RAMBOLL

ENVIRONMENT
& HEALTH

MEMORANDUM

May 10, 2022

To: George Pfeiffer, P.E., Honeywell
William Hague, P.E., Wood

From: Mark Nielsen, P.E., Ramboll
Jose Sananes, P.E., Ramboll
Owen Zalme, Ramboll

Subject: **SA-7 Sediment Remedy Long-Term Monitoring**
Summary of Year 8 Monitoring & Proposed Year 8 Program

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As required by the Consent Order on Sediment Remediation and Financial Assurances (Consent Order) entered by the U.S. District Court (District of New Jersey) on May 28, 2008 in the matter of Interfaith Community Organization et al vs. Honeywell International et al, and Riverkeeper, Inc., et al vs. Honeywell International et al (Civil Action Nos. 95-2097 and 06-0022), Honeywell conducted sediment remediation in the Hackensack River in the vicinity of Study Area (SA) 7 (Site) along Route 440 in Jersey City, New Jersey. The Consent Order, as amended in September 2013, set forth the specific components of dredging, capping, and monitored natural recovery (MNR) for the Sediment Remedy.

In accordance with the *Long-Term Monitoring Plan* (LTMP; revised April 18, 2012) developed as part of the 100% Design for Study Area 7 (100% Design; Cornerstone/ENVIRON 2012), annual monitoring is conducted to assess the on-going effectiveness of the sediment remedy. This report presents the results of monitoring performed by Ramboll US Consulting, Inc. (Ramboll) during Year 8 of the LTMP and the monitoring activities proposed for Year 9.

OVERVIEW OF LTMP

As summarized on Table 1, the LTMP requires bathymetric surveys, cap integrity monitoring, pore water sampling, biological monitoring, and surface sediment sampling at designated locations in Years 1, 2, and 5 of post-construction of the sediment cap areas. After Year 5, the monitoring program is reduced to conducting a bathymetric survey once every five (5) years. In addition, the LTMP requires continued hydraulic and hydrodynamic monitoring to identify high energy events that trigger additional assessment of cap areas[1] (note that no high energy events were identified during the first five years of post-construction monitoring or in Years 6 and 7).

Similar to the cap area monitoring, the LTMP specifies bathymetric surveys and sediment profile imaging (SPI) for monitored natural recovery (MNR) areas in

[1] High Energy Events are defined by the Consent Order as summarized on Tables 1 and 2

Years 1, 2 and 5 of the post-construction period (see Table 2). After Year 5, the monitoring program is reduced to conducting a bathymetric survey once every five (5) years. In addition, the LTMP requires continued hydraulic and hydrodynamic monitoring to identify high energy events that trigger additional assessment of MNR areas.

As specified in the LTMP and confirmed in the LTMP Year 5 Implementation Report (Year 5 Report; Ramboll, May 2019), cap integrity monitoring, pore water sampling, biological sampling, surface sediment sampling, and SPI were discontinued after Year 5, as the results of the first five years of post-construction monitoring demonstrated that the remediation areas remain stable relative to constructed conditions.

Bathymetric surveys will be conducted every 5 years. All long-term monitoring (LTM) activities can be terminated after 15 years (i.e., 2028) and through two high-energy events, or a total period of 25 years (i.e., 2038), whichever is shorter.

SUMMARY OF YEAR 8 ACTIVITIES

As described in the Year 5 Report, construction of Cap Areas 16 and 22 in Droyers Cove was completed in 2018 in coordination with the beneficial environmental project (BEP) implementation. As a result, these two cap areas were not included in the routine monitoring completed in Years 1 through 5 of the LTMP. Therefore, these cap areas were inspected in coordination with the BEP inspection program in Years 6, 7, and 8.[2]

The specific scope of inspections and monitoring conducted in Year 8 were as follows:

- Ramboll completed three[3] visual inspections of the Droyers Cove BEP area to document the continued establishment of vegetation and functionality of the BEP. Since Cap Area 16 underlies the BEP area and Cap Area 22 is located proximate to the BEP area, these cap areas were also visually inspected three times in Year 8.[4] The inspections were performed at low tide on April 27, July 23, and October 6, 2021. As detailed below, the October 6, 2021 inspection took place after the September 2021 high energy event. The results of these inspections were documented in summary logs (see **Attachment A**). Inspection of the Cap Area 16 and 22 long-term monitoring plate locations determined that the long-term monitoring plates were not visible, confirming that the plates have remained buried and no observable loss of cap material has occurred. In fact, some deposition of sediment (up to 3 inches in Cap Area 22) was observed over the caps.
- As required by the LTMP, Ramboll monitored hydraulic and hydrodynamic data to identify high energy events that would trigger additional assessment. The results of hydraulic and hydrodynamic monitoring performed during the first (January through March), second (April through June), third (July through September), and fourth (October through December) quarters of 2021 are attached (**Attachment B**). As detailed in Ramboll's February 2022 LTMP Post-High Energy Report, these monitoring data indicated that a high energy event occurred on September 1, 2021 caused by the remnants of hurricane Ida. The event resulted in 8.41-inches of rain within

[2] The Year 6 and 7 inspections and monitoring activities were documented in memoranda dated January 30, 2020 and February 26, 2021.

[3] The BEP area was also visually inspected on September 21, 2022 and inspected using an unmanned aerial vehicle (UAV) on October 7, 2021. Cap Area 22 was also inspected using the UAV.

[4] Cap Area 22 was not fully exposed at the time of inspection on July 23 and October 6, 2021 (i.e., low tide was not low enough to fully expose the cap surface).

a 24-hour period, thus exceeding for a 50-year storm event, although neither the storm surge nor wind speeds exceeded the applicable thresholds nor the conditions simulated for the 100% Design. Therefore, in conformance with the Revised Implementation Plan, a Post-High Energy Event assessment of conditions within the SA-7 sediment area was conducted from October to November 2021, and included a bathymetric survey and cap integrity monitoring.

As detailed in the Post-High Energy Report, the assessment of conditions within the SA-7 sediment area following the September 2021 high energy event demonstrated that the remediation capped and MNR areas remain stable relative to constructed conditions and no further actions are warranted. However, repairs are needed for portions of the BEP area. Specifically,

1. The results of the comparison between the baseline and Post-High Energy Event bathymetric surveys indicate a net deposition of sediment across both the sediment cap areas and the MNR areas. This comparison identified three of the 175 sediment cap subareas with a loss in bed elevation (ranging from 5.05 to 8.55 inches inches) and none of the 140 MNR subareas (up to ¼-acre in size) showed net loss in the bed elevation. Since the losses estimated based on the bathymetric surveys in the three sediment cap subareas (Sub Areas 16-2, 22-1 and 22-2) were more than the 4-inch threshold for identifying an Erosional Area, the integrity of these subareas was further evaluated via direct inspection.
2. Cap integrity inspections were conducted at intertidal cap areas, subtidal cap areas where the model predicted the highest shear stresses, and the three sediment cap subareas identified by the bathymetric survey as showing a net decrease in the bed elevation (i.e., Sub Areas 16-2, 22-1 and 22-2). At all long-term cap monitoring plate locations, the posts of the monitoring plates were not observed, and armor stone was present, indicating that the caps remains in-place with no evidence of erosion of cap materials. In fact, an accumulation of sediment was observed at all locations inspected and, in subtidal cap areas, evidence of biological activity and submerged aquatic vegetation was observed.
3. Comparison of panoramic images taken in April 2016 and October 2021 indicated that there has been an accumulation of sediment throughout the cap and MNR areas and little to no erosion since 2016.
4. Significant erosional damage was only observed on the northern portion of the BEP, where surface water flows from Kellogg Street into the BEP area. In this area, the survey identified the following impacts from the storm event:
    - An approximately 4-foot deep scour hole in the upland transition area in northeast corner;
    - Surface erosional damage across the northernmost portion of the low marsh and, to a lesser extent, the high marsh (approximately 1300 square feet);
    - Damage to approximately 60 linear feet of shoreline stabilization berm; and
    - Sediment scouring at the discharge of Outfall D. Beyond this area, small segments of the stone edge along the rip-rap aprons was displaced and some exposed geotextile was observed along the shoreline stabilization berm.

    Damaged areas were repaired in March 2022 to prevent further erosional damage.
5. Field observations, aerial imagery and sediment surface measurements at BEP reference posts located within Cap Area 16 showed that areas of significant erosional damage are limited to the northern portion of the BEP and that the integrity of Cap Area 16 was mostly unaffected. Even considering the maximum cumulative erosion measured since May 2019 and minimum

as-built thickness measurement, the existing thickness exceeds the Consent Order required thickness of 12 inches.

Consistent with Year 6 and 7 and except as noted above, only hydraulic and hydrodynamic monitoring and visual inspections were considered necessary to evaluate the integrity of Cap Areas 16 and 22 in Year 8 given the following factors:

1. The results of seven years of post-construction monitoring of the SA-7 sediment remedy area within the main portion of the Hackensack River have documented the relative stability of the cap areas completed in 2013.
2. Cap Areas 16 and 22 are located within Droyers Cove, which exhibits lower currents than the main portion of the Hackensack River.
3. Cap Area 16 is within the BEP shoreline wetland area, which has been vegetated.

In accordance with the LTMP, the next bathymetric surveys of the entire SA-7 sediment remedy area will be conducted in 2023 and 2028 (i.e., 10 and 15 years after completion of the sediment remedy in 2013), unless a high-energy event occurs sooner. These surveys will include Cap Areas 16 and 22.

PROPOSED ACTIVITIES FOR YEAR 9

Repairs to the BEP area caused by the remnants of hurricane Ida will be completed in early 2022. The repairs will consist of the placement of stone along the shoreline stabilization berm on the eastern side of the BEP, regrading of the eroded areas located on the eastern side of the BEP, placement of stone armoring between the BEP area and Kellogg Street (to help prevent future erosional damage), and placement of additional stone armoring along the edges of the outfall aprons (where they connect to the shoreline stabilization berm).

Consistent with the requirements of the LTMP, in Year 9 (2022), Ramboll proposes to continue to perform hydraulic and hydrodynamic monitoring on a monthly basis to identify any high-energy events that would trigger additional assessment of the remedy area. Ramboll will prepare quarterly reports summarizing the hydraulic and hydrodynamic monitoring results. If a high-energy event occurs in Year 9, Ramboll will implement LTMP field activities (bathymetric survey, ROV cap integrity monitoring, and SPI survey) over the entire sediment remedy area.

In addition, consistent with activities in Years 6, 7, and 8, Ramboll will conduct a minimum of three visual inspections of the BEP Area in Year 9 (April, July, and October 2022) to continue to document the establishment of vegetation and functionality of the BEP. Cap Areas 16 and 22 will be included in these inspections. Following each inspection, summary logs documenting observations will be submitted to Honeywell and after the third inspection, Ramboll will prepare a summary report documenting all Year 9 inspection and monitoring activities.

Please let us know should you have any questions or wish to discuss further.

TABLES

Table 1: Summary of Long-Term Monitoring of the Capped Areas

Monitoring Elements for Capped Areas	YEAR							LTMP Section Reference
	1	2	5	6 to 15	20	25	HEV	
Hydraulic and Hydrodynamic Evaluation								
Routine Monitoring and Analysis	X	X	X					4.1.1
Severe Event Monitoring and Analysis	X	X	X	X			Note 1	4.1.1
Bathymetry	X	X	X	X	X	X	Note 2	4.1.2
Cap Integrity Monitoring	X		X				Note 3	4.1.3
Pore Water Sampling	X	X	X	Note 4, 5				4.2.1
Surface Sediment Sampling			X	Note 5				4.2.2
Sediment Trap Sampling	Note 6							4.2.3
Biological Monitoring	X		X	Note 5				4.3

HEV: Following all High Energy Events

Note 1: After 15 years, high-event assessments will be discontinued if the monitoring objectives have been achieved and maintained for 15 years and through at least two high energy events.

Note 2: Bathymetric surveys will be conducted following up to two high-energy events (if not encountered in the first five years). No additional surveys will be performed if bathymetric surveys show no negative impacts on overall cap integrity (i.e., cap maintains coverage of target areas) for a period of 15 years and through two high-energy events, or a total period of 25 years, whichever is shorter.

