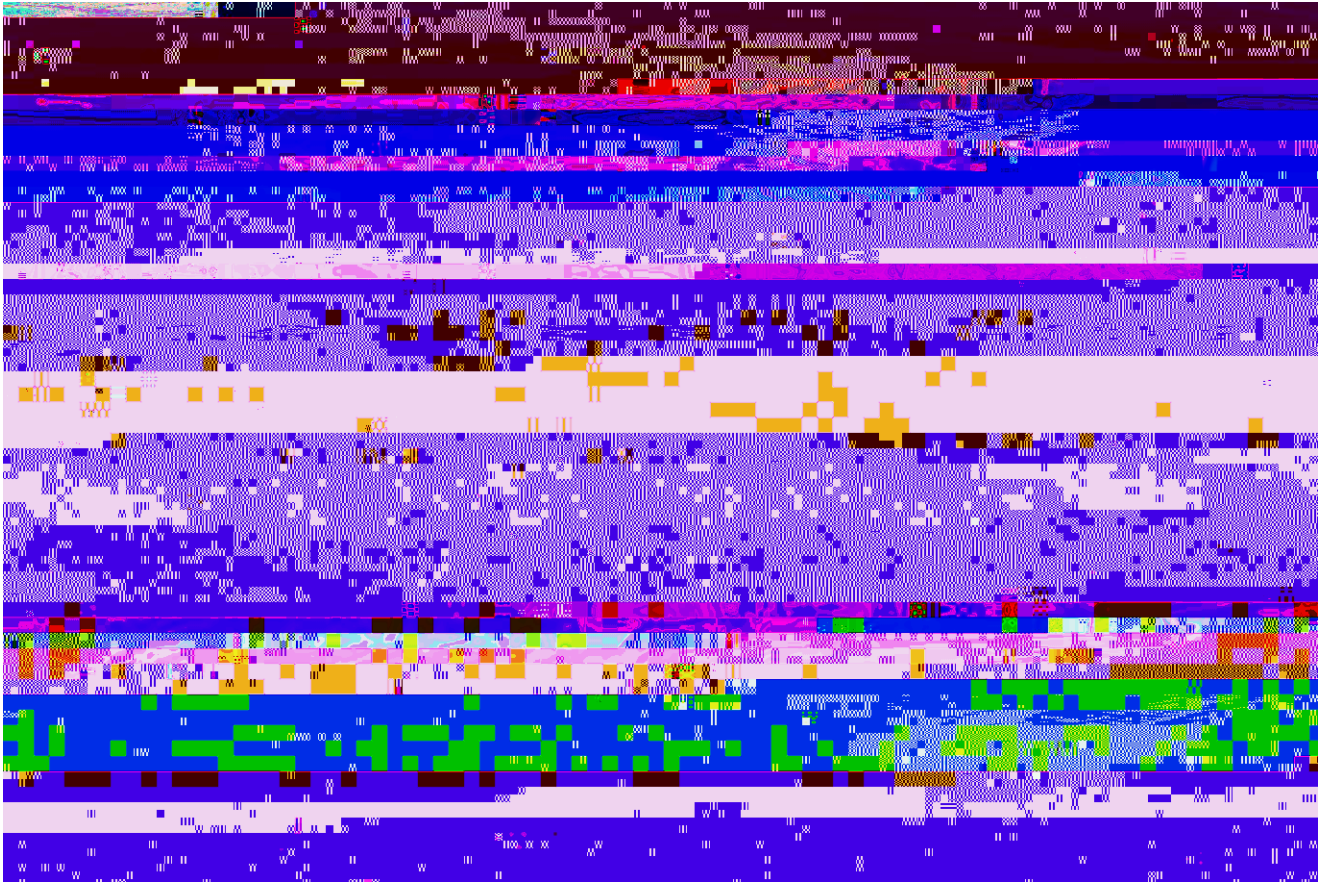


2019 ANNUAL REPORT - TO THE CITY OF NORTH WILDWOOD ON THE CONDITION OF THE CITY BEACHES



Aerial view of North Wildwood looking northwest into Hereford Inlet on October 12, 2019 showing high tide at the north end of the City. The new bulkhead is evident starting at 5th Avenue, replacing the dune once present. The accumulation of shoal sand northeast of the inlet jetty is also evident with the expectation of greater accretion to come. The prior year's back pass sand lies partially in the pocket between the jetty and earlier spit growth into the inlet. (Aerial photo taken by Ted Kington)

PREPARED FOR: THE CITY OF NORTH WILDWOOD
901 ATLANTIC AVENUE
NORTH WILDWOOD, NJ 0 8260

PREPARED BY: THE STOCKTON UNIVERSITY COASTAL RESEARCH CENTER
30 WILSON AVENUE
PORT REPUBLIC, NJ 08241
February 26, 2020

TABLE OF CONTENTS

Introduction	1
2018 Weather Events	1
Figure 1. Aerial view of North Wildwood December 7, 2019	2
Figure 2. 1995 versus 2016 Aerial photograph of Hereford Inlet looking at North Wildwood	3
Engineered Beach Performance	3
Oceanfront Beach Surveys in 2019	3
Figure 3. Representative Profile Locations on the North Wildwood Beach	4
Table 1. Beach Changes Between July 2013 and October 2019	5
Table 2. Beach Changes Between June 2019 and October 2019	7
Sand Backpass Operations	8
Individual Site Reviews	10
Figures 67. Site 00+00 photograph and cross sections	12
Figure 8. Site 02+00 cross sections	14
Figures 910. Site 04+00 photograph and cross sections	16
Figures 11-12. Site 06+00 photograph and cross sections	18
Figures 1314. Site 20+00 photograph and cross sections	20
Figures 1516. Site 40+00 photographs and cross sections	22
Figures 1718. Site 52+00 photographs and cross sections	24
Figures 1920. Site 58+00 photographs and cross sections	26
Figures 21-22. Site 60+00 photograph and cross sections	28
Figures 23203	

