2017 ANNUAL REPORT ON
THE CONDITION OF THE MUNICIPAL BEACHES FOR
THE BOROUGH OF STONE HARBOR, CAPE MAY COUNTY, NEW JERSEY

Aerial photograph

Introduction:

This annual report presents the status of the beaches and dunes within the Borough of Stone Harbor from October 2016 to October 2017. During this time, the Borough's beaches between 105th and 123rd Streets received maintenance sands in the 2nd Periodic Nourishment Cycle that commenced in February 2017 using Hereford Inlet as the borrow source. By March 7, the total amount placed in the southerly section was 394,000 cubic yards (CY) (http://stoneharbornj.org/stone-harboravalon-beach-replenishment-project-update/). In May, repairs commenced in Stone Harbor's north end beaches (80th Street to 105th Street) using Flood Control Coastal Emergency Act (FCCE) funding. A borrow site within Townsends Inlet was the sand source for approximately 320,000 CY that was placed on the Borough's north end beaches (80th to 105th Streets). The north end project was completed a few days prior to the

Stone Harbor Engineered Beach Performance

Since completion of the Federal/State/Municipal beach nourishment project within the Borough of Stone Harbor in 2003, the engineered beach sustained several significant storm events but maintained its storm protection value to the community during Hurricanes Irene and Sandy by preventing major flooding by storm waves and dune breaches. After Sandy, the beaches received sand courtesy of Public Law 113-2 that authorized emergency repairs to the Borough's beaches at no cost to the state or Borough (2013), and through a periodic nourishment cycle (2017) which was cost-shared.

Tables 1 and 2 provide shoreline and volume change

2015), and -292,889 CY (2015-2016), totaling -787,447 CY. This volume resulted in a loss of 116.8% of the pay volume placed on the beaches in 2013.

Table 1 shows that all beaches within the Borough gained in volume and the shoreline moved seaward between October 2016 and October 2017. The gains were attributed to the separate beach fill activities that occurred in February-March 2017 in the southern section (105th Street to 123rd Street) and in May-June 2017 in the north end (80th Street to 105th Street). Approximately 714,000 CY of sand were placed on the Borough's beaches.

Table 2 provides the changes that occurred between June and October 2017. Even though some sites lost sand volume (SH-103 & SH-108), there was an overall gain of 59,267 cubic yards within the Borough's oceanfront.

Table 2
Stone Harbor Semi-Annual Survey
Spring 2017 (#49) to Fall 2017 (#50)
Shoreline and Total Sand Volume Changes

The semi-annual comparison (Table 2) shows that the shoreline retreated at the northern and central profile locations, though volume losses were recorded at only the central locations (103rd Street and 108th Street). Spring to Fall landward shoreline movement has been a typical occurrence since 2014 and may be related to beach fill equilibration as the summer waves move sand landward and generate a steeper beachface, making the shoreline appear to migrate landward. The largest portion of the volume losses recorded at 103rd Street and 108th Street were from the berm (above 0.0 ft. NAVD). After the beach nourishment activities, both profile locations displayed the widest beaches within the Borough (approximately 250 ft.). The beach sands from these locations between June and October were either moved downdrift or captured in a nearshore bar beyond the CRC's measured profile. The October surveys were completed approximately two weeks after the offshore passage of Hurricane Jose. The larger wave set accompanying the hurricane likely adjusted the profile shape. The net change to the

Individual Site Descriptions:

This section describes the changes documented at each of the beach profile locations from October 2016 to October 2017. All of the sites are located within the Federal shore protection project limits that received sand during the February-March (105th to 123rd Streets) or May-June (80th to 105th Streets) fill activities.

SH

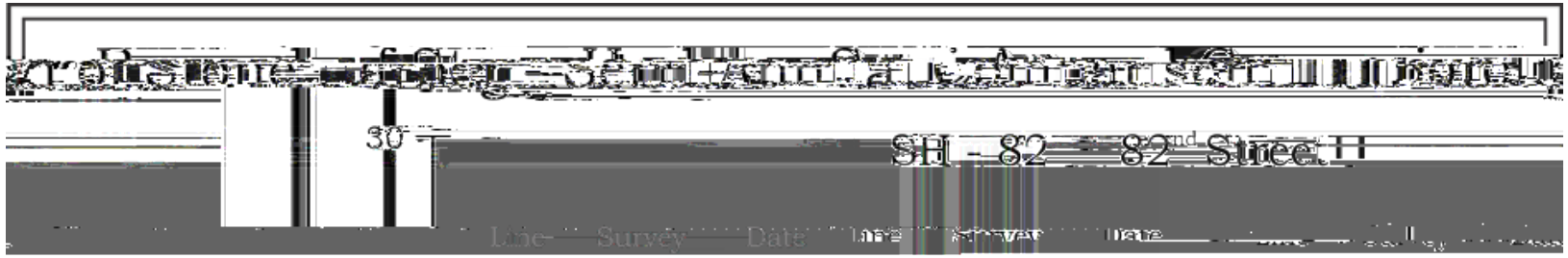

Figure 1. The profile cross sections
Nearshore sand bars captured the majority of the total volume gain of 46.8 yds^3/ft. between October 2016 and October 2017. This is probably attributable to the waves generated by Hurricane Jose moving sand offshore from the beachface two weeks earlier.

SH-90, is located at 90th Street and was originally established in 1986 as a survey site for the New Jersey Beach Profile Network (NJBPN). The profile line is set north of the public beach access path to provide a typical cross-sectional representation of the dune and beach that is bounded by groins at 84th Street and 92rd Street. The dune system consists of two ridges approximately 150 feet wide extending from the street end revetment to the seaward dune toe.