Note 3: After Year 5, routine sediment cap integrity monitoring will be discontinued unless data collected during the first five years of monitoring indicate that additional monitoring is warranted. Monitoring will still be conducted following a high-energy event if two such events did not occur within the first five years. Monitoring may also be performed after Year 5 if the bathymetry survey identifies an area of potential erosion warranting further assessment (see Section 4.1.2)

Note 4: The first year of pore water sampling is limited to those areas of potential intermediate groundwater plume upwelling identified in the 2007 *Final Groundwater Investigation Report, Honeywell Study Area 7 Site*; this corresponds to portions of Cap Areas 1, 6, 8, 13, and 18 . In Year 2, sampling will be performed in Areas 1, 8, 13 and 18.

Note 5: After Year 5, sampling will be discontinued, unless the data collected during the first five years of monitoring indicate further monitoring is warranted.

Note 6: If surface sediment sampling of capped areas results in the detection of total chromium concentrations greater than 370 ppm, sediment trap sampling units may be deployed in those areas to further assess site conditions and to evaluate potential contaminant sources.

Table 2: Summary of Long-Term Monitoring of the MNR Areas

Monitoring Elements for MNR Areas	YEAR							LTMP Section Reference
	1	2	5	6 to 15	20	25	HEV	
Hydraulic and Hydrodynamic Evaluation								
Routine Monitoring and Analysis	X	X	X					5.1
Severe Event Monitoring and Analysis	X	X	X	X			Note 1	5.1
Bathymetry	X	X	X	X	X	X	Note 2	5.2
Sediment Profile Imaging	X	X	X				Note 3	5.3
Sediment Core Sampling	Note 4							5.2, 7.2

HEV: Following all High Energy Events

Note 1: After 15 years, severe event assessments will be discontinued if the monitoring objectives have been achieved and maintained for 15 years and through at least two high energy events.

Note 2: Bathymetric surveys will be conducted following up to two high-energy events (if not encountered in the first five years). Following at least two high energy events, bathymetry surveys will be conducted only in MNR areas where erosion may have resulted in more than a 4-inch decrease in the elevation of the sediment surface, based on the results of the hydrodynamic evaluation.

Note 3: Following high energy events, SPI surveys will be performed in MNR areas where erosion may have resulted in more than a four-inch decrease in surface sediment elevations based on the hydrodynamic evaluation and measured observations

Note 4: In the event that a bathymetric survey identifies an Erosional Area as defined in the LTMP, sampling of top 12-inches sediment for total chromium in Erosion Areas is required to confirm that concentrations in top 12-inches remain below 370 ppm.

ATTACHMENT A
YEAR 8 INSPECTION LOGS

ATTACHMENT A.1
APRIL 27, 2021 INSPECTION LOG

SITE INSPECTION LOG

PROJECT NAME:	SA-7 Long-Term Monitoring Year 8	INSPECTION DATE:	April 27, 2021
		WEATHER	SNOWY ☐ RAINY ☐ OVERCAST ☐
PROJECT NUMBER:	1690012529	CONDITIONS:	PARTLY CLOUDY ☐ SUNNY ☒
PROJECT LOCATION:	SA-7 Droyers Cove BEP	TEMPERATURE (ºF):	60 ºF
	City of Jersey City, Hudson County, NJ	PREVAILING WIND:	5-10 mph (SE)
INSPECTOR NAME:	Owen Zalme/June Yeung	INSPECTOR	
INSPECTOR TITLE:	Senior Consultant/Senior Consultant	SIGNATURE(s):	

The inspection was conducted around the predicted low tide at 3:48 pm, when Cap Area 16, the entire BEP area (including the shoreline stabilization berm), and Cap Area 22 were fully exposed. **Figure 1** presents the location of the as-built BEP and cap areas described in the tables that follow.

TABLE 1. SEDIMENT CAP AREA INSPECTION LOG

CAP AREA	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
16	• Long-term monitoring plate was not observed (i.e., plate remains buried). • Depth to sediment surface measurements taken at reference posts indicate an average decrease in sediment deposition of 0.3 inches throughout the cap area (with losses of up to 1.1 inches in some areas and gains of up to 0.4 inches in others) since the May 29, 2019 inspection. o Note that the CO-required thickness for this area is 12 inches and thickness verification measurements of the shoreline fill portion of the area during construction ranged from 25 to 40.8 inches. Even considering maximum cumulative erosion measured (1.1 inches since May 2019) and minimum thickness, the existing thickness would be at least 23.9 inches.	1 to 3	• None
22	• Long-term monitoring plate was not observed (i.e., plate remains buried). • Consistent with prior observations, on approximately 20% of the cap and concentrated in depressional areas, 2 to 3 inches of siltation was measured over the armor layer. • The establishment of sub-aquatic vegetation was observed across portions of the cap area.	4 to 7	• None

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
SHORELINE STABILIZATION	• Shoreline stabilization appeared to be in good condition. • There were two approximately 15- to 20-foot sections of snow fence located along the shoreline stabilization area on the outer edge of the BEP area that had been knocked down. One was near Outfalls B and C and the other was located between Outfalls A and B.	8 to 9	• Reinstall snow fencing in the two areas along the perimeter of the shoreline stabilization area.
OUTFALL RIPRAP APRONS	• Outfall A: Consistent with prior observations, areas of 6 to 12 inches of siltation were observed on the surface of the western portion of the riprap apron, with greater siltation in the upland portion than in the low marsh zone. • Outfalls B and C: Consistent with prior observations, approximately 1 to 3 inches of siltation (likely displaced shoreline fill) were observed throughout the riprap apron, especially in the vicinity of both outfalls. Approximately 3 to 4 inches of siltation was observed along the western edge of the Outfall B riprap apron. • Outfall D: Extension piping appeared to be in good condition.	10 to 12	• None
PLANTING ZONE A – LOW MARSH	• Overall total vegetative coverage decreased relative to October 2020 (25%), estimated around 15 to 20% within the vicinity of Outfall A and less than 5% elsewhere. Vegetative coverage continued to be better in the upper portion of the low marsh zone compared to conditions in the lower portion of the low marsh zone. o New growth was observed on the spartina present. Additionally, there were fresh shoots emerging from the ground where there were no obvious signs of a plug, likely indicating new colonization. It has thus become increasingly difficult to discern plugs from new colonization. o Consistent with prior observations, approximately 2 to 3 inches of siltation was observed over a small area of GroSoxx (approximately 2 SF) to the west of Outfall A. The GroSoxx in this area were completely covered by silt. o No invasive species were observed at the time of inspection. • Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 1.4 inches (with losses of up to 1.1 inches in some areas and gains of up to 9.0 inches in others) occurred since the May 29, 2019 inspection. • Coarse-grained material (sand, gravel, and cobbles) was observed on the surface of the shoreline fill material near Outfall D likely the result of fine washout from surficial materials. • Waterfowl exclusion measures appeared to be in acceptable condition. However, there were several locations where the string was loose and/or a fence post was tilted or uplifted, which may reduce effectiveness of the measures.	13 to 17	• Continue monitoring erosional/depositional rates using reference posts during inspections. • Repair waterfowl exclusion measures. • Consider planting additional plugs in the low marsh areas where establishment remains low. In low elevation areas, consider clumping plugs for increased stability and to improve resistance to tidal energy.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED

PLANTING ZONE B – HIGH MARSH	• Overall total vegetative coverage increased slightly since October 2020 from 50% to 65%.
	  o Vegetation appeared healthy with many new shoots present and signs of emergent growth throughout. Observations suggest that new colonization occurred since 2020.
	  o Consistent with observations since October 2019, an odor typically associated with an anoxic environment (e.g., bog, wetland, swamp, etc.) was noted when stepping on the GroSoxx on the central portion of the BEP area, east of Outfall A. No vegetative growth was observed at this location.
	  o Generally, vegetative growth observed throughout the areas of GroSoxx located at the interface of the uplands transition area and high marsh zone, particularly near the outfalls, increased since October 2020. Unlike previous inspections in 2020, new emergent vegetative growth was observed in the lower half of the GroSoxx with evidence of new colonization.
	• Observations regarding the condition of the GroSoxx, geogrid, and anchors were consistent with those made since October 2019:
	  o Empty GroSoxx sleeves were observed outside of the geogrid.
	  o There were several areas where ripping/holes or loose geogrid were observed.
	  o Several anchors (both the Gripple Rock and Terra-Lock™ Earth anchors) showed signs of significant uplift (possibly due to the deflation of the GroSoxx), though none were fully lifted out of the ground.
	  o Significant shifting of GroSoxx underneath the geogrid occurred, and the third row of GroSoxx (from the bottom) appeared to be mostly missing.
	  o Significant siltation was observed over the GroSoxx located on the western side of Outfall A, with many of the GroSoxx completely buried up to the drift line.
	• Observations regarding the condition of the RockSoxx installed along the interface of the upland transition area and high marsh zone in the central portion of the BEP area (between Outfalls A and B, and just north of Outfall C) were consistent with those made during prior inspections:
	  o Some of the RockSoxx showed signs of wear and tear, with holes on the surface that could potentially result in loss of the material within.
	  o Large cuts/openings were observed in several RockSoxx in the central portion of the BEP area, primarily between Outfalls A and B.
	• No invasive species were observed at the time of inspection.
	• A small amount of debris (e.g. vegetative waste, plastic, trash, consumables) was observed along the drift deposit line below the bottom row of GroSoxx, consistent with observations made during prior inspections.
	• Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 0.7 inches (with losses of up to 0.3 inches and gains of up to 2.4 inches in others) since the May 29, 2019 inspection.
	• Consistent with observations during prior inspections, coarse-grained material (sand, gravel, and cobbles) was observed on the surface of the shoreline fill material, especially near Outfall D.
	• Waterfowl exclusion measures east of Outfall C were tilted or uplifted fence posts.
		18 to 31	• Continue monitoring erosional/depositional rates using reference posts during inspections.
			• Repair or replace the damaged RockSoxx.
			• Consider planting plugs in the areas with exposed geogrid, where soil has filled in over previously installed GroSoxx to increase rate of colonization.
			• Consider implementing options to repair the high marsh zone (generally within the drift line) where vegetation is not successfully establishing and the GroSoxx appear to be saturated and in some cases “emptying out”.
			• Repair waterfowl exclusion measures.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
PLANTING ZONE C – UPLANDS TRANSITION AREA	• Overall vegetative coverage remained approximately the same relative to October 2020, estimated around 85-95% throughout the BEP area. Consistent with prior observations: o Many of the emergent shoots of vegetation previously observed were much more established. o GroSoxx, geogrid, anchors, and the ¾-inch stone strip appeared to be in good condition, despite the conditions observed in the high marsh zone. • Invasive species coverage was generally consistent with observations made in October 2020, estimated around 5% overall. Observed invasive species include a white mulberry tree (*Morus alba*) growing in the central portion of the BEP area and a small cluster of common reed (*Phragmites australis*) approximately 3 feet in diameter located in the area northeast of Outfall C. • Many of the previously observed native species remained dormant at the time of the visit and were not readily identifiable. However, the observed vegetative community remained predominately native and appeared well established. • Consistent with observations made in October 2020, evidence of tidal drift deposits was observed lining the lower extent of the GroSoxx, at the boundary with the high marsh zone. • Waterfowl exclusion measures appeared to be in good condition, with the exception of one pole in the area west of Outfall A that requires re-installation.	32 to 37	• Reinstall pole for waterfowl exclusion measures.

SITE INSPECTION LOG (CONTINUED)

Photo 1: Northern end of Cap Area 16. Note largely dormant vegetation and intact waterfowl exclusion measures (facing west).

Photo 2: Western end of Cap Area 16. Note limited vegetative growth in low marsh zone (facing northeast).

SITE INSPECTION LOG (CONTINUED)

Photo 3: Cap Area 16 and shoreline stabilization berm viewed from SA-6S bulkhead (facing southwest).

Photo 4: Cap Area 22. Note the Beneficial Environmental Project area located in the background (facing southeast).

SITE INSPECTION LOG (CONTINUED)

Photo 5: Cap Area 22. Note depressional areas on the armoring stone (facing northwest).

Photo 6: Cap Area 22. Note depressional areas in the armoring stone (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 7: Sub-aquatic vegetation established in accumulated sediments located within depressional areas in the armoring stone of Cap Area 22.

Photo 8: Shoreline stabilization along the central portion of the BEP area. Note the compromised snow fence (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 9: Shoreline stabilization at the end of Outfalls B and C. Note the compromised snow fence along the edge of the outfall apron (facing northwest).

Photo 10: Outfalls C and B located in the central portion of the BEP area (facing south).

SITE INSPECTION LOG (CONTINUED)

Photo 11: Outfall A discharge area. Note the accumulation of sediment in the foreground (facing northeast).