2019 ANNUAL REPORT - TO THE CITY OF NORTH WILDWOOD
ON THE CONDITION OF THE CITY

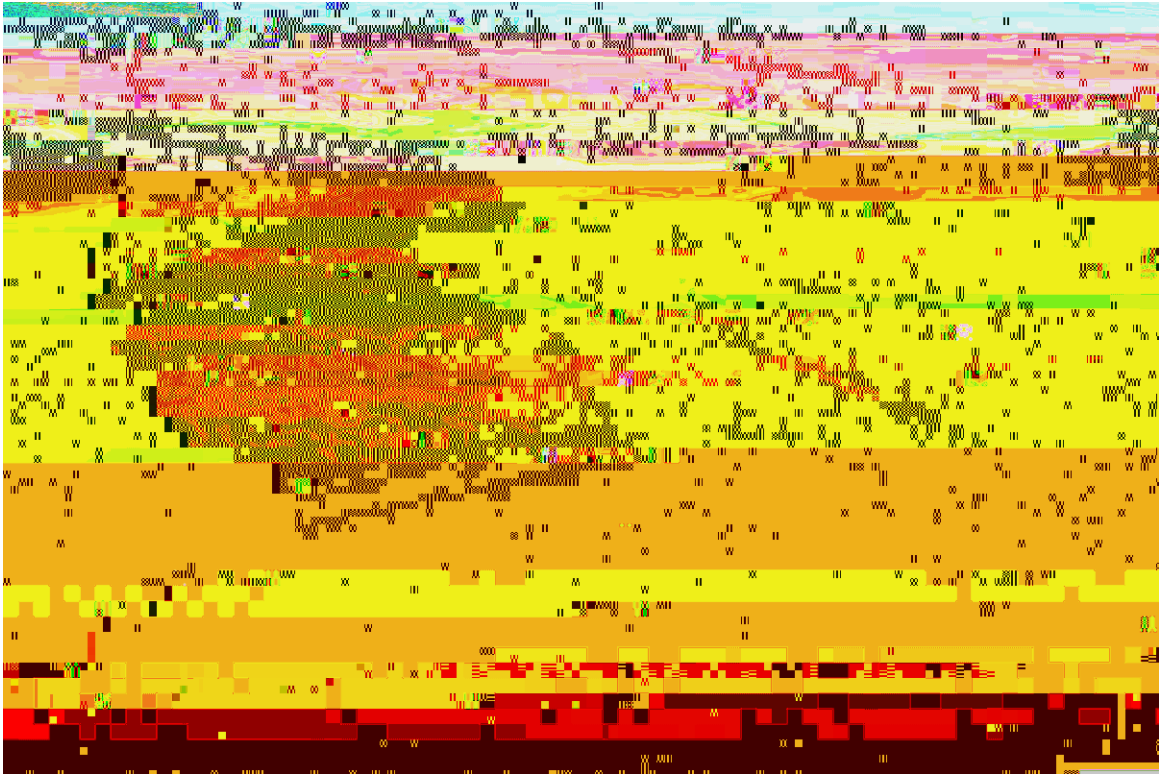


Figure 2. (Presented last year, but significant still) The northeast quadrant of the City of North Wildwood between March 1995 and August 2016 shows that oceanfront erosion appeared to be associated to large changes in shoal position and exposure at low tide in Hereford Inlet. In 1995, an exposed island sat between Central and Surf Avenues forcing a branch of the main tidal channel against the North Wildwood shoreline. There was no beach at the inlet shore until southeast of Surf Avenue. There was an extensive exposed sand flat system attached to the beach front system extending into the inlet. The ebb tidal currents exited in proximity to the oceanfront beach and deposited sand in transport where wave action could easily move it to the beach bar system, and eventually onto the dry beach.

Oceanfront Beach Surveys:

Table 1 is a compilation of all beach changes since July 2013 hydraulic restoration of Hurricane Sandy damages to the beach. The sandy restoration cross sections at 200+ spacing are compared to those taken in November 2019 to show all losses since 2013, including any sand volumes added through sand back passing or the amount pumped onto the beach from Beach Creek dredging in 2015. Each 200+ sand volume is added to the last one to give an accumulated total sand volume change along the oceanfront. Three zones are defined as the northern zone (107,173 cubic yards); the middle zone where major losses occurred (324,540 cy.); and the southern zone with the piers where 199,655 cubic yards of sand were lost over the past years.

Table 2 below shows just the past six months of change following the spring back pass which added 157,000 cubic yards to the northern beaches by Memorial Day 2019. In the past 6 months the northern zone lost 43,995 cubic yards of sand; the middle zone lost 99,037 cubic yards; and the southern zone just 13,214 cubic yards with multiple cross sections gaining material in small net volumes. The negative number is due to mid-section carry over onto survey lines 30+00 and 032+00 generating 12,876 cy of the entire negative volume.

Sand on the North Wildwood oceanfront traditionally migrates south into the City of Wildwood and from there into Wildwood Crest, then on to Lower Township. Sand shed from the northern zone of the North Wildwood city beaches first adds to the middle zone, and then moves into the southern zone around the piers. So long as Hereford Inlet sand remains stuck in the inlet shoals at the inlet mouth, the sand supply on the oceanfront beaches is trapped in this endless cycle of southerly transport without any input from Hereford Inlet

This knowledge ultimately led the US Army Corps of Engineers to present sand back passing on a large scale from beaches south of North Wildwood as their primary methodology in dealing with shoreline stability. They figured that taking

[Redacted text block]

Back Pass Operations:

The past four years of major sand harvesting effort using Wildwood City sources commenced in the spring of 2016. By Memorial Day 165,000 cubic yards had been placed in a beach berm parallel to the dune toe from 3rd Avenue, south toward 18th Avenue.

Following the March 14, 2017 northeast storm, the City commenced hauling sand from the stormwater discharge points in the City of Wildwood using heavy trucks to move material to the erosion zone at 3rd Avenue. The estimate from truck logs indicated placement of about 190,000 cy of sand by mid-May 2017.

In 2018, material was again harvested (153,375 cu. yds) from the storm water outfall areas and berm between discharge points and truck hauled up to the zone of serious erosion. Distribution was more regional in this year.

During 2019, 157,000 cubic yards of sand were extracted from the Wildwood stormwater discharge area with placement along the dune toe between 12th and 5th Avenues, concentrating in the middle sections. Sand moved both into the Hereford Inlet North Wildwood shore up to Surf Avenue and to the south back toward Wildwood in about equal quantities.