The June beach fill added elevation to the berm and moved the shoreline seaward by 80 ft. from its position in October 2016. The major profile changes occurred below the datum. The dunes remained relatively untouched over the course of the year.

Site SH-90 90th Street (Photoplates 2a-2c)

Photoplate 2c

Figure 2. The cross sections show a significant change between October 2016 and October 2017 due to the north end beach fill and summer sand gains raising berm and nearshore elevations. Total volume gains were 74.1 yds^3/ft. where below datum gains amounted to nearly 85% of the total. This change likely follows the pattern set by the passage of Hurricane Jose.

SH

Figure 3. The profile cross sections at 95th Street show the elevation gains produced by the June beach fill. Annual volume gains amounted to 44.7 yds^3/ft. gain across the whole profile. The October 2017 profile shows the filling of the nearshore trough from relocated berm sand or from the cross-shore transport of sand from offshore.

Figure 4. The cross sections at 103rd Street show a lowered dune elevation between October 2016 and June 2017. Sand was added to the dune toe and berm during the May-June beach fill. Profile volume losses (-30.2 yd^3/ft.) occurred between June and October, mostly from above the 0.0 ft. datum. Two weeks prior to survey 50, Hurricane Jose passed offshore generating large waves which acted to flatten

SH-108, is located at the end of 108th Street and was placed near the middle of the groin cell. This site shares a history similar to site SH-103. The original 1996 profile crossed the bulkhead and dropped to the rock revetment at the bulkhead toe and a narrow beach just seaward of the rocks provided limited recreational area for beach patrons. Exposure of the rocks accelerated the beach erosion as waves refracted off the hard structure and scoured the sandy beach. Larger storm waves and surge overtopped the revetment and caused local flooding. Sand was placed here during the 1998 municipal beach fill that re-established a dry beach and dune ridge. In 2003, the initial Federal project enhanced the width of both the dune and re

SH-112 is located on the open lot adjacent to the Villa Maria Catholic retreat that occupies the paper location of 112th Street. The profile line extends landward to a reference location along 2nd Avenue. An open grass lot occupies the city block between 2nd Avenue and the wooden bulkhead revetment. The wooden revetment runs parallel to the beach the entire length of the Borough along the oceanfront property lines and seaward street ends. The bulkhead is significantly offset landward at 111th Street, providing additional area for dune development to occur naturally. As a result, the width of the primary dune was nearly 200 feet from the bulkhead to the seaward dune toe. This location has a very significant primary dune largely due to the limited oceanfront development on this parcel. Occupied by the Catholic Church as a retreat for over a century, the site has no structures directly at the landward dune toe. The dunes spill over the bulkhead and occupy most of the origi 12 tr o2 7926 Tm0 g0 [(ha)4(s no4/b)-9(y)2hqatndwai(s d(y)20(d(y)2a)7( )(a)4(w)-7(a)4(USAc r)5E(y)TJje)3(t)]

Figure 6. The profiles at 112th Street show the annual change to the beach and nearshore between October 2016 and October 2017. The berm sand that was placed in March was redistributed into a nearshore sand bar by October 2017. The below datum volume gain was 11.1 yd^3/ft. between surveys #49 and #50. Hurricane Jose had a

SH-116 is located

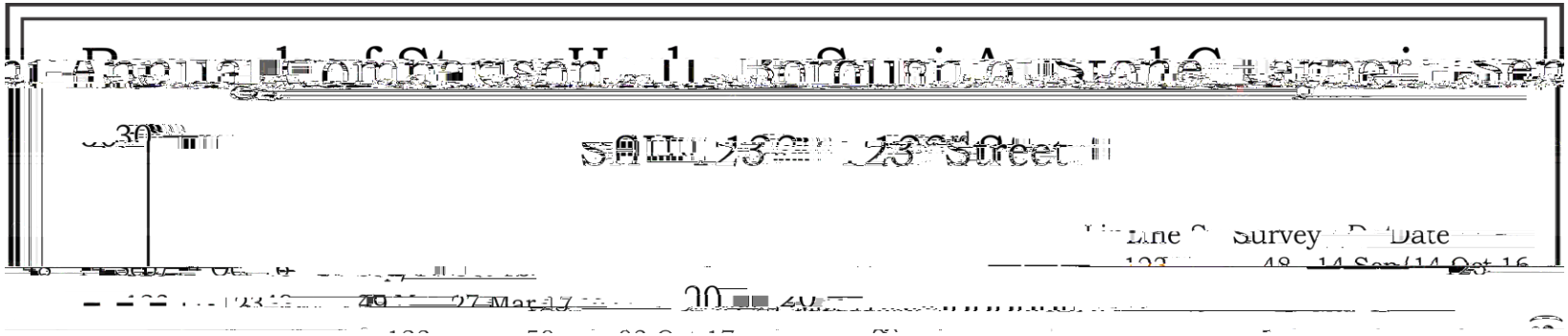

Figure 8. The cross sections at 123rd Street show erosion of the berm sand that was placed in the February-March beach fill. The total volume change between surveys #49 and #50 was not incredibly significant (-1.1 yds^3/ft.). The above-datum losses nearly balanced the below-datum gain. The shoreline moved 16.5 ft. seaward.

Summary

In the years following the last major beach fill in 2013, the beaches within the Borough of Stone Harbor were impacted by moderate to significant northeast storm events that, while did not create dune breaches or major damages, stressed the beaches enough to reduce their storm protection capacity. The most damaging of the recent storms occurred in January 2016 (northeast storm Jonas), a 10-year event with 65 MPH winds occurring during a spring tide. This event produced a volume loss of 292,889 cubic yards, adding a loss that culminated in losing 116% of the fill volume that was placed in the 2013 post-Sandy beach fill. The dunes survived but the beach narrowed as a result of the storm.