Photo 12: Outfall A and the debris screen. Note the accumulation of sediment in the foreground (facing southeast).

SITE INSPECTION LOG (CONTINUED)

Photo 13: Limited vegetation present throughout the low marsh zone. Note tilted/loose waterfowl exclusion fencing (facing northwest).

Photo 14: Limited vegetation present throughout the low marsh zone. Note tilted/loose waterfowl exclusion fencing (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 15: Limited vegetative growth present in the low marsh zone located between Outfalls A and B (facing west).

Photo 16: Limited vegetative growth present in the low marsh zone located between Outfalls A and B. Note tilted/loose waterfowl exclusion fencing (facing east).

SITE INSPECTION LOG (CONTINUED)

Photo 17: Vegetative growth present in the low marsh zone from the western side of the BEP area (facing southeast).

Photo 18: Vegetation on the eastern side of the BEP area. Note the healthy and vibrant vegetation in the uplands and high marsh zones, but limited growth in the low marsh (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 19: Vegetation on the eastern side of the BEP area. Note the healthy and vibrant vegetation in the uplands and high marsh zones, but limited growth in the low marsh (facing southwest).

Photo 20: Exposed geogrid and sparse vegetation in the high marsh zone of the northern portion of the BEP area adjacent to Outfall C (facing southwest).

SITE INSPECTION LOG (CONTINUED)

Photo 21: Sparse vegetation present near exposed geogrid and RockSoxx located adjacent to Outfall B (facing southwest).

Photo 22: Sparse vegetation present near the exposed RockSoxx located in the central portion of the BEP area between Outfalls A and B (facing south).

SITE INSPECTION LOG (CONTINUED)

Photo 23: Sparse vegetation present near the exposed RockSoxx located in the central portion of the BEP area between Outfalls A and B (facing southeast).

Photo 24: Sparse vegetation present on the exposed geogrid and RockSoxx located adjacent to Outfall A (facing southwest).

SITE INSPECTION LOG (CONTINUED)

Photo 25: Vegetation present on the high marsh zone and the limited vegetative growth in the lower portion of the GroSoxx located near Outfall A. Note the fresh shoots and increased levels of colonization (facing southeast).

Photo 26: Sparse vegetation present near the exposed geogrid and RockSoxx located adjacent to Outfall A (facing east).

SITE INSPECTION LOG (CONTINUED)

Photo 27: Emergent growth of vegetation observed throughout the high marsh zone. Note: the new shoots appeared to be healthy and in good condition and exposed geogrid below it.

Photo 28: Partially buried and sparsely vegetated GroSoxx near Outfall A.

SITE INSPECTION LOG (CONTINUED)

Photo 29: Typical damaged RockSoxx located along the drift line within the transition area between the high marsh and upland vegetative communities between Outfalls A and B.

Photo 30: Sparse vegetation present near the exposed GroSoxx located adjacent to Outfall C (facing northeast).

SITE INSPECTION LOG (CONTINUED)

Photo 31: Vegetation present on the western side of the BEP area. Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas (facing southeast).

Photo 32: Upland vegetation present on the eastern side of the BEP area (facing southwest). Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas.

SITE INSPECTION LOG (CONTINUED)

Photo 33: Upland vegetation present on the eastern side of the BEP area (facing southeast). Note the dormant, healthy, and vibrant vegetation in the upland areas.

Photo 34: Upland vegetation present on the eastern side of the BEP area (facing northeast). Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas.

SITE INSPECTION LOG (CONTINUED)

Photo 35: Upland vegetation present in the central portion of the BEP area (facing east). Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas.

Photo 36: Upland vegetation present on the western side of the BEP area (facing northwest). Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas.

SITE INSPECTION LOG (CONTINUED)

Photo 37: Upland vegetation present on the eastern side of the BEP area (facing north). Note the dormant, healthy, and vibrant vegetation in the high marsh and upland areas, but sparse vegetation in the low marsh zone.

ATTACHMENT A.2
JULY 23, 2021 INSPECTION LOG

SITE INSPECTION LOG

PROJECT NAME:	SA-7 Long-Term Monitoring Year 8	INSPECTION DATE:	July 23, 2021
		WEATHER	SNOWY ☐ RAINY ☐ OVERCAST ☐
PROJECT NUMBER:	1690012529	CONDITIONS:	PARTLY CLOUDY ☐ SUNNY ☒
PROJECT LOCATION:	SA-7 Droyers Cove BEP	TEMPERATURE (ºF):	86 ºF (High 87°F)
	City of Jersey City, Hudson County, NJ	PREVAILING WIND:	5-10 mph (NNE)
INSPECTOR NAME:	Owen Zalme/Alanna McLaughlin	INSPECTOR SIGNATURE(s):	
INSPECTOR TITLE:	Senior Consultant/ Consultant		

The inspection was conducted around the predicted low tide at 2:52 pm, when Cap Area 16, the entire BEP area (including the shoreline stabilization berm), and a portion of Cap Area 22 were exposed. **Figure 1** presents the location of the as-built BEP and cap areas described in the tables that follow.

TABLE 1. SEDIMENT CAP AREA INSPECTION LOG

CAP AREA	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
16	• Long-term monitoring plate was not observed (i.e., plate remains buried). • Depth to sediment surface measurements taken at reference posts indicate an average decrease in sediment deposition of 0.09 inches throughout the cap area (with losses of 0.7 inches in some areas and gains of up to 0.5 inches in others) since the May 29, 2019 inspection. o Note that the CO-required thickness for this area is 12 inches and thickness verification measurements of the shoreline fill portion of the area during construction ranged from 25 to 40.8 inches. Even considering maximum cumulative erosion measured (0.7 inches since May 2019) and minimum thickness, the existing thickness would be at least 24.3 inches.	1 to 3	• None
22	• Cap Area was partially exposed at low tide. • Long-term monitoring plate was not observed (i.e., plate remains buried). • Consistent with prior observations, on approximately 20% of the cap and concentrated in depressional areas, 2 to 3 inches of siltation was measured over the armor layer. • The establishment of sub-aquatic vegetation was observed across portions of the cap area.	4 to 5	• None

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG			
BEP AREA ELEMENT	**OBSERVATIONS**	**PHOTO(S) TAKEN**	**CORRECTIVE ACTION(S) REQUIRED**
SHORELINE STABILIZATION	• Shoreline stabilization appeared to be in good condition.	6	• None
OUTFALL RIPRAP APRONS	• Outfall A: Consistent with prior observations, areas of 6 to 12 inches of siltation were observed on the surface of the western portion of the riprap apron, with greater siltation in the upland portion than in the low marsh zone. • Outfalls B and C: Consistent with prior observations, approximately 1 to 3 inches of siltation (likely displaced shoreline fill) were observed throughout the riprap apron, especially in the vicinity of both outfalls. Approximately 3 to 4 inches of siltation was observed along the western edge of the Outfall B riprap apron. • Outfall D: Extension piping appeared to be in good condition.	7 to 10	• None
PLANTING ZONE A – LOW MARSH	• Overall total vegetative coverage in the vicinity of Outfall A increased slightly relative to April 2021 from 15-20%) to around 25%. However, coverage remained less than 5% elsewhere within the low marsh zone. Vegetative coverage continues to be better in the upper portion of the low marsh zone compared to conditions in the lower portion of the low marsh zone. o Fresh shoots of emergent growth were observed on the specimens present. Vegetation appeared healthy and vibrant in the highest elevation of the low marsh zone. Lower elevation areas appeared as mudflats with limited vegetation. o Evidence of goose browsing was observed, specifically on emergent specimens typically found in the lower elevations where plant cover is significantly less. o Consistent with prior observations, approximately 2 to 3 inches of siltation was observed over a small area of GroSoxx (approximately 2 SF) to the west of Outfall A. The GroSoxx in this area are completely covered by silt. o No invasive species were observed at the time of inspection. • Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 1.6 inches (with losses of up to 0.7 inches in some areas and gains of up to 9.0 inch in others) occurred since the May 29, 2019 inspection. • Coarse-grained material (sand, gravel, and cobbles) was observed on the surface of the shoreline fill material near Outfall D likely the result of fine washout from surficial materials.	11 to 15	• Continue monitoring erosional/depositional rates using reference posts during inspections. • Consider planting additional plugs in the low marsh areas where establishment remains low. In low elevation areas, consider clumping plugs for increased stability and to improve resistance to tidal energy.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED

PLANTING ZONE B – HIGH MARSH	• Overall total vegetative coverage increased since April 2021 from 65% to 85-90%.
	  o Vegetation appeared healthy with many new shoots present and signs of emergent growth throughout. Vegetation was generally 1.5 to 3 feet in height throughout. Observations suggest that new colonization occurred since April 2021.
	  o Consistent with observations since October 2019, an odor typically associated with an anoxic environment (e.g., bog, wetland, swamp, etc.) was noted when stepping on the GroSoxx on the central portion of the BEP area, east of Outfall A. No vegetative growth was observed at this location.
	  o Consistent with observations in April 2021, vegetative growth observed throughout the areas of GroSoxx located at the interface of the uplands transition area and high marsh zone, particularly near the outfalls increased. New emergent vegetative growth was observed in the lower half of the GroSoxx with evidence of new colonization.
	• Observations regarding the condition of the GroSoxx, geogrid, and anchors were consistent with those made since October 2019:
	  o Empty GroSoxx sleeves were observed outside of the geogrid.
	  o There were several areas where ripping/holes or loose geogrid were observed.
	  o Several anchors (both the Gripple Rock and Terra-Lock™ Earth anchors) showed signs of significant uplift (possibly due to the deflation of the GroSoxx), though none were fully lifted out of the ground.
	  o Significant shifting of GroSoxx underneath the geogrid occurred, and the third row of GroSoxx (from the bottom) appeared to be mostly missing.
	  o Significant siltation was observed over the GroSoxx located on the western side of Outfall A, with many of the GroSoxx completely buried up to the drift line.
	• Observations regarding the condition of the RockSoxx installed along the interface of the upland transition area and high marsh zone in the central portion of the BEP area (between Outfalls A and B, and just north of Outfall C) were consistent with those made during prior inspections:
	  o Some of the RockSoxx showed signs of wear and tear, with holes on the surface that could potentially result in loss of the material within.
	  o Large cuts/openings were observed in several RockSoxx in the central portion of the BEP area, primarily between Outfalls A and B.
	• No invasive species were observed at the time of inspection.
	• A small amount of debris (e.g. vegetative waste, plastic, trash, consumables) was observed along the drift deposit line below the bottom row of GroSoxx, consistent with observations made during prior inspections.
	• Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 0.7 inches (with losses of up to 0.1 inches and gains of up to 2.1 inches in others) since the May 29, 2019 inspection.
	• Consistent with observations during prior inspections, coarse-grained material (sand, gravel, and cobbles) was observed on the surface of the shoreline fill material, especially near Outfall D.
		16 to 26	• Continue monitoring erosional/depositional rates using reference posts during inspections.
			• Repair or replace the damaged RockSoxx.
			• Consider planting plugs in the areas with exposed geogrid, where soil has filled in over previously installed GroSoxx to increase rate of colonization.
			• Consider implementing options to repair the high marsh zone (generally within the drift line) where vegetation is not successfully establishing and the GroSoxx appear to be saturated and in some cases “emptying out”.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
PLANTING ZONE C – UPLANDS TRANSITION AREA	• Overall vegetative coverage remained approximately the same relative to April 2021, estimated around 85-95% throughout the BEP area. Consistent with prior observations: o Many of the emergent shoots of vegetation previously observed were much more established. o GroSoxx, geogrid, anchors, and the ¾-inch stone strip appeared to be in good condition, despite the conditions observed in the high marsh zone. • Invasive species coverage increased slightly since the observations made in April 2021 from 5%, to 510%. Observed invasive species included a white mulberry tree (*Morus alba*) growing in the central portion of the BEP area and a small cluster of common reed (*Phragmites australis*) approximately 3 feet in diameter located in the area northeast of Outfall C. A small 8 by 30 foot band of lawn grass was observed west of Outfall A. Additional observed invasive species included: o white hairy vetch (*Vicia villosa*) o common mugwort (*Artemisia vulgaris*) o Yellow bushclover (*Lespedeza cuneata*) o purple loosestrife (*Lythrum salicaria*) o red clover (*Trifolium pratense*) o velvet leaf (*Abutilon theophrasti*) o bird's-foot trefoil (*Lotus corniculatus*) o hedge bindweed (*Calystegia sepium*) • A predominantly native community of spartina and native grasses has been established. In addition, the following notable native species were also observed: o purpletop grass (*Tridens flavus*) o Swamp milkweed (*Asclepias incarnata*) o Creeping saltbush (*Atriplex prostrata*) o Deer tongue (*Dichanthelium clandestinum*) o Black-eyed Susan (*Rudbeckia hirta*) o Wild carrot (*Daucus carota*) o Switchgrass (*Panicum virgatum*); and o False sunflower (*Heliopsis helianthoides*) • Consistent with observations made in April 2021, evidence of tidal drift deposits was observed lining the lower extent of the GroSoxx, at the boundary with the high marsh zone.	27 to 32	• None

Note:

All snow fencing and waterfowl exclusion measures (i.e., string) installed around and within the BEP area were removed by Wood PLC on June 22, 2021. The posts, which had been left in place were removed following the July inspection; however, 14 posts were left in place to allow for the continuation of the sedimentation depth measurements.