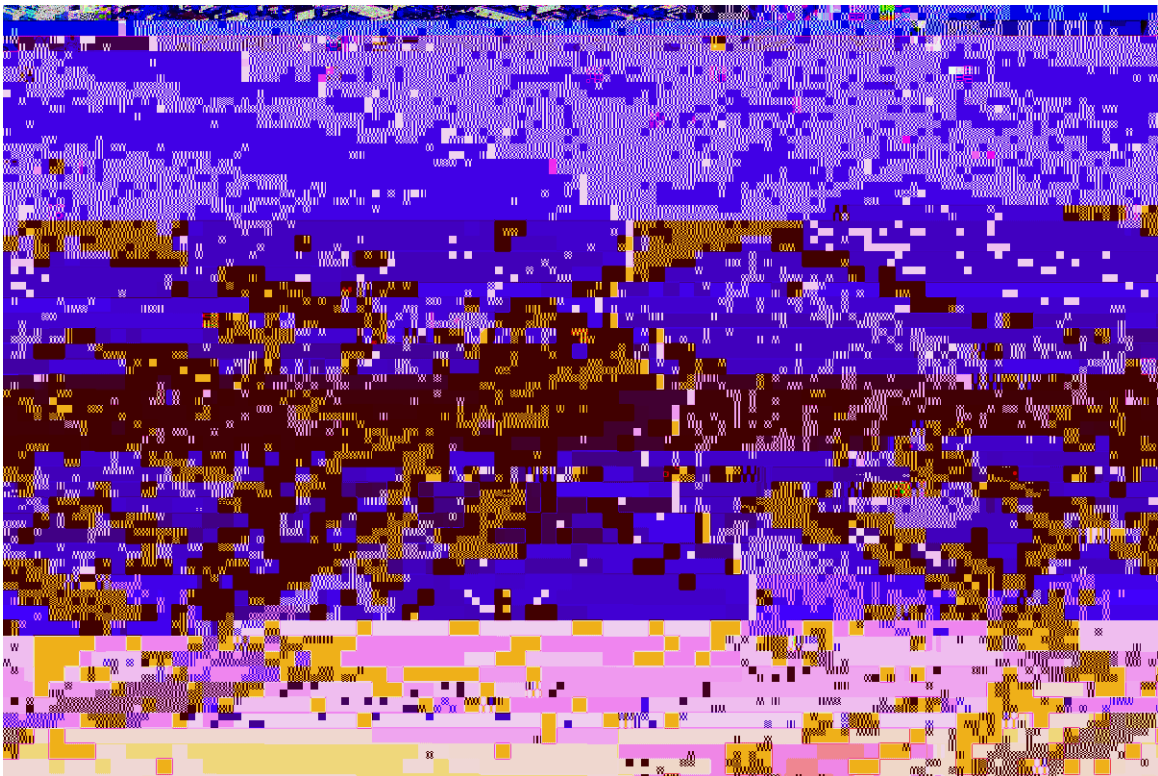


Figure 4. City of Wildwood oceanfront beach July 21, 2019 six weeks after conclusion of the 2019 back passing effort. The stormwater discharge points lie at the heads of each of the excavations at elevations well below the surface elevation. Burial means little effective stormwater discharge. They were originally built ending at the water's edge just past low tide. This view presents 20-25 years of evidence for shoreline accretion in the City of Wildwood.

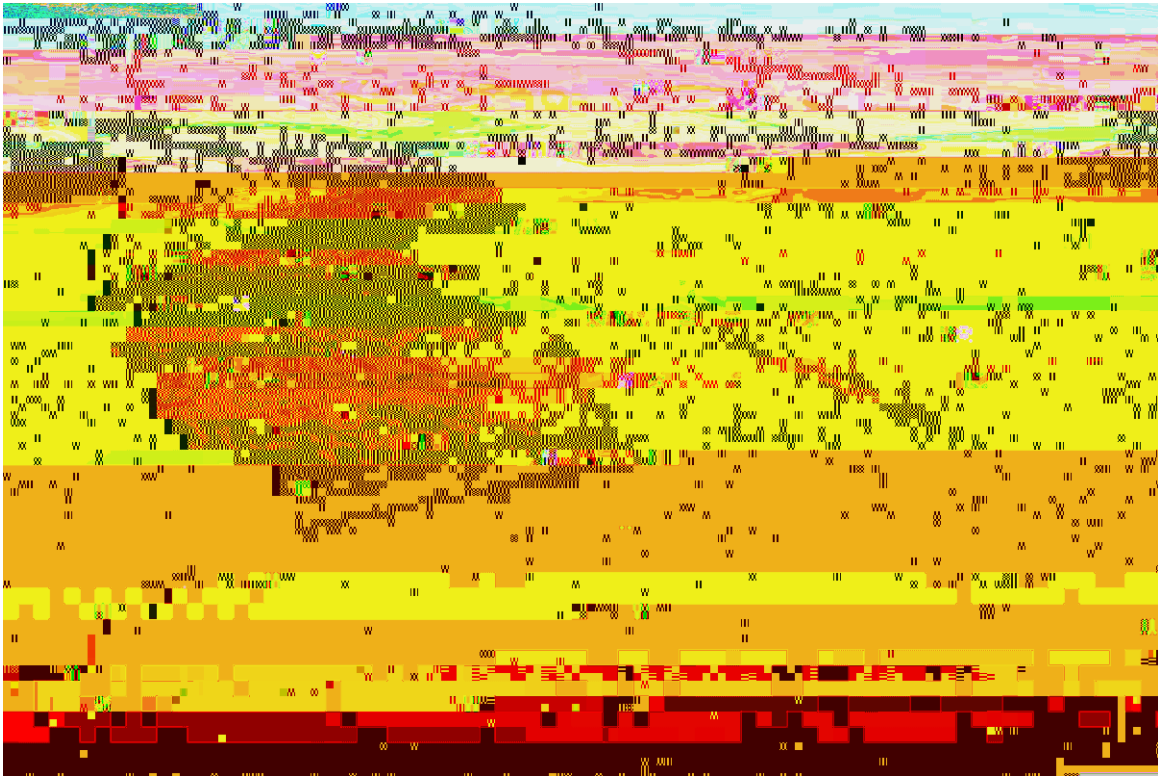


Figure 5. December 7, 2019 view into Hereford Inlet including the northern zone of the North Wildwood oceanfront. Note that new sand has been deposited from the jetty at 2nd Ave. toward the northwest to a point seaward of the prime bird nesting area west of Surf Avenue. The shoal island and its trailing sand bar lie between 500 and 1,000 feet seaward into the inlet from the City beaches.

