, such as the anticipated height to which the property must be elevated;

(E) The anticipated cost of filling the owner's property or otherwise bringing it into compliance with the renourishment if performed by the city and billed to the owner;

(F) That the property owner must inform the city within 20 days of the date of the notice whether the owner will address the identified nuisance by filling the property or by otherwise bringing the property into compliance with the renourishment, or, alternatively, will allow the city to bring the property into compliance and agree to pay associated costs; and

(G) If the property owner does not make an election within 20 days of the notice or does not bring the property into compliance with the renourishment by the deadline provided and to the satisfaction of the code enforcement officer, the city will fill the property or otherwise bring it into compliance, and bill the property owner for the associated costs of same.

(Ord. 31-17, passed 12-12-17)

§ 151.63 RIGHT OF ENTRY.

When it is necessary to make an inspection to enforce the provisions of this subchapter, or if the property owner has not addressed the identified issues in a timely fashion, the code enforcement officer, the city, or its designee, has the right to enter the property:

(A) To inspect it;

(B) To determine what actions must be taken to bring the property into compliance with the renourishment; or

(C) To bring the property into compliance by filling the property in or otherwise addressing any other noticed issues. The city will provide at least 48 hours of notice of such entry to the occupants of the property or, at the option of the owner, directly to any owner that provides a method of immediate contact.

(Ord. 31-17, passed 12-12-17)

§ 151.64 PRESENTATION AND PAYMENT OF BILL; LIEN.

(A) If the property is filled or brought into compliance by the city, the code enforcement officer will present a bill to the property owner by certified mail or hand delivery. The bill will be based on the cost of filling the owner's property, including the cost of transporting and placing the sand, or otherwise bringing the property into compliance with the renourishment. The bill will set forth the amount owed by the property owner along with an explanation for how the amount was calculated. The property owner will have 60 days to pay the bill.

(B) If the property owner has not fully paid the bill within 60 days or made other arrangements with the code enforcement officer, the bill plus any costs of collection will constitute a lien against the property in the manner provided by law, and the city or code enforcement officer may undertake collection of the bill plus the costs of collection by any legal means, including filing a recorded lien against the property in the amount of the bill plus the costs of collection, initiating an action to collect on the bill plus the costs of collection or to foreclose on the lien in the Charleston County Court of Common Pleas, or assessing a fee or tax against the property in the amount of the bill plus the costs of collection.

(Ord. 31-17, passed 12-12-17)

§ 151.65 REQUEST FOR HEARING.

If a property owner objects to any aspect of the notice or the requirements set forth therein, including any bill presented to the property owner for payment, the owner may request a hearing before the City Administrator within 20 days of the date of

the notice. The City Administrator will then set a hearing to address any such objections within ten days of the request and will issue a ruling on any such objections. The City Administrator's ruling will be the final determination of the city.

(Ord. 31-17, passed 12-12-17)

§ 151.99 PENALTY.

(A) Any person violating any provision of this code for which no specific penalty is prescribed shall be subject to §10.99.

(B) Any person altering the area that is the subject of §§151.35 through 151.38 by littering, destruction of vegetation or the artificial movement of the existing sand dunes shall subject to a $500 fine, and each day such exists shall constitute a separate offense. Violators will be required to replace altered sand dunes and replant the natural vegetation of the area.

(`95 Code, § 5-10-5) (Ord. 15-93, passed 9-7-93)

CHAPTER 154: (RESERVED)

CHAPTER 155: EMINENT DOMAIN

Section

155.001 General provisions

§ 155.001 GENERAL PROVISIONS.

At no time shall the city use eminent domain to buy or condemn real property and transfer or sell same to any individual or entity for profit.

(Ord. 53-05, passed 8-23-05)