SITE INSPECTION LOG (CONTINUED)

Photo 1: Northern end of Cap Area 16. Note vibrance of vegetation present in upland and high marsh planting zones (facing southwest). All snow fencing and waterfowl exclusion measures have been removed but posts remain.

Photo 2: Western end of Cap Area 16. Note limited vegetative growth in low marsh zone and that all snow fencing and waterfowl exclusion measures have been removed but posts remained (facing northeast).

SITE INSPECTION LOG (CONTINUED)

Photo 3: Cap Area 16 viewed from SA-6S bulkhead (facing south).

Photo 4: Cap Area 22 (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 5: Cap Area 22 (facing northeast).

Photo 6: Shoreline stabilization along the central portion of the BEP area (facing northwest). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained at the time of the inspection.

SITE INSPECTION LOG (CONTINUED)

Photo 7: Discharge area of Outfalls B and C (facing northwest). Note that all snow fencing had been removed, but posts remained in place at the time of the inspection.

Photo 8: Outfalls B and C located in the central portion of the BEP area (facing southeast).

SITE INSPECTION LOG (CONTINUED)

Photo 9: View of the western side of the BEP area from the Outfall A discharge area (facing northwest). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained.

Photo 10: Outfall A and the debris screen (facing south).

SITE INSPECTION LOG (CONTINUED)

Photo 11: Limited vegetation present throughout the low marsh zone (facing southwest). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained.

Photo 12: Limited vegetation present throughout the low marsh zone (facing northwest). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained.

SITE INSPECTION LOG (CONTINUED)

Photo 13: Limited vegetation present in the low marsh zone located between Outfalls A and B (facing southeast). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained.

Photo 14: Example of the limited vegetation present in the low marsh zone located between Outfalls A and B.

SITE INSPECTION LOG (CONTINUED)

Photo 15: Vegetation present in the low marsh zone from the western side of the BEP area (facing northwest). Note that all snow fencing and waterfowl exclusion measures have been removed but posts remained.

Photo 16: Vegetation on the eastern side of the BEP area. Note the healthy and vibrant vegetation in the uplands and high marsh zones, but limited growth in the low marsh zone (facing southwest).

SITE INSPECTION LOG (CONTINUED)

Photo 17: Vegetation on the eastern side of the BEP area. Note the healthy and vibrant vegetation in the uplands and high marsh zones, but limited growth in the low marsh zone and that all snow fencing and waterfowl exclusion measures have been removed but posts remained (facing southwest).

Photo 18: Sparse vegetation present near the exposed geogrid located in the eastern portion of the BEP area near Outfall C (facing southwest).

SITE INSPECTION LOG (CONTINUED)

Photo 19: Exposed geogrid and RockSoxx in the high marsh zone of the central portion of the BEP area between Outfalls A and B (facing east).

Photo 20: Sparse vegetation present near the exposed RockSoxx located in the central portion of the BEP area between Outfalls A and B. Note the damaged RockSoxx.

SITE INSPECTION LOG (CONTINUED)

Photo 21: Exposed geogrid and RockSoxx in the high marsh zone of the central portion of the BEP area between Outfalls A and B (facing west).

Photo 22: Improved vegetative growth in lower portion of GroSoxx near Outfall A and exposed geogrid/RockSoxx. Note that all waterfowl exclusion measures have been removed but posts remain in place (facing east).

SITE INSPECTION LOG (CONTINUED)

Photo 23: Partially buried and sparsely vegetated GroSoxx near Outfall A to the right, healthy and vibrant upland vegetation pictured left (facing northwest).

Photo 24: Typical damaged RockSoxx located along the drift line within the transition area between the high marsh and upland vegetative communities between Outfalls A and B.

SITE INSPECTION LOG (CONTINUED)

Photo 25: Sparse vegetation present near the exposed geogrid and RockSoxx located adjacent to Outfall C (facing southeast).

Photo 26: Vegetation present on the western side of the BEP area (facing southeast). Note the healthy and vibrant vegetation in the high marsh and upland zones and removed snow fencing and waterfowl exclusion measures.

SITE INSPECTION LOG (CONTINUED)

Photo 27: Swamp Milkweed present in the upland transition zone on the western side of the BEP area.

Photo 28: Black-eyed Susan present in the upland transition zone in the central portion of the BEP area.

SITE INSPECTION LOG (CONTINUED)

Photo 29: Upland vegetation present on the eastern side of the BEP area (facing northeast). Note the healthy and vibrant vegetation in the high marsh and upland zones and removed waterfowl exclusion measures.

Photo 30: Upland (right) and high marsh vegetation in the central portion of the BEP area (facing east). Note the healthy and vibrant vegetation in the high marsh / upland zones and removed waterfowl exclusion measures.

SITE INSPECTION LOG (CONTINUED)

Photo 31: Upland (left) and high marsh vegetation on the western side of the BEP area (facing west). Note the healthy and vibrant vegetation in the high marsh / upland zones and removed waterfowl exclusion measures.

Photo 32: Upland vegetation (background) present on the eastern side of the BEP area (facing south). Note the healthy and vibrant vegetation in the high marsh and upland zones.

ATTACHMENTA.3
OCTOBER 6, 2021 INSPECTION LOG

SITE INSPECTION LOG

PROJECT NAME:	SA-7 Long-Term Monitoring Year 8	INSPECTION DATE:	October 6, 2021
		WEATHER	SNOWY ☐ RAINY ☐ OVERCAST ☐
PROJECT NUMBER:	1690012529	CONDITIONS:	PARTLY CLOUDY ☐ SUNNY ☒
PROJECT LOCATION:	SA-7 Droyers Cove BEP	TEMPERATURE (ºF):	67 ºF (High 71°F)
	City of Jersey City, Hudson County, NJ	PREVAILING WIND:	0-5 mph (NNE)
INSPECTOR NAME:	Owen Zalme/Adrian Ezeagu	INSPECTOR SIGNATURE(s):	
INSPECTOR TITLE:	Senior Consultant/Senior Consultant		

The inspection was conducted around the predicted low tide at 3:27 pm, when Cap Area 16, the entire BEP area (including the shoreline stabilization berm), and a portion of Cap Area 22 were exposed. **Figure 1** presents the location of the as-built BEP and cap areas described in the tables that follow. On September 1, 2021 the remnants of Hurricane Ida resulted in damages to the BEP area due to excessive runoff from Kellogg Street. A post-storm inspection was performed on September 21, 2021 to document conditions within the BEP following the storm event. The results of the post-storm inspection are documented within this inspection report.

TABLE 1. SEDIMENT CAP AREA INSPECTION LOG

CAP AREA	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
16	• Long-term monitoring plate was not observed (i.e., plate remains buried). • Depth to sediment surface measurements taken at reference posts located with Cap Area 16 indicated an average increase in sediment bed elevation of 0.2 inches throughout the cap area (with losses of 0.9 inches in some areas and gains of up to 1.3 inches in others) since the May 29, 2019 inspection. – Note that the CO-required thickness for this area is 12 inches and thickness verification measurements of the shoreline fill portion of the area during construction ranged from 25 to 40.8 inches. Even considering maximum cumulative erosion measured (0.9 inches since May 2019) and minimum thickness, the existing thickness would be at least 23.1 inches.	1 to 3	• None
22	• Cap Area was partially exposed at low tide. • Long-term monitoring plate was not observed (i.e., plate remains buried). • Consistent with prior observations, on approximately 20% of the cap and concentrated in depressional areas, 2 to 3 inches of siltation was measured over the armor layer. • The establishment of sub-aquatic vegetation was observed across portions of the cap area.	4 to 6	• None

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG			
BEP AREA ELEMENT	**OBSERVATIONS**	**PHOTO(S) TAKEN**	**CORRECTIVE ACTION(S) REQUIRED**
SHORELINE STABILIZATION	• Shoreline stabilization was damaged by the September 2020 storm event. Specifically, – Approximately 65 linear feet of shoreline stabilization stone, located on the eastern side of the BEP near Outfall D, washed out. – Several areas of exposed geofabric were observed between the BEP fill material and the shoreline stabilization stone.	7 to 8	• Repair shoreline stabilization stone on the eastern side of the BEP (near Outfall D) . • Cut or cover exposed geofabric located between the BEP fill material and the shoreline stabilization stone.
OUTFALL RIPRAP APRONS	• The outfalls were damaged by the September 2020 storm event. Specifically, – Outfall A: Approximately 8 linear feet of the stone edge on the southwest side of the outfall's apron was displaced. – Outfalls B and C: Consistent with prior observations, approximately 1 to 3 inches of siltation (likely displaced shoreline fill) were observed throughout the riprap apron, especially in the vicinity of both outfalls. Approximately 3 to 4 inches of siltation was observed along the western edge of the Outfall B riprap apron. However, approximately 15 linear feet of the stone edge along the northwest corner of the apron was displaced. – Outfall D: The outfall makes a 90-degree turn near the southernmost corner of the bulkhead at the terminus of Kellogg Street. A significant area of erosion approximately 20 square feet and 4 feet deep was observed at this location, exposing the pipe. The stone around the pipe in this area was washed out and scatted in the low marsh planting zone on the eastern side of the BEP. Although outside of the BEP area, an approximately 65 ft long, 1 to 1.5 feet deep and 1 to 2 feet wide scour channel was observed in sediments at the discharge of the outfall.	9 to 15	• Repair the damages to outfall areas and fill scour hole at the elbow of Outfall D.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
PLANTING ZONE A – LOW MARSH	• Overall total vegetative coverage in the vicinity of Outfall A remained consistent with the July 2021 inspection (25% vegetative cover). However, coverage remained less than 5% elsewhere within the low marsh zone. Vegetative coverage continues to be better in the upper portion of the low marsh zone compared to conditions in the lower portion of the low marsh zone. – Significant new growth was observed on the specimens present within the low marsh planting zone. Vegetation appeared healthy and vibrant in the highest elevation of the low marsh zone, although the observed specimens were beginning to enter their dormant stage at the time of the inspection. Lower elevation areas appeared as mudflats with limited vegetation. – In the area of erosion located on the eastern side of the BEP caused by the September 2020 storm event (near Outfall D), many of the low marsh plants were fully uprooted and or displaced. Outside of this area many of the planted specimens appeared unaffected by the storm event. – Consistent with prior observations, approximately 2 to 3 inches of siltation was observed over a small area of GroSoxx (approximately 2 SF) to the west of Outfall A. The GroSoxx in this area are completely covered by silt. – No invasive species were observed at the time of inspection. • Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 1.7 inches (with losses of up to 0.9 inches and gains of up to 9.5 inches in others) since the May 29, 2019 inspection. Note that monitoring post #8 was removed along with the goose exclusion measures from the BEP. • The September 2020 storm event resulted in surface erosional damage across approximately 1300 square feet in the northernmost portion of the low marsh and, to a lesser extent, the high marsh. The damage to this area appears to be the result of excessive runoff from Kellogg Street.	16 to 20	• Continue monitoring erosional/depositional rates using reference posts during inspections. • Repair eroded areas. • Replace plugs that were uprooted or lost, primarily in the eroded area on the eastern side of the BEP. • Consider planting additional plugs in the low marsh areas where establishment remains low. In low elevation areas, consider clumping plugs for increased stability and to improve resistance to tidal energy.