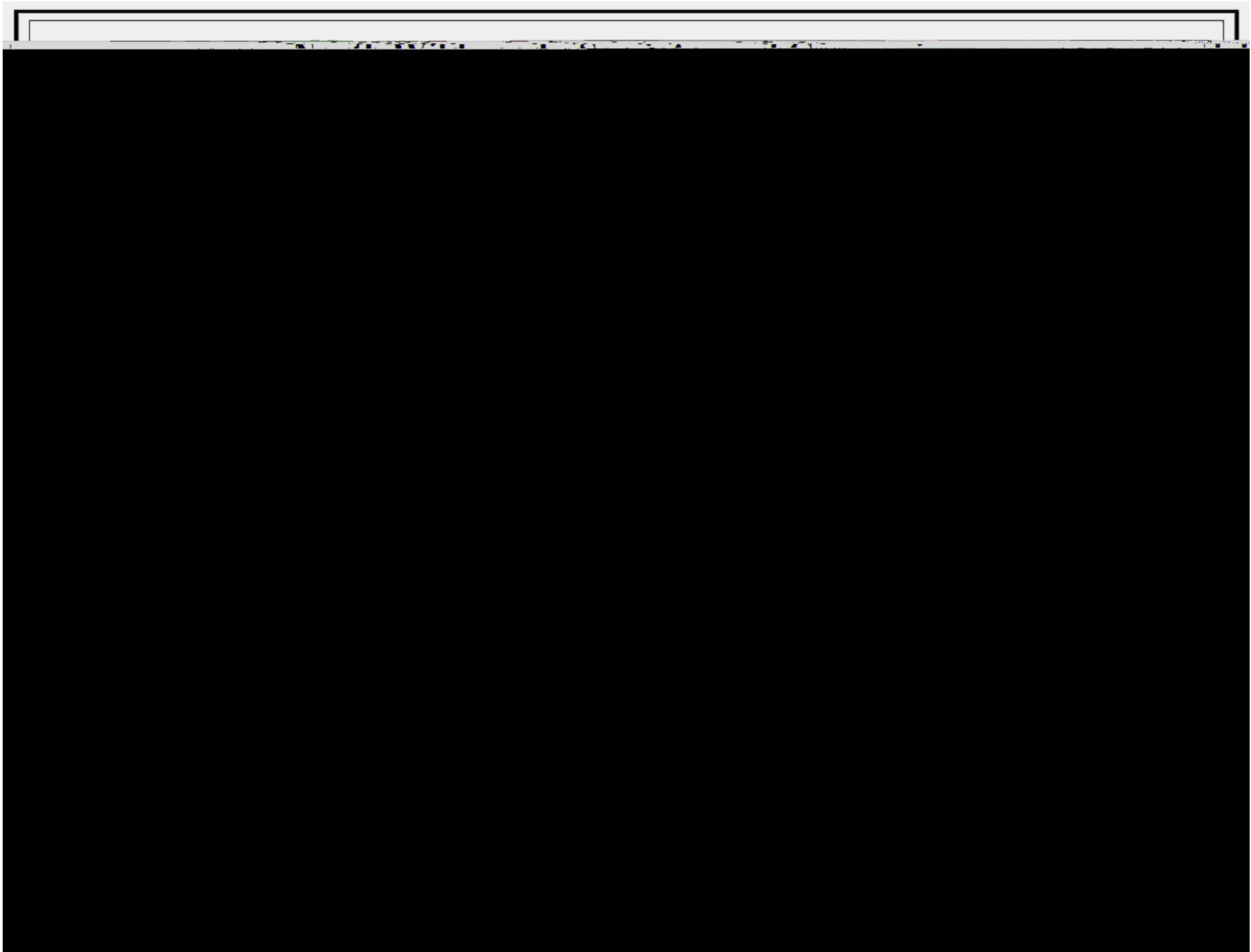
While a major hydraulic beach restoration project might serve the City's immediate future needs, this prospect has the issue that Hereford Inlet is part of the Coastal Barrier Resources System (CBRS), that has definite restrictions on spending federal funds to move sand outside the CBRS to North Wildwood. While congressional assistance has produced some progress in resolving this problem, there is no authority given to the US Army Corps to extract sand from Hereford Inlet shoals for either Stone Harbor or North Wildwood beaches. This is why the USACE has elected to focus its project for the Wildwoods on sand back-passing in a larger scale because of this restriction on

below zero elevation NAVD 88. The best condition among the four surveys occurred in June 2019 when the starting beach elevation point was at 2.0 feet NAVD 88.



Figure 6. View to the south taken November 7, 2019, showing that the waves at low tide still reach the revetment. The slope offshore is relatively gentle, but not suitable for recreational use.

The site is currently not useable for recreational purposes other than watching the sea from the gazebo or fishing. Expected back passing of sand should provide a narrow dry beach for the coming summer season.



Site 02+00 (about 100 feet south of inlet gazebo)

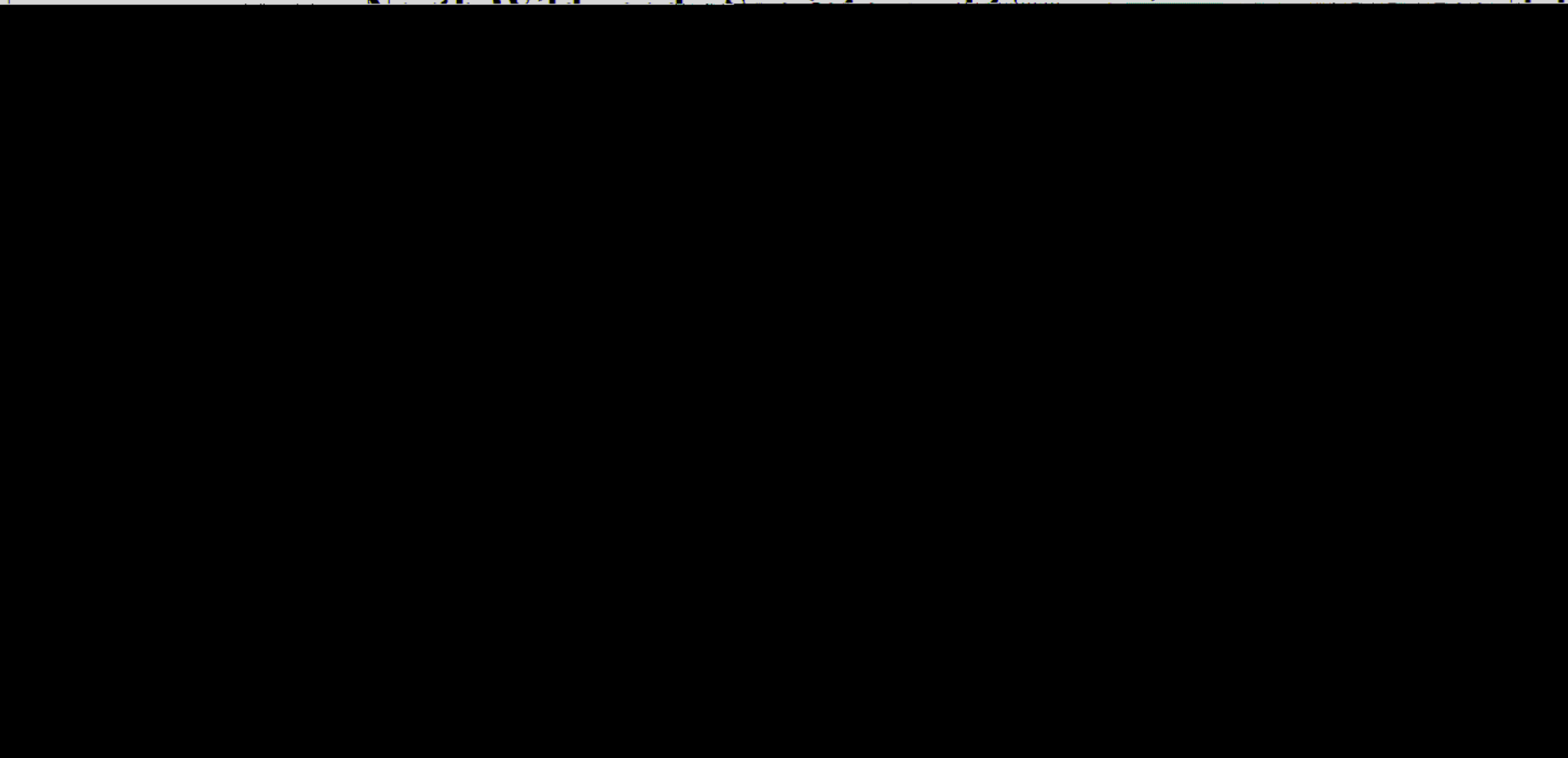


Figure 9. Site 02+00 is located 200 feet south of the inlet jetty. The line extends perpendicular to the seawall into the offshore region. Sand transport from the City of Wildwood served to provide a summer bathing beach area that vanished by October 25, 2019. This loss was 60.99 cfs^3/ft . and the shoreline retreated 90 feet. The October 2019 cross section was lower than any previously.