SITE INSPECTION LOG (CONTINUED)

PLANTING ZONE B – HIGH MARSH	• Overall total vegetative coverage Remains consistent with the July 2021 inspection, with vegetive cover ranging from 85 to 90%. – Significant new growth was observed on the specimens present within the high marsh planting zone. Vegetation was generally greater than 3 feet in height throughout. Observations suggest that new colonization occurred since July 2021. – Consistent with observations since October 2019, an odor typically associated with an anoxic environment (e.g., bog, wetland, swamp, etc.) was noted when stepping on the GroSoxx on the central portion of the BEP area, east of Outfall A. No vegetative growth was observed at this location. – Consistent with observations in July 2021, vegetative growth observed throughout the areas of GroSoxx located at the interface of the uplands transition area and high marsh zone, particularly near the outfalls increased. Significant vegetative growth was observed in the lower half of the GroSoxx with evidence of new colonization. – Much of the high marsh zone appears to have been largely unaffected by the September 2022 storm event, with the exception of the eastern side of the BEP where many of the planted plugs were uprooted and/or have exposed roots. Outside of this area many of the planted specimens appeared unaffected by the storm event. • Observations regarding the condition of the GroSoxx, geogrid, and anchors were consistent with those made since October 2019: – Empty GroSoxx sleeves were observed outside of the geogrid. – There were several areas where ripping/holes or loose geogrid were observed. – Several anchors (both the Gripple Rock and Terra-Lock™ Earth anchors) showed signs of significant uplift (possibly due to the deflation of the GroSoxx), though none were fully lifted out of the ground. – Significant shifting of GroSoxx underneath the geogrid occurred, and the third row of GroSoxx (from the bottom) appeared to be mostly missing. – Significant siltation was observed over the GroSoxx located on the western side of Outfall A, with many of the GroSoxx completely buried up to the drift line. • Observations regarding the condition of the RockSoxx installed along the interface of the upland transition area and high marsh zone in the central portion of the BEP area (between Outfalls A and B, and just north of Outfall C) were consistent with those made during prior inspections: – Some of the RockSoxx showed signs of wear and tear, with holes on the surface that could potentially result in loss of the material within. – Large cuts/openings were observed in several RockSoxx in the central portion of the BEP area, primarily between Outfalls A and B. • No invasive species were observed at the time of inspection. • Large amounts of debris (e.g., vegetative waste, plastic, trash, consumables) was observed along the drift deposit line (i.e., the transition zone between high marsh and uplands) below the bottom row of GroSoxx, especially on the eastern side of the BEP. • Depth to sediment surface measurements taken at reference posts indicate that an average increase in sediment deposition of 0.5 inches (with losses of up to 0.6 inches and gains of up to 2.1 inches in others) since the May 29, 2019 inspection. • The September 2020 storm event resulted in surface erosional damage across approximately 1300 square feet in the northernmost portion of the low marsh and, to a lesser extent, the high marsh. The damage to this area appears to be the result of excessive runoff from Kellogg Street. Additionally, there is large stone and gravel scattered throughout much of this area.	21 to 26	• Continue monitoring erosional/depositional rates using reference posts during inspections. • Repair eroded areas. • Replace plugs that were uprooted or lost, primarily in the eroded area on the eastern side of the BEP. • Repair or replace the damaged RockSoxx. • Consider planting plugs in the areas with exposed geogrid, where soil has filled in over previously installed GroSoxx to increase rate of colonization. • Consider implementing options to repair the high marsh zone (generally within the drift line) where vegetation is not successfully establishing and the GroSoxx appear to be saturated and in some cases “emptying out”.

SITE INSPECTION LOG (CONTINUED)

TABLE 2. BENEFICIAL ENVIRONMENTAL PROJECT AREA INSPECTION LOG

BEP AREA ELEMENT	OBSERVATIONS	PHOTO(S) TAKEN	CORRECTIVE ACTION(S) REQUIRED
PLANTING ZONE C – UPLANDS TRANSITION AREA	• Overall vegetative coverage remained approximately the same relative to July 2021, estimated around 85 to 95% throughout the BEP area. Consistent with prior observations: – Many of the emergent shoots of vegetation previously observed were much more established. – GroSoxx, geogrid, anchors, and the ¾-inch stone strip appeared to be in good condition, despite the conditions observed in the high marsh zone. – Much of the upland transition area appears to have been largely unaffected by the high-energy event, with the exception of the wash out area located on the eastern side of the BEP. Within this eroded area many of the planted plugs have become uprooted and or have exposed roots because the fill material washed away. Outside of this area many of the planted specimens appeared unaffected by the storm event. • Invasive species coverage remains consistent with the July 2021 inspection with invasive cover ranging from 5% to 10%. Observed invasive species included a white mulberry tree (*Morus alba*) growing in the central portion of the BEP area and a small cluster of common reed (*Phragmites australis*) approximately 3 feet in diameter located in the area northeast of Outfall C. A small 8 by 30 foot band of lawn grass was observed west of Outfall A. Additional observed invasive species included: – white hairy vetch (*Vicia villosa*) – common mugwort (*Artemisia vulgaris*) – Yellow bushclover (*Lespedeza cuneata*) – purple loosestrife (*Lythrum salicaria*) – red clover (*Trifolium pratense*) – velvet leaf (*Abutilon theophrasti*) – bird's-foot trefoil (*Lotus corniculatus*) – hedge bindweed (*Calystegia sepium*) • A predominantly native community of spartina and native grasses has been established. In addition, the following notable native species were also observed: – purpletop grass (*Tridens flavus*) – Creeping saltbush (*Atriplex prostrata*) – Deer tongue (*Dichanthelium clandestinum*) – Black-eyed Susan (*Rudbeckia hirta*) – Wild carrot (*Daucus carota*) – Switchgrass (*Panicum virgatum*); and – False sunflower (*Heliopsis helianthoides*) • Significant erosion and scouring of sediment was observed on the eastern side of the BEP, where the washout from Kellogg Street occurred. Damage in this area primarily consists of a 4 foot deep scour hole (approximately 5 feet by 5 feet wide) located in the northeast corner of the upland zone and BEP. Additionally, there is large stone and gravel scattered throughout much of this area.	27 to 31	• Repair eroded areas. • Replace plugs that were uprooted or lost, primarily in the eroded area on the eastern side of the BEP.

Note:

SITE INSPECTION LOG (CONTINUED)

Photo 1: Northern end of Cap Area 16. Note vibrant vegetation present in high marsh planting zone (facing west).

Photo 2: Central portion of Cap Area 16. Note limited vegetation present in low marsh zone (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 3: Western end of Cap Area 16. Note vibrant vegetation present in high marsh planting zone (facing northeast).

Photo 4: Cap Area 22 (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 5: Cap Area 22 (facing west).

Photo 6: Siltation and subaquatic vegetation observed on Cap Area 22.

SITE INSPECTION LOG (CONTINUED)

Photo 7: Eroded area located on the eastern side of the BEP near Outfall D (facing northeast). Note the shoreline stabilization stone scattered throughout and the exposed geotextile.

Photo 8: Shoreline stabilization stone located east of Outfalls B and C (facing southwest). Note the exposed geotextile fabric between the shoreline stabilization stone and the BEP fill material (facing southwest).

SITE INSPECTION LOG (CONTINUED)

Photo 9: Moderate scouring observed in the western side (i.e., right side) of Outfall A (facing southwest)

Photo 10: Missing armoring observed along the western edge if the apron for Outfalls B and C (facing northeast). Stone was pushed into the nearby BEP fill material..

SITE INSPECTION LOG (CONTINUED)

Photo 11: Outfalls B and C (facing southeast). Note the siltation present on the stone which lines the apron.

Photo 12: Scour channel was observed in sediments at the discharge of the Outfall D (facing east).

SITE INSPECTION LOG (CONTINUED)

Photo 13: Eroded area located in the eastern corner of the BEP at the Outfall D (facing southeast). Note the displaced shoreline stabilization stone and erosion throughout.

Photo 14: Large area of erosion located in the easternmost corner of the BEP area (facing southeast). Note the area of erosion is approximately 4-ft deep.

SITE INSPECTION LOG (CONTINUED)

Photo 15: Exposed Outfall D pipe within 4-foot-deep scour hole located near the southeast corner of the BEP along the bulkhead.

Photo 16: Vegetation present in the low marsh planting zone within Cap Area 16 (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 17: Area where the low marsh planting zone meets the high marsh planting zone within the eastern side of the BEP (facing northeast). Note the significant amount of debris and uprooted plant material.

Photo 18: Low marsh planting zone within Cap Area 16 (facing northeast).

SITE INSPECTION LOG (CONTINUED)

Photo 19: Low marsh planting zone between Outfalls A and C (facing west). Note the vibrant and healthy vegetation within the adjacent high marsh planting zone.

Photo 20: Stunted low marsh vegetation near Outfall A (facing north). Note the vibrant and healthy vegetation within the adjacent high marsh planting zone.

SITE INSPECTION LOG (CONTINUED)

Photo 21: Vibrant and healthy vegetation within the high marsh and the upland transition area (featured left) within Cap Area 16 (facing southwest).

Photo 22: Vibrant and healthy vegetation within the high marsh and the upland transition area between Outfalls A and B (facing south).

SITE INSPECTION LOG (CONTINUED)

Photo 23: High marsh plantings on the western side of the BEP (facing west). Note the vibrant and health vegetation and exposed geotextile fabric between the shoreline stabilization stone and the BEP fill material.

Photo 24: Vibrant and healthy vegetation within the high marsh and the upland transition area (featured left) within Cap Area 16 (facing southwest). Note the debris present along the drift line in the high marsh planting zone.

SITE INSPECTION LOG (CONTINUED)

Photo 25: Area of exposed Grosoxx and geogrid located east of Outfall C (facing south).

Photo 26: Area of exposed Grosoxx and geogrid between Outfalls A and B. Note the debris scattered throughout the geogrid.

SITE INSPECTION LOG (CONTINUED)

Photo 27: Vibrant and healthy upland transitional and high marsh (featured left) vegetation between Outfalls A and B (facing east).

Photo 28: Vibrant and healthy upland transitional and high marsh (featured right) vegetation near Outfall A (facing northwest).

SITE INSPECTION LOG (CONTINUED)

Photo 29: Vibrant and healthy high marsh and upland transitional (featured right) vegetation located east of Outfall C (facing northeast).

Photo 30: Native aster located within the upland transitional planting zone within the BEP.

SITE INSPECTION LOG (CONTINUED)

Photo 31: Black-eyed Susan located within the upland transitional planting zone of the BEP.

ATTACHMENT B
YEAR 8 HYDRAULIC AND HYDRODYNAMIC EVALUATION SUMMARIES

ATTACHMENT B.1
Q1 2021 HYDRAULIC AND HYDRODYNAMIC EVALUATION SUMMARIES

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **January 2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 0.68 Date: 1/1/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 0.793 Date: 1/16/2021 Time: 5:00 Exceeds event trigger criteria? YES Max Tide Gauge Reading (m): 1.35 Date: 1/16/2021 Time: 15:00 Exceeds event trigger criteria? NO 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 36 Date: 1/29/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: NW OK	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: JY

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

```
000
CXUS51 KOKX 011010
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     JANUARY
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  39  27  33   1  32   0 0.68    T    0  6.0 16 350   M    M   7 14     20 120
 2  53  34  44  12  21   0 0.04  0.0    0 12.0 28 280   M    M   8 1      41 270
 3  38  32  35   3  30   0 0.23  0.2    0 10.9 16  20   M    M  10 14     20  10
 4  46  34  40   8  25   0 0.02    T    0  8.9 15 360   M    M   8 14     18 330
 5  42  36  39   7  26   0 0.00  0.0    0  8.3 14 330   M    M  10 8      19 310
 6  43  32  38   6  27   0 0.00  0.0    0 12.4 25 310   M    M   6        33 300
 7  44  31  38   6  27   0 0.00  0.0    0 12.2 18 340   M    M   1        25 340
 8  39  26  33   1  32   0 0.00  0.0    0 10.3 20 360   M    M   6        24  10
 9  39  23  31  -1  34   0 0.00  0.0    0 13.3 22 360   M    M   5        28 360
10  44  27  36   4  29   0 0.00  0.0    0  7.8 15 350   M    M   4        18 350
11  38  25  32   1  33   0 0.00  0.0    0  2.7  8 350   M    M   7        10 290
12  46  25  36   5  29   0 0.00  0.0    0  4.3 12  20   M    M   4 8      13  20
13  45  31  38   7  27   0 0.00  0.0    0  5.3 18 270   M    M   8        25 270
14  50  33  42  11  23   0 0.00  0.0    0  4.0 12 360   M    M   8 8      14 330
15  47  32  40   9  25   0 0.61  0.0    0  9.2 20  90   M    M   9 138    30  90
16  48  37  43  12  22   0 0.62  0.0    0 11.3 26  70   M    M   8 1      35  70
17  44  34  39   8  26   0 0.00  0.0    0 14.4 28 270   M    M   6        34 280
18  47  32  40   9  25   0 0.00  0.0    0 12.4 23 250   M    M   5        28 280
19  43  31  37   6  28   0    T    T    0 12.4 25 270   M    M   5        34 250
20  41  27  34   3  31   0 0.01  0.3    T 11.0 29 310   M    M   7 1      37 280
21  43  22  33   2  32   0 0.00  0.0    0  6.5 22 230   M    M   5        26 240
22  48  30  39   8  26   0 0.00  0.0    0 10.7 25 270   M    M   6        31 270
23  36  24  30  -2  35   0 0.00  0.0    0 19.0 31 300   M    M   4        40 300
24  34  22  28  -4  37   0 0.00  0.0    0 15.1 25 300   M    M   5        35 330
25  41  23  32   0  33   0 0.00  0.0    0  6.7 14  10   M    M   8        18 310
26  35  31  33   1  32   0 0.15  0.5    0  8.0 17 290   M    M  10 14     19  70
27  38  30  34   2  31   0    T    T    0 11.7 22 320   M    M   9 1      28 330
28  35  21  28  -4  37   0 0.00  0.0    0 18.9 35 330   M    M   5        41 330
29  27  16  22 -10  43   0 0.00  0.0    0 20.7 36 310   M    M   3        47 310
30  34  16  25  -7  40   0 0.00  0.0    0 11.7 22 320   M    M   2        27 320
31  26  19  23  -9  42   0 0.14  2.2    0  9.4 20  40   M    M   9 1      24  40
==============================================================================
SM 1273  863       940   0  2.50  3.2    327.5          M      198
==============================================================================
AV 41.1 27.8                             10.6 FASTST   M    M   6    MAX(MPH)
                                MISC ---->    36 310                47 310
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210101&edate=20210201&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **February 2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 1.44 Date: 2/1/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 1.15 Date: 2/1/2021 Time: 21:00 Exceeds event trigger criteria? YES Max Tide Gauge Reading (m): 1.59 Date: 2/2/2021 Time: 5:00 Exceeds event trigger criteria? YES 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 36 Date: 2/6/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: WSW OK	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: JY

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

000
CXUS51 KOKX 011559
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: NEWARK NJ
MONTH: FEBRUARY
YEAR: 2021
LATITUDE: 40 42 N
LONGITUDE: 74 10 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	31	22	27	-5	38	0	1.44	15.1	5	20.9	32	10	M	M	10	149	41	30
2	34	30	32	0	33	0	0.06	0.4	17	16.4	24	350	M	M	10	19	32	360
3	37	29	33	1	32	0	0.02	0.5	17	11.6	23	330	M	M	9	1	30	310
4	43	30	37	4	28	0	0.00	0.0	14	10.1	21	340	M	M	4		27	310
5	48	31	40	7	25	0	0.08	T	11	9.0	28	270	M	M	8	1	36	270
6	44	28	36	3	29	0	0.00	0.0	9	10.2	36	240	M	M	5		46	240
7	36	25	31	-2	34	0	0.30	5.7	7	9.5	24	310	M	M	8	1	30	300
8	29	16	23	-10	42	0	0.00	0.0	12	7.7	20	310	M	M	3		28	290
9	33	22	28	-6	37	0	T	0.0	11	8.0	17	10	M	M	8	16	19	10
10	35	21	28	-6	37	0	0.01	0.1	11	5.9	13	270	M	M	7		20	290
11	33	25	29	-5	36	0	0.11	2.3	13	10.0	17	350	M	M	10	1	23	320
12	31	16	24	-10	41	0	0.00	0.0	12	7.6	16	350	M	M	9		20	320
13	28	23	26	-8	39	0	T	0.0	11	12.5	18	10	M	M	10	6	24	350
14	38	26	32	-2	33	0	T	0.0	10	8.7	15	20	M	M	9	6	18	10
15	34	31	33	-2	32	0	0.01	0.0	8	10.0	16	20	M	M	10	18	19	10
16	51	33	42	7	23	0	0.84	0.0	5	13.0	32	260	M	M	8	1	40	250
17	33	22	28	-7	37	0	0.00	0.0	3	10.1	24	320	M	M	6		30	330
18	29	24	27	-8	38	0	0.48	4.0	1	12.2	21	360	M	M	10	1468	25	350
19	33	27	30	-5	35	0	0.07	1.3	4	10.8	20	20	M	M	10	16	23	20
20	35	26	31	-5	34	0	0.00	0.0	4	13.1	24	280	M	M	6		32	270
21	37	21	29	-7	36	0	0.00	0.0	3	7.6	17	340	M	M	2		20	330
22	37	28	33	-3	32	0	0.54	1.2	2	7.4	20	260	M	M	10	12	25	250
23	45	33	39	3	26	0	T	0.0	1	10.2	20	250	M	M	8	18	26	240
24	54	33	44	8	21	0	0.00	0.0	T	10.7	20	190	M	M	4		26	190
25	50	37	44	7	21	0	0.00	0.0	0	12.4	25	320	M	M	3		37	290
26	46	33	40	3	25	0	0.00	0.0	0	6.5	14	350	M	M	7		17	110
27	51	37	44	7	21	0	0.37	0.0	0	7.2	22	250	M	M	8	1	27	270
28	46	38	42	4	23	0	0.32	0.0	0	5.6	13	30	M	M	10	1	16	30
SM	1081	767		888		0	4.65	30.6		284.9			M		212			
AV	38.6	27.4								10.2	FASTST		M	M	8		MAX(MPH)	
								MISC ---->			36	240					46	240

https://w2.weather.gov/climate/index.php?wfo=okx

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210201&edate=20210301&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **March** **2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 1.35 Date: 3/24/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 0.487 Date: 3/28/2021 Time: 22:00 Exceeds event trigger criteria? NO Max Tide Gauge Reading (m): 1.331 Date: 3/29/2021 Time: 1:00 Exceeds event trigger criteria? NO 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 44 Date: 3/26/2021 Exceeds trigger criteria? YES Wind direction over 6-hr period: W OK Note: (1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: JY

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