Site 04+00 (between 3rd and 4th Avenues)

The sites located in the northern portion of the island adjacent to Hereford Inlet are approximately 400 feet south of the 2nd Avenue jetty. This area has typically been an erosional shoreline due to its proximity to the inlet and the direct impact from northeast storms. An offshore bar was present in the fall of 2018 indicating sand accumulation offshore related to inlet geomorphic changes which may prove positive to the north end beach. This beach received substantial sand placement during the spring 2019 back pass effort creating a wide recreational beach during the summer. However, by late October the majority of that new material was gone, moved either into Hereford Inlet or transferred south along the remaining oceanfront. This process repeated the events recorded during 2018. Sand placed here during episodes of backing show in the October 2017 and June 2018 survey data, but the beach was eroded to a narrow strip by October 2018.

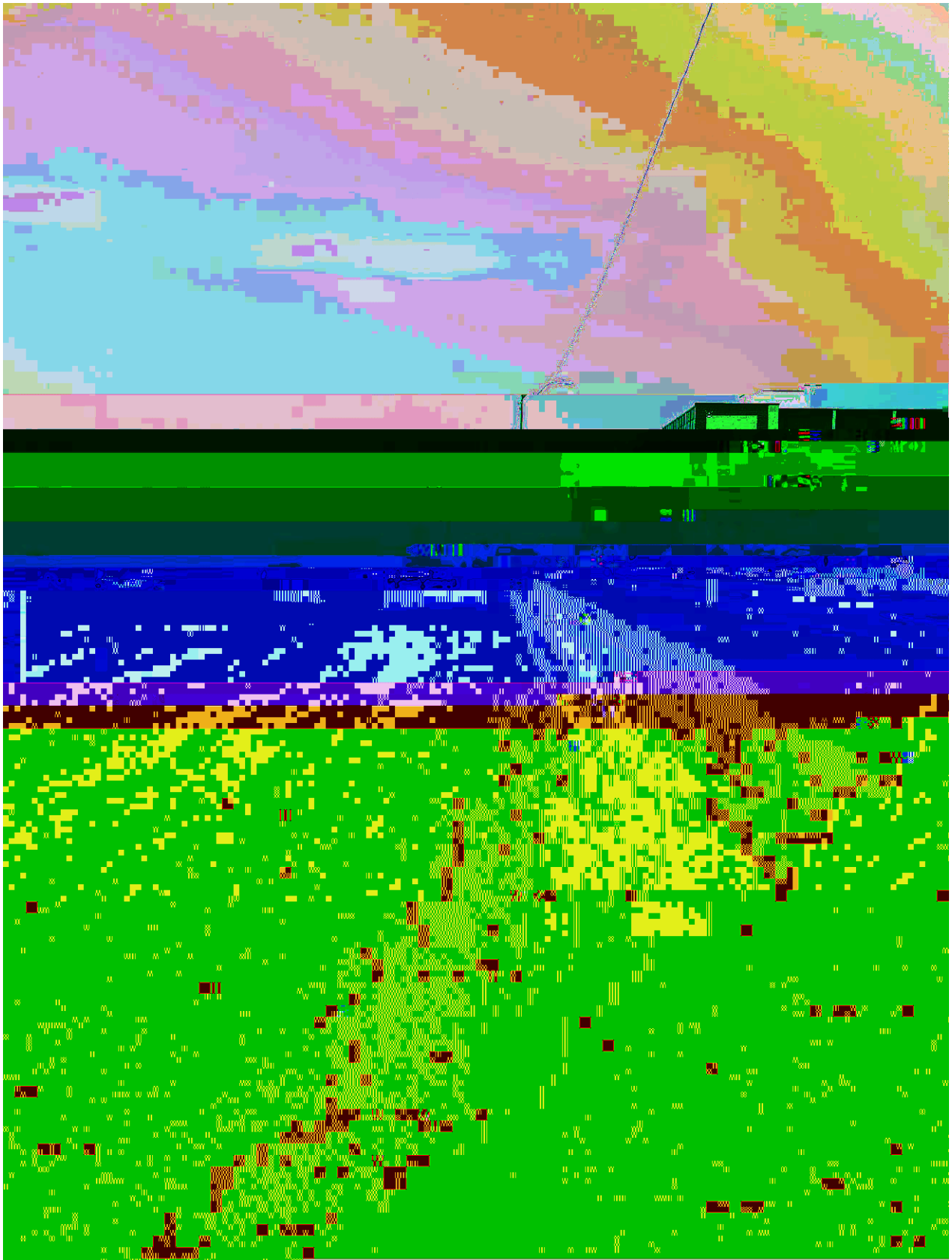


Figure 10. View to the south taken from directly in front of the cap on the new bulkhead that starts just south of the 3rd Avenue gazebo after conclusion of back passing on June 6, 2019. By October, the site was wet to the bulkhead with a complete loss of the bathing area.

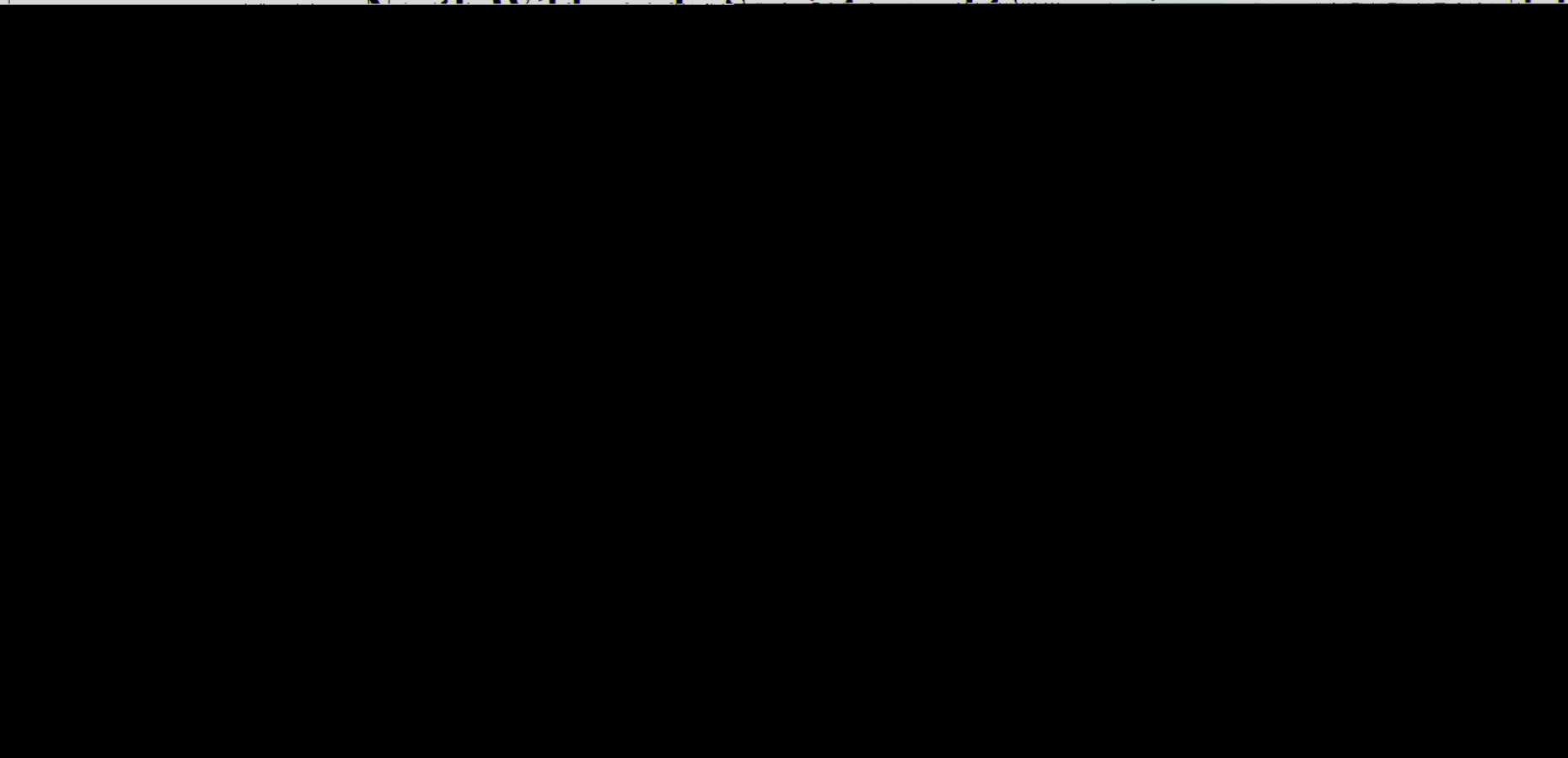


Figure 11. Site 04+00 is located 400 feet south of the inlet jetty. The June 2019 survey covers the 2019

Site 06+00 (approximately at 4th Avenue)

The third of the northern survey sites is located at the end of 4th Avenue where the new bulkhead was completed in early 2018. By 2018 all traces of the 2009 dune system had eroded away, replaced by material

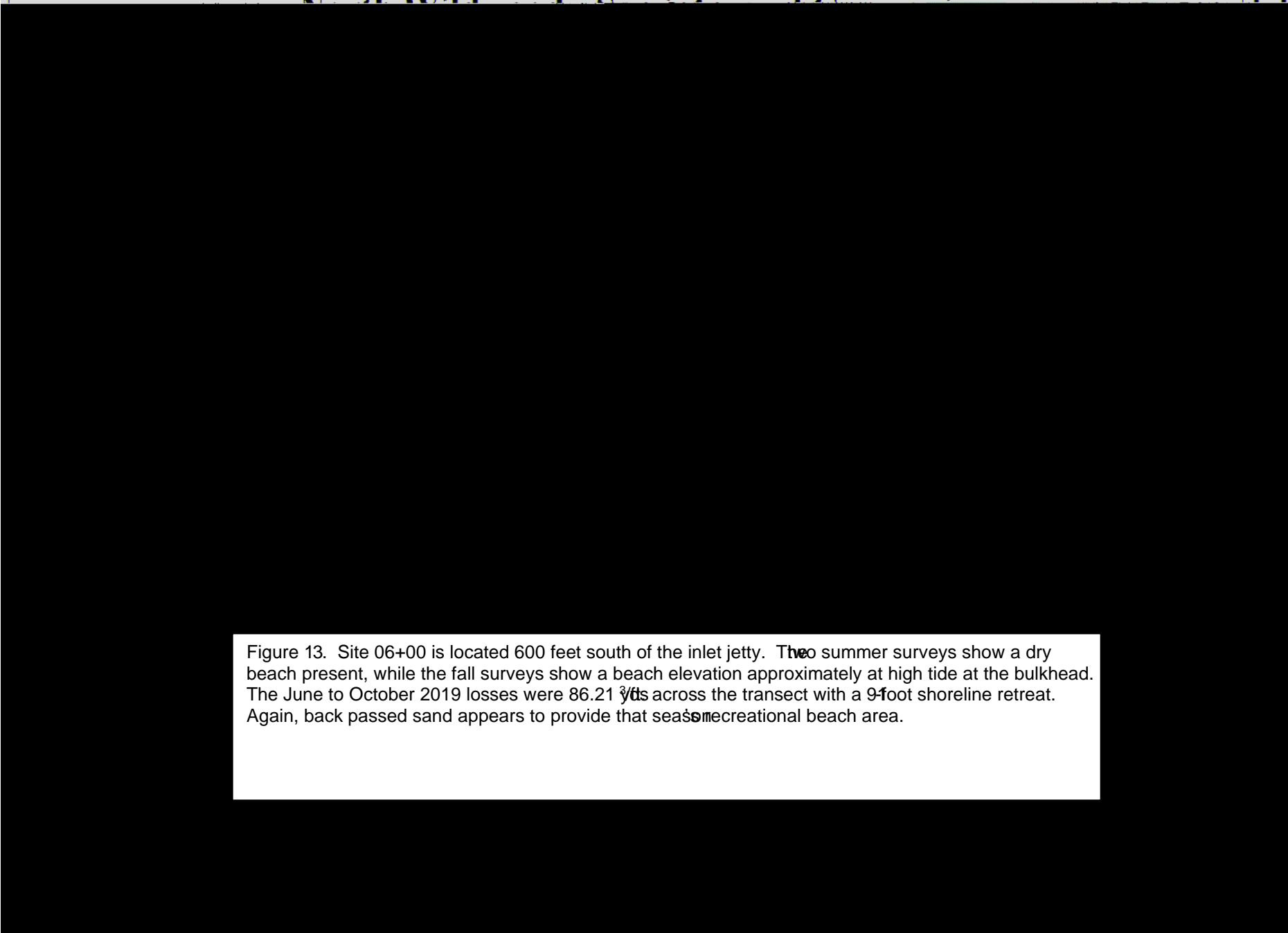


Figure 13. Site 06+00 is located 600 feet south of the inlet jetty. The summer surveys show a dry beach present, while the fall surveys show a beach elevation approximately at high tide at the bulkhead. The June to October 2019 losses were 86.21 yds across the transect with a 9-foot shoreline retreat. Again, back passed sand appears to provide that seasonal recreational beach area.

Fig

Site 40+00 (17th Avenue)

Positioned 4,000 feet south of the Avenuejetty, this site



Figure 17. Site40+00 is located 400 feet south of the

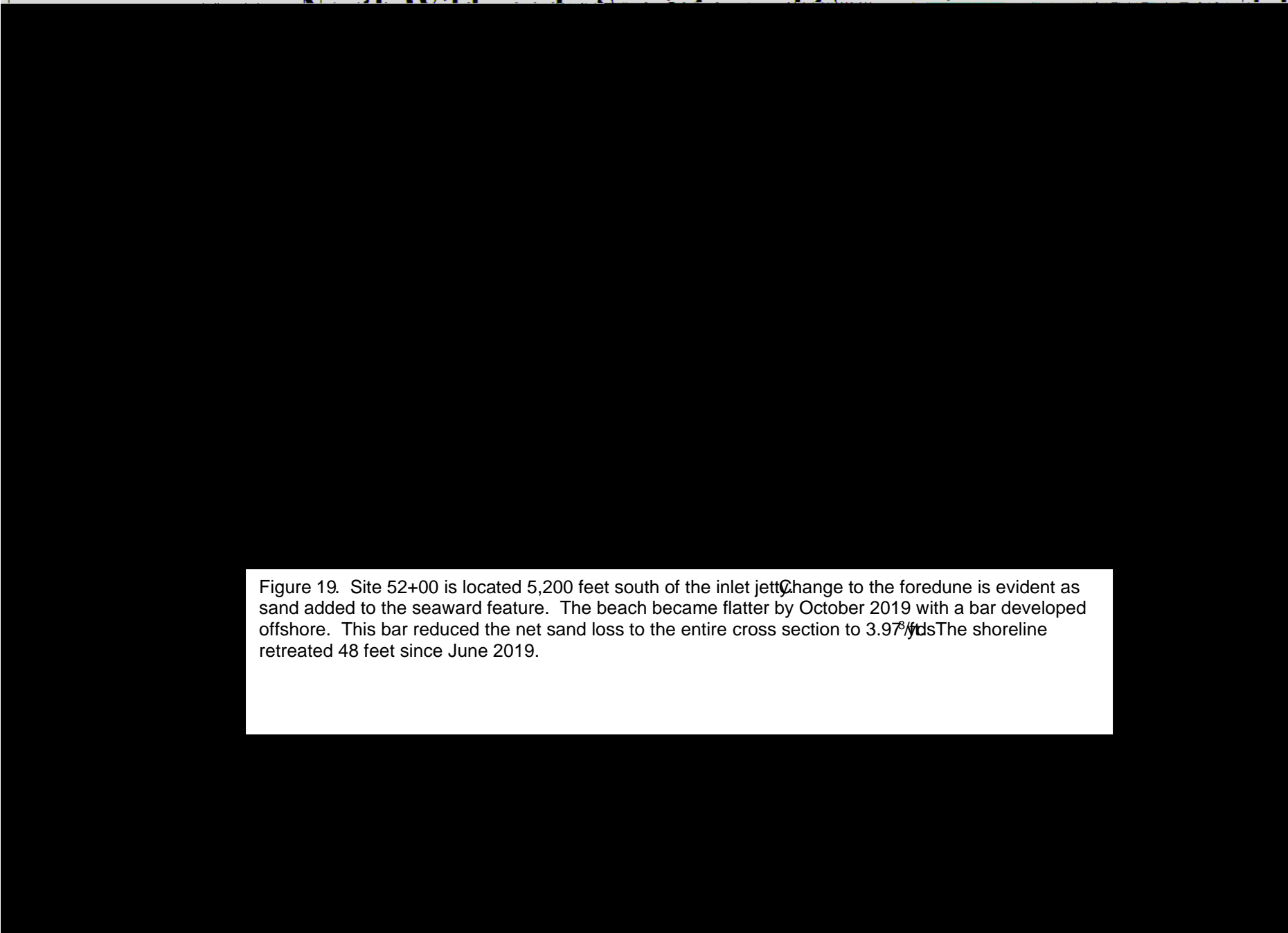


Figure 19. Site 52+00 is located 5,200 feet south of the inlet jetty. Change to the foredune is evident as sand added to the seaward feature. The beach became flatter by October 2019 with a bar developed offshore. This bar reduced the net sand loss to the entire cross section to 3.97%. The shoreline retreated 48 feet since June 2019.

Site 58+00 (Between 23rd & 24th Avenues)

This site is located in the southern section of the City's oceanfront where the engineered dune system was originally constructed seaward of the piers. The original NJDEP project permits mandated a seaward jog in the dune system, which resulted in their vulnerability to the state of frequent storms since 2009.

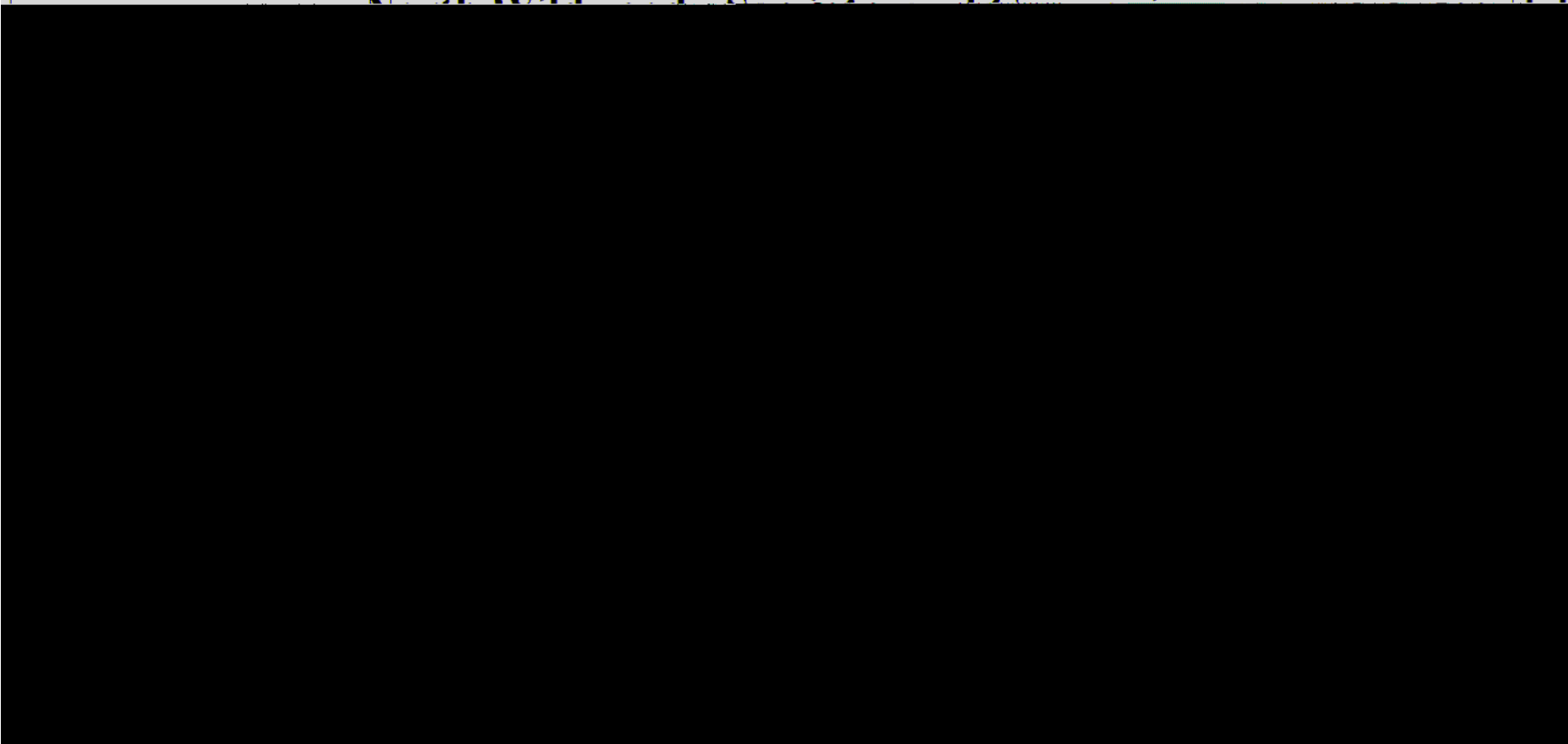


Figure 22. Site 60+00 is located 6,000 feet south of the inlet jetty. The site is located between timber piers and Morey's Surfside Pier. The "island dune" has been templated because of the dense and pristine vegetation. Here the losses were quite minimal with the entire profile losing 194 yds³/ft. The shoreline retreated 4 feet.

Site 64+00 between 25 and 26

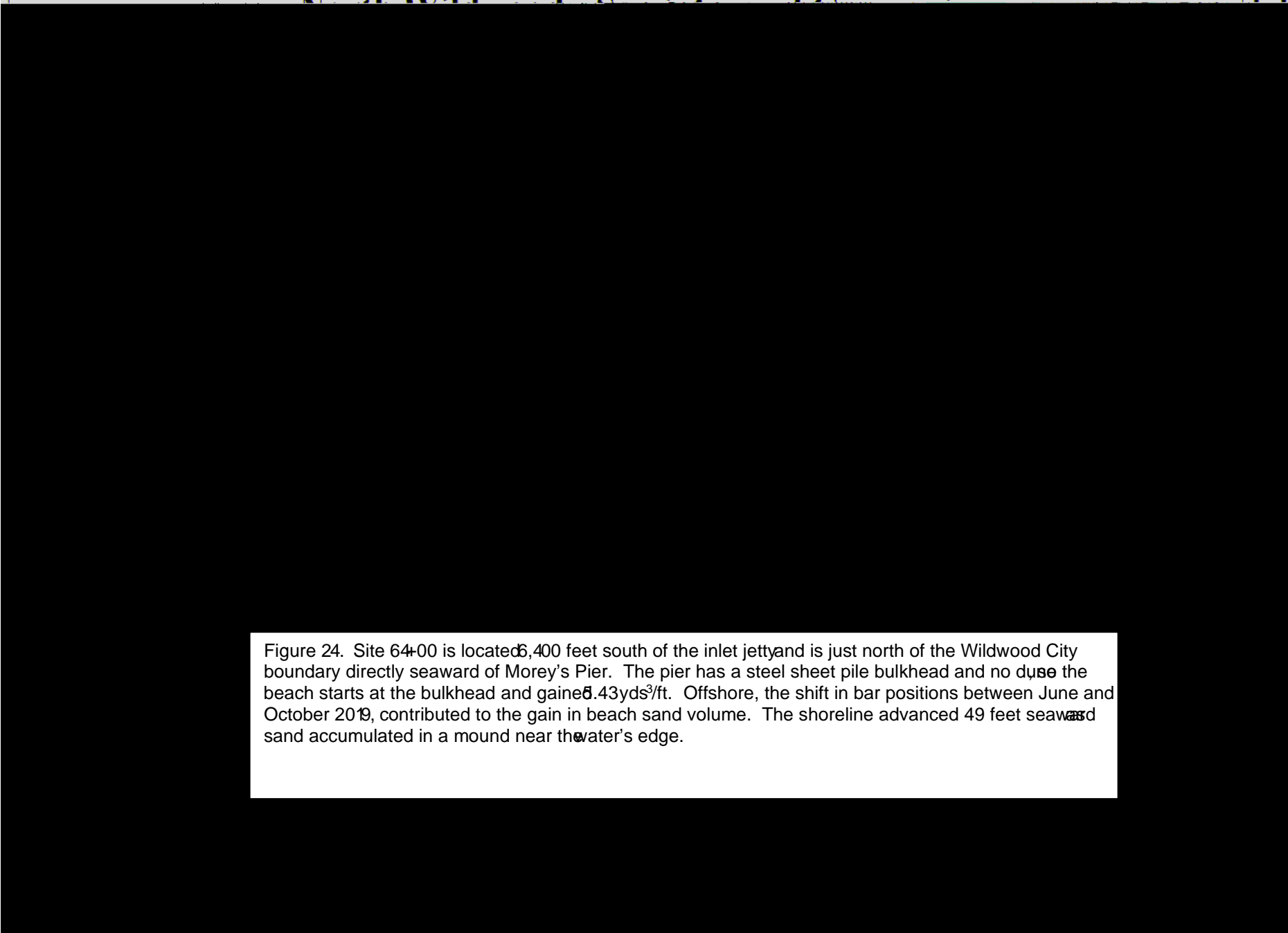


Figure 24. Site 64+00 is located 6,400 feet south of the inlet jetty and is just north of the Wildwood City boundary directly seaward of Morey's Pier. The pier has a steel sheet pile bulkhead and no dune; the beach starts at the bulkhead and gained 6.43 yds³/ft. Offshore, the shift in bar positions between June and October 2019, contributed to the gain in beach sand volume. The shoreline advanced 49 feet seaward and sand accumulated in a mound near the water's edge.

Summary/Conclusions

While northeast storms were infrequent and mild, multiple episodes of low velocity northeast winds helped to generate frequent episodes of wave erosion at the North Wildwood coastal oceanfront focused on the zone between 1st and 2nd Avenues. Wave and tidal action moved the past season's sand back pass supply either into Hereford Inlet extending a bar north past Surf Avenue or south toward the Wildwood City boundary. The outcome has been a growing need for a hydraulic fill to regenerate a full beach design template cross sections similar to that put in place in 2009.

Sand back passing can supply material at a slow rate per cubic yard, but the rate and volume of material moved per day is far less than that of a large hydraulic dredge operating in close proximity to the beachfront being supplied with sand.

Permits should be sought to conduct hydraulic beach maintenance going forward on a 5 year schedule in the absence of either continued City funding of large scale sand recycling or further delay in the start of the anticipated US Army Corps of Engineers shore protection project. The NJ Div. of Coastal Engineering should be approached to renew the 2009 project scope, that even if done to the level of half (750,000 cu yd) sand volume (1.45 million cu yd) would reset the stage so that a stable oceanfront shoreline could be maintained using the sand back passing methodology to, perhaps, g