```
253
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     MARCH
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:     SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  49  32  41   3  24   0 0.18  0.0    0 13.9 36 300   M    M   8 18     50 300
 2  35  21  28 -10  37   0 0.00  0.0    0 17.5 35 290   M    M   2        48 290
 3  52  27  40   2  25   0 0.00  0.0    0 10.9 21 230   M    M   3        26 240
 4  46  27  37  -1  28   0 0.00  0.0    0 16.1 31 310   M    M   4        41 290
 5  39  23  31  -8  34   0 0.00  0.0    0 16.2 29 310   M    M   2        37 300
 6  37  28  33  -6  32   0    T    T    0 12.4 26 330   M    M   7        33 320
 7  43  28  36  -3  29   0 0.00  0.0    0 11.6 18 320   M    M   4        25 320
 8  45  25  35  -5  30   0 0.00  0.0    0  8.8 17 290   M    M   2        22 280
 9  66  37  52  12  13   0 0.00  0.0    0 11.8 21 310   M    M   5        27 320
10  52  35  44   4  21   0 0.00  0.0    0  6.6 17 140   M    M   5        23 140
11  75  44  60  20   5   0 0.00  0.0    0  6.6 18 240   M    M   8 128    23 230
12  71  53  62  21   3   0    T  0.0    0 14.5 29 290   M    M   7        40 310
13  53  33  43   2  22   0 0.00  0.0    0 15.4 35 340   M    M   1        52 270
14  56  31  44   3  21   0 0.00  0.0    0 19.6 39 320   M    M   3        49 320
15  41  24  33  -9  32   0 0.00  0.0    0 18.0 33 330   M    M   3        43 320
16  38  28  33  -9  32   0 0.01    T    0  6.6 10  20   M    M   9 4      15 100
17  46  35  41  -1  24   0 0.00  0.0    0  5.4 10  20   M    M  10        13  10
18  46  41  44   1  21   0 0.67  0.0    0  9.6 26  20   M    M  10 1      34  20
19  46  33  40  -3  25   0 0.06    T    0 18.7 35 360   M    M   6 1      43  10
20  60  30  45   2  20   0 0.00  0.0    0  5.1 13 290   M    M   0        16 290
21  63  34  49   5  16   0 0.00  0.0    0  3.7 10 150   M    M   2        16  80
22  59  35  47   3  18   0 0.00  0.0    0  4.7 14 140   M    M   1        18 150
23  64  38  51   7  14   0 0.00  0.0    0  5.8 12  20   M    M   6 18     14 150
24  58  45  52   7  13   0 1.35  0.0    0  6.8 15 100   M    M  10 1      20 100
25  67  51  59  14   6   0 0.01  0.0    0  6.5 15 250   M    M  10 1      19 260
26  84  51  68  23   0   3 0.10  0.0    0 17.0 44 260   M    M   6 1      59 260
27  69  50  60  14   5   0 0.00  0.0    0  8.0 20 310   M    M   5        26 310
28  66  50  58  12   7   0 0.54  0.0    0  8.7 38 300   M    M   9 1      50 300
29  57  43  50   4  15   0 0.00  0.0    0 17.0 35 300   M    M   4        45 290
30  61  35  48   1  17   0 0.00  0.0    0  7.6 17 140   M    M   2        24 150
31  69  49  59  12   6   0 0.28  0.0    0  6.5 16 190   M    M   9 1      23 170
==============================================================================
SM 1713 1116       595   3  3.20    T    337.6          M      163
==============================================================================
AV 55.3 36.0                                10.9 FASTST   M    M   5    MAX(MPH)
                                MISC ---->    44 260                  59 260
==============================================================================
```

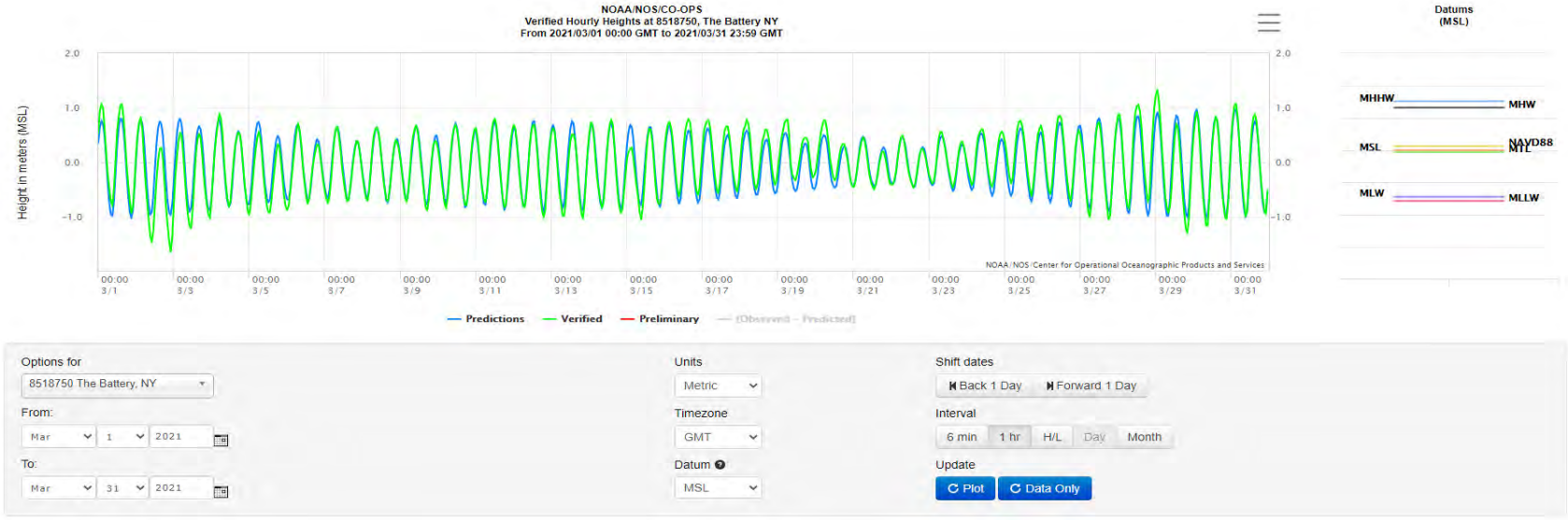
https://w2.weather.gov/climate/index.php?wfo=okx

Daily Observations

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
12:17 PM	76 °F	62 °F	62 %	SW	21 mph	33 mph	29.60 in	0.0 in	Mostly Cloudy / Wind
12:51 PM	80 °F	58 °F	47 %	WSW	31 mph	40 mph	29.59 in	0.0 in	Partly Cloudy / Windy
1:51 PM	82 °F	52 °F	35 %	SW	31 mph	47 mph	29.57 in	0.0 in	Mostly Cloudy / Wind
2:51 PM	83 °F	45 °F	26 %	WSW	40 mph	54 mph	29.57 in	0.0 in	Mostly Cloudy / Wind
3:51 PM	82 °F	43 °F	25 %	WSW	33 mph	47 mph	29.57 in	0.0 in	Partly Cloudy / Windy
4:51 PM	79 °F	42 °F	27 %	WSW	32 mph	41 mph	29.61 in	0.0 in	Fair / Windy
5:51 PM	75 °F	42 °F	31 %	W	26 mph	48 mph	29.67 in	0.0 in	Fair / Windy
6:51 PM	70 °F	41 °F	35 %	W	30 mph	39 mph	29.76 in	0.0 in	Fair / Windy
7:51 PM	65 °F	40 °F	40 %	W	29 mph	39 mph	29.81 in	0.0 in	Fair / Windy
8:51 PM	62 °F	40 °F	44 %	W	18 mph	30 mph	29.86 in	0.0 in	Fair
9:51 PM	60 °F	39 °F	46 %	W	17 mph	25 mph	29.91 in	0.0 in	Fair
10:51 PM	59 °F	38 °F	46 %	WNW	26 mph	35 mph	29.95 in	0.0 in	Fair / Windy
11:10 PM	58 °F	38 °F	47 %	NW	13 mph	0 mph	29.96 in	0.0 in	Fair
11:51 PM	57 °F	39 °F	51 %	NW	10 mph	0 mph	29.97 in	0.0 in	Fair

Averaged wind speed over the 6-hour period =	32	mph

https://www.wunderground.com/history/daily/us/nj/newark/KEWR/date/2021-3-26



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210301&edate=20210331&timezone=GMT&datum=MSL&interval=h&action=data

ATTACHMENT B.2
Q2 2021 HYDRAULIC AND HYDRODYNAMIC EVALUATION SUMMARIES

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **April** **2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 0.89 Date: 4/11/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 0.569 Date: 4/12/2021 Time: 7:00 Exceeds event trigger criteria? NO Max Tide Gauge Reading (m): 1.271 Date: 4/30/2021 Time: 3:00 Exceeds event trigger criteria? NO 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 38 Date: 4/21/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: W OK	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: JY

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

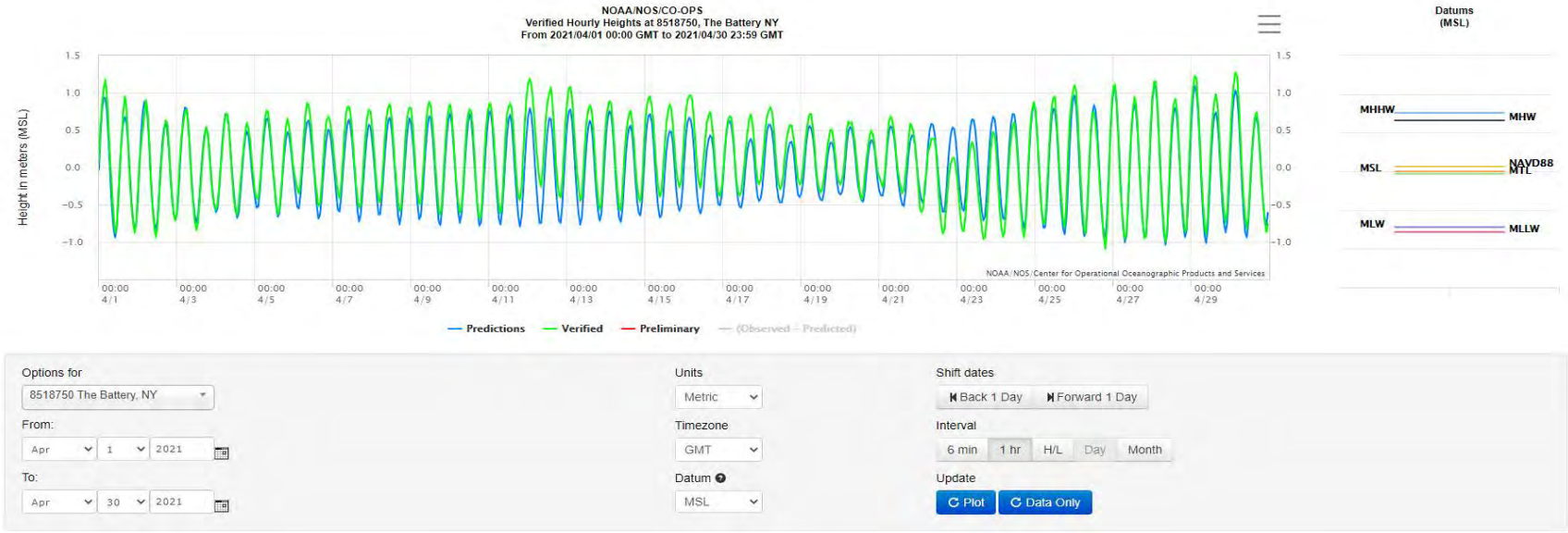
```
000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     APRIL
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  58  37  48   0  17   0 0.03  0.0    0 18.4 29 300   M    M   9        38 280
 2  40  28  34 -14  31   0 0.00  0.0    0 15.8 26 310   M    M   6        35 310
 3  54  30  42  -6  23   0 0.00  0.0    0  9.5 18 310   M    M   2        26 330
 4  67  42  55   6  10   0    T  0.0    0  7.7 22 340   M    M   7        29 320
 5  70  46  58   9   7   0 0.00  0.0    0 17.4 29 320   M    M   2        37 310
 6  71  46  59  10   6   0 0.00  0.0    0 10.7 23 340   M    M   2        32 320
 7  71  49  60  10   5   0    T  0.0    0  5.8 13  20   M    M   6        15  50
 8  68  46  57   7   8   0 0.00  0.0    0  5.0 13 140   M    M   2        18 130
 9  53  49  51   0  14   0 0.01  0.0    0  5.3 10 130   M    M   7        15 140
10  67  50  59   8   6   0    T  0.0    0  3.6 10 120   M    M  10 1      13 130
11  58  46  52   1  13   0 0.89  0.0    0  6.8 16  90   M    M  10 12     26 110
12  50  44  47  -5  18   0 0.29  0.0    0  9.4 24  30   M    M  10 1      27  30
13  66  41  54   2  11   0 0.09  0.0    0  7.4 17 340   M    M   5        20 340
14  72  45  59   7   6   0 0.00  0.0    0  8.2 21 250   M    M   7        25 230
15  58  46  52  -1  13   0 0.36  0.0    0  8.1 22 340   M    M   9 1      27 330
16  55  40  48  -5  17   0    T  0.0    0 12.5 24 290   M    M   8        31 290
17  54  42  48  -6  17   0 0.00  0.0    0  9.1 17 320   M    M   9        23 330
18  63  47  55   1  10   0 0.00  0.0    0  7.3 17 260   M    M   8        25 260
19  68  50  59   5   6   0 0.00  0.0    0  5.5 18 300   M    M   7        24 280
20  78  48  63   9   2   0 0.00  0.0    0 12.8 25 230   M    M   4        32 240
21  75  40  58   3   7   0    T  0.0    0 15.4 38 270   M    M   7 38     53 270
22  51  37  44 -11  21   0 0.00  0.0    0 18.4 30 280   M    M   6        40 260
23  67  40  54  -2  11   0 0.00  0.0    0 14.3 29 260   M    M   3        38 260
24  72  43  58   2   7   0    T  0.0    M  8.1 20 240   M    M   6        26 230
25  67  50  59   3   6   0 0.48  0.0    0 11.3 22 330   M    M   8 1      29 330
26  64  42  53  -3  12   0 0.00  0.0    0 15.9 28 330   M    M   2 8      34 280
27  63  47  55  -2  10   0    T  0.0    0  5.3 12 110   M    M   7        16 100
28  89  50  70  13   0   5    T  0.0    0  7.1 32  10   M    M   8 8      38  10
29  80  60  70  12   0   5 0.02  0.0    M  8.3 23 200   M    M  10 8      29 190
30  73  47  60   2   5   0 0.01  0.0    M 22.6 38 310   M    M   7 38     53 250
==============================================================================
SM 1942 1328       319  10  2.18  0.0    313.0          M      194
==============================================================================
AV 64.7 44.3                              10.4 FASTST   M    M   6    MAX(MPH)
                                  MISC ---->  # 38 270               # 53 270
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210401&edate=20210430&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **May** **2021**	*Assessment Required?*

Rainfall Event Data:

Max Rainfall (in): 1.15 Date: 5/28/2021
50-Year, 24-Hr event? NO

Note:

(1) A max rainfall of 1.15 inches was also observed on 05/30/2021, which was also not classified as a 50-year, 24-hr event.

NO

Storm Surge Event Data:

Max Increase Above Predicted Normal Tidal Cycling (m): 0.674 Date: 5/29/2021 Time: 15:00
Exceeds event trigger criteria? YES

Max Tide Gauge Reading (m): 1.514 Date: 5/29/2021 Time: 3:00
Exceeds event trigger criteria? YES

10-year storm surge event defined as a hurricane? NO

NO

Wind Event Data:

Max Wind (mph): 45 Date: 5/26/2021
Exceeds trigger criteria? YES
Wind direction over 6-hr period: W OK

Note:

(1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.

NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: JY

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

```
000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     MAY
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  68  43  56  -3   9   0 0.00  0.0    0 15.3 29 300   M    M   5        37 310
 2  86  56  71  12   0   6    T  0.0    M 13.7 26 240   M    M   7        30 240
 3  71  55  63   3   2   0 0.47  0.0    0  6.8 12 360   M    M  10 13     14  40
 4  75  54  65   5   0   0 0.30  0.0    0  7.8 17 120   M    M   9 1      25 100
 5  64  53  59  -1   6   0 0.26  0.0    0  6.6 22 300   M    M   9 1      27 310
 6  69  50  60   0   5   0 0.00  0.0    0 12.1 26 330   M    M   5        33 350
 7  66  48  57  -4   8   0 0.00  0.0    0  8.0 14 160   M    M   8        19 140
 8  55  48  52  -9  13   0 0.15  0.0    0  6.1 14 110   M    M   9 8      18 110
 9  65  43  54  -7  11   0 0.38  0.0    0  8.7 20 240   M    M   7 1      26 230
10  63  49  56  -6   9   0 0.01  0.0    0  9.2 17 310   M    M   8 1      25 310
11  70  50  60  -2   5   0 0.00  0.0    0 11.8 25 260   M    M   6        31 260
12  71  47  59  -3   6   0 0.00  0.0    0 14.2 24 320   M    M   4 8      32 320
13  74  50  62   0   3   0 0.00  0.0    0  7.8 16 350   M    M   2        21 310
14  78  49  64   1   1   0 0.00  0.0    0  7.1 16 210   M    M   1        23 220
15  79  54  67   4   0   2 0.00  0.0    0  6.5 14 340   M    M   5        17 160
16  76  58  67   4   0   2 0.00  0.0    0  6.0 18 350   M    M   8 3      24 230
17  80  54  67   3   0   2 0.00  0.0    0  6.7 12 130   M    M   4        18 160
18  85  55  70   6   0   5 0.00  0.0    0  9.2 20 230   M    M   3        26 240
19  91  57  74  10   0   9 0.00  0.0    0  6.2 16 360   M    M   3        20 360
20  76  60  68   4   0   3 0.00  0.0    0  6.6 15 140   M    M   6        20 150
21  83  57  70   5   0   5 0.00  0.0    0  5.5 14 120   M    M   4        18 120
22  96  64  80  15   0  15 0.00  0.0    0  8.3 20 280   M    M   9        26 290
23  94  68  81  16   0  16 0.00  0.0    0 14.5 25  20   M    M   7        33 350
24  68  60  64  -2   1   0 0.00  0.0    0 11.3 22  10   M    M   8        26 360
25  81  58  70   4   0   5 0.00  0.0    0  9.7 18 230   M    M   8        22 230
26  94  66  80  14   0  15 0.09  0.0    M 12.1 45 260   M    M   7 38     55 260
27  87  66  77  11   0  12 0.01  0.0    0 12.3 21 340   M    M   6 3      28 300
28  71  52  62  -5   3   0 1.15  0.0    0 13.5 24  50   M    M   9 1      33  70
29  52  49  51 -16  14   0 0.58  0.0    0 16.2 25  30   M    M  10 1      35  50
30  53  48  51 -16  14   0 1.15  0.0    0 13.7 20 360   M    M  10 1      23  20
31  76  51  64  -4   1   0    T  0.0    0  9.1 20 300   M    M   8        28 320
==============================================================================
SM 2317 1672       111  97  4.55  0.0    302.6          M      205
==============================================================================
AV 74.7 53.9                                 9.8 FASTST   M    M   7    MAX(MPH)
                                  MISC ---->    45 260                 55 260
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx

Daily Observations

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
9:51 AM	77 °F	65 °F	66 %	SW	12 mph	0 mph	30.03 in	0.0 in	Mostly Cloudy
10:27 AM	78 °F	65 °F	64 %	SSW	10 mph	0 mph	30.03 in	0.0 in	Partly Cloudy
10:51 AM	79 °F	65 °F	62 %	SW	8 mph	0 mph	30.02 in	0.0 in	Partly Cloudy
11:51 AM	83 °F	66 °F	56 %	SW	12 mph	20 mph	30.00 in	0.0 in	Fair
12:51 PM	86 °F	67 °F	53 %	SW	8 mph	0 mph	29.97 in	0.0 in	Partly Cloudy
1:51 PM	87 °F	68 °F	53 %	S	14 mph	0 mph	29.93 in	0.0 in	Partly Cloudy
2:51 PM	90 °F	67 °F	46 %	SSW	13 mph	0 mph	29.89 in	0.0 in	Fair
3:51 PM	93 °F	64 °F	38 %	SW	12 mph	22 mph	29.86 in	0.0 in	Fair
4:51 PM	93 °F	63 °F	37 %	SW	14 mph	22 mph	29.84 in	0.0 in	Fair
5:51 PM	92 °F	60 °F	34 %	SW	16 mph	25 mph	29.82 in	0.0 in	Mostly Cloudy
6:45 PM	90 °F	61 °F	38 %	W	41 mph	55 mph	29.84 in	0.0 in	Squalls / Windy
6:47 PM	88 °F	57 °F	35 %	W	35 mph	55 mph	29.84 in	0.0 in	Light Rain with Thunde
6:51 PM	81 °F	60 °F	49 %	WNW	31 mph	55 mph	29.84 in	0.0 in	T-Storm / Windy
6:54 PM	77 °F	61 °F	58 %	W	25 mph	48 mph	29.84 in	0.0 in	T-Storm / Windy
6:58 PM	77 °F	61 °F	58 %	W	21 mph	43 mph	29.83 in	0.0 in	Light Rain with Thunde
7:14 PM	77 °F	62 °F	60 %	WSW	14 mph	0 mph	29.83 in	0.0 in	Thunder
7:19 PM	76 °F	62 °F	62 %	WSW	13 mph	0 mph	29.83 in	0.0 in	Light Rain
7:51 PM	74 °F	64 °F	71 %	S	12 mph	0 mph	29.84 in	0.0 in	Light Rain
8:51 PM	73 °F	65 °F	76 %	SSW	14 mph	21 mph	29.88 in	0.0 in	Mostly Cloudy
9:51 PM	73 °F	64 °F	73 %	SW	10 mph	0 mph	29.87 in	0.0 in	Mostly Cloudy
10:51 PM	73 °F	65 °F	76 %	WNW	10 mph	0 mph	29.86 in	0.0 in	Mostly Cloudy
11:51 PM	71 °F	65 °F	81 %	SSW	7 mph	0 mph	29.89 in	0.0 in	T-Storm
11:56 PM	71 °F	65 °F	81 %	SW	10 mph	0 mph	29.89 in	0.0 in	Heavy T-Storm

Averaged wind speed over the 6-hour period = 20 mph

https://www.wunderground.com/history/daily/us/nj/newark/KEWR/date/2021-5-26

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210501&edate=20210531&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **June** **2021**	*Assessment Required?*

Rainfall Event Data:

Max Rainfall (in): 2.19 Date: 6/8/2021
50-Year, 24-Hr event? NO

Note:

(1) A max rainfall of 1.15 inches was also observed on 05/30/2021, which was also not classified as a 50-year, 24-hr event.

NO

Storm Surge Event Data:

Max Increase Above Predicted Normal Tidal Cycling (m): 0.32 Date: 6/10/2021 Time: 21:00
Exceeds event trigger criteria? NO

Max Tide Gauge Reading (m): 1.233 Date: 6/25/2021 Time: 1:00
Exceeds event trigger criteria? NO

10-year storm surge event defined as a hurricane? NO

NO

Wind Event Data:

Max Wind (mph): 31 Date: 6/4/2021
Exceeds trigger criteria? NO
Wind direction over 6-hr period: W OK

NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: TEA

National Weather Service - Climate Data - Microsoft Edge

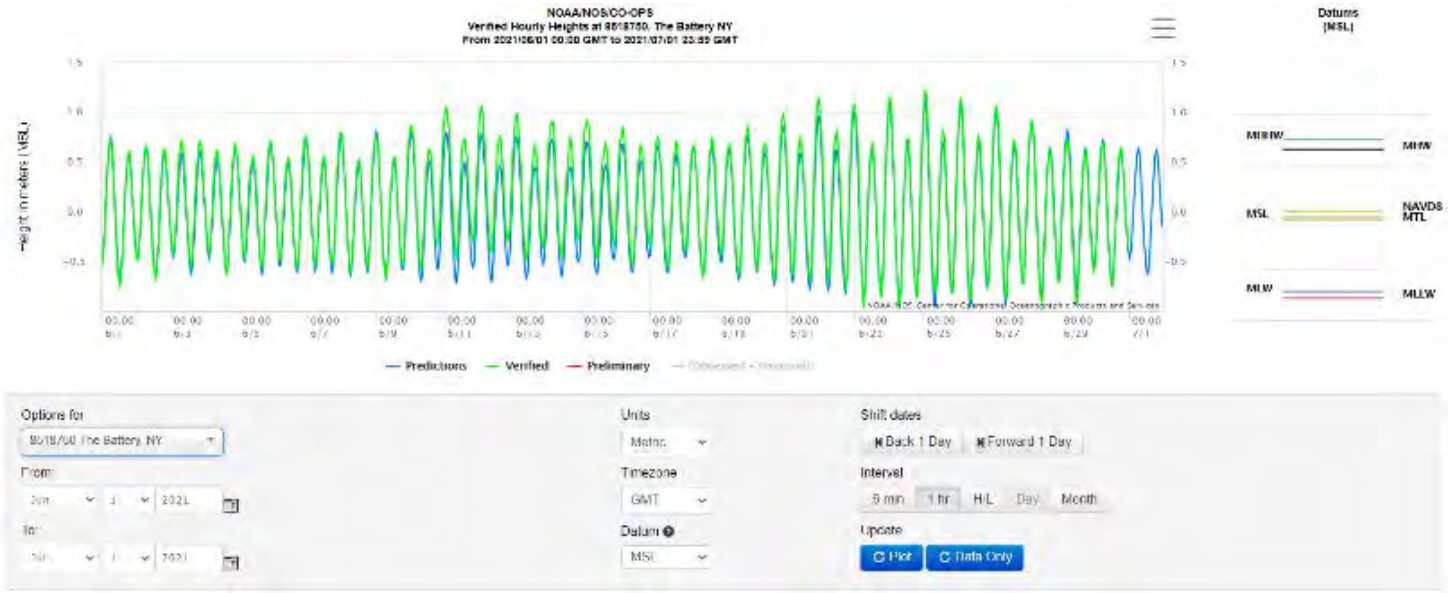
https://w2.weather.gov/climate/getclimate.php?wfo=okx

000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: NEWARK NJ
MONTH: JUNE
YEAR: 2021
LATITUDE: 40 42 N
LONGITUDE: 74 10 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	80	54	67	-1	0	2	0.00	0.0	0	7.4	15	230	M	M	7		21	190
2	79	60	70	2	0	5	T	0.0	0	5.5	14	120	M	M	8		17	120
3	77	62	70	1	0	5	0.41	0.0	0	4.3	10	200	M	M	10	138	14	190
4	83	65	74	5	0	9	0.19	0.0	0	8.6	31	280	M	M	8	138	41	280
5	95	64	80	11	0	15	0.00	0.0	0	10.8	24	240	M	M	3		30	250
6	97	71	84	14	0	19	0.00	0.0	0	8.0	18	230	M	M	4		23	260
7	95	74	85	15	0	20	0.04	0.0	0	8.2	15	130	M	M	6	3	20	110
8	93	73	83	13	0	18	2.19	0.0	0	7.7	23	310	M	M	8	13	31	310
9	96	72	84	13	0	19	0.53	0.0	0	6.9	28	240	M	M	7	3	36	220
10	85	67	76	5	0	11	0.00	0.0	0	10.4	20	110	M	M	6		25	110
11	73	65	69	-2	0	4	T	0.0	0	6.4	13	80	M	M	9		16	80
12	72	62	67	-5	0	2	T	0.0	0	5.7	12	30	M	M	8		14	150
13	78	59	69	-3	0	4	T	0.0	0	5.7	13	190	M	M	7		17	200
14	78	66	72	0	0	7	0.16	0.0	0	6.2	15	130	M	M	9	13	19	140
15	85	67	76	3	0	11	0.01	0.0	0	10.4	22	330	M	M	5		29	330
16	81	63	72	-1	0	7	0.00	0.0	0	11.5	22	330	M	M	2		29	290
17	81	57	69	-4	0	4	0.00	0.0	0	6.9	16	280	M	M	3		22	290
18	88	60	74	0	0	9	0.00	0.0	0	11.7	21	230	M	M	5		28	220
19	93	68	81	7	0	16	0.05	0.0	0	11.2	26	220	M	M	9		33	220
20	91	64	78	4	0	13	0.00	0.0	0	8.5	18	220	M	M	6		23	240
21	92	76	84	9	0	19	T	0.0	0	9.7	31	220	M	M	8		34	220
22	80	59	70	-5	0	5	0.17	0.0	0	10.9	22	340	M	M	9	1	26	330
23	80	55	68	-7	0	3	0.00	0.0	0	8.8	17	350	M	M	4		23	300
24	79	58	69	-6	0	4	0.00	0.0	0	6.0	15	150	M	M	4		24	180
25	83	60	72	-4	0	7	0.00	0.0	M	8.0	15	160	M	M	7		21	170
26	86	70	78	2	0	13	0.07	0.0	M	10.2	20	180	M	M	8	1	25	180
27	95	74	85	9	0	20	0.00	0.0	0	12.8	22	190	M	M	8		31	210
28	99	77	88	12	0	23	0.00	0.0	0	13.8	22	220	M	M	5	8	24	210
29	102	79	91	14	0	26	0.00	0.0	0	12.7	22	260	M	M	2		28	230
30	103	74	89	12	0	24	0.54	0.0	0	12.7	31	250	M	M	4	13	39	250
SM	2599	1975			0	344	4.36	0.0		267.6			M		189			
AV	86.6	65.8								8.9	FASTST		M	M	6		MAX(MPH)	
									MISC ---->		#	31	280				41	280

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210601&edate=20210701&timezone=GMT&datum=MSL&interval=h&action=

ATTACHMENT B.3
Q3 2021 HYDRAULIC AND HYDRODYNAMIC EVALUATION SUMMARIES

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **July** **2021**	*Assessment Required?*

Rainfall Event Data:

Max Rainfall (in): 2.28 Date: 7/17/2021
50-Year, 24-Hr event? NO

Note:
(1) A max rainfall of 1.53 inches was observed on 07/02/2021 and 1.60 inches on 07/09/2021, both were also not classified as 50-year, 24-hr events.

NO

Storm Surge Event Data:

Max Increase Above Predicted Normal Tidal Cycling (m): 0.496 Date: 7/9/2021 Time: 11:00
Exceeds event trigger criteria? NO

Max Tide Gauge Reading (m): 1.237 Date: 7/23/2021 Time: 0:00
Exceeds event trigger criteria? NO

10-year storm surge event defined as a hurricane? NO

NO

Wind Event Data:

Max Wind (mph): 45 Date: 7/6/2021
Exceeds trigger criteria? YES
Wind direction over 6-hr period: NW OK

Note:
(1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.

NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: TEA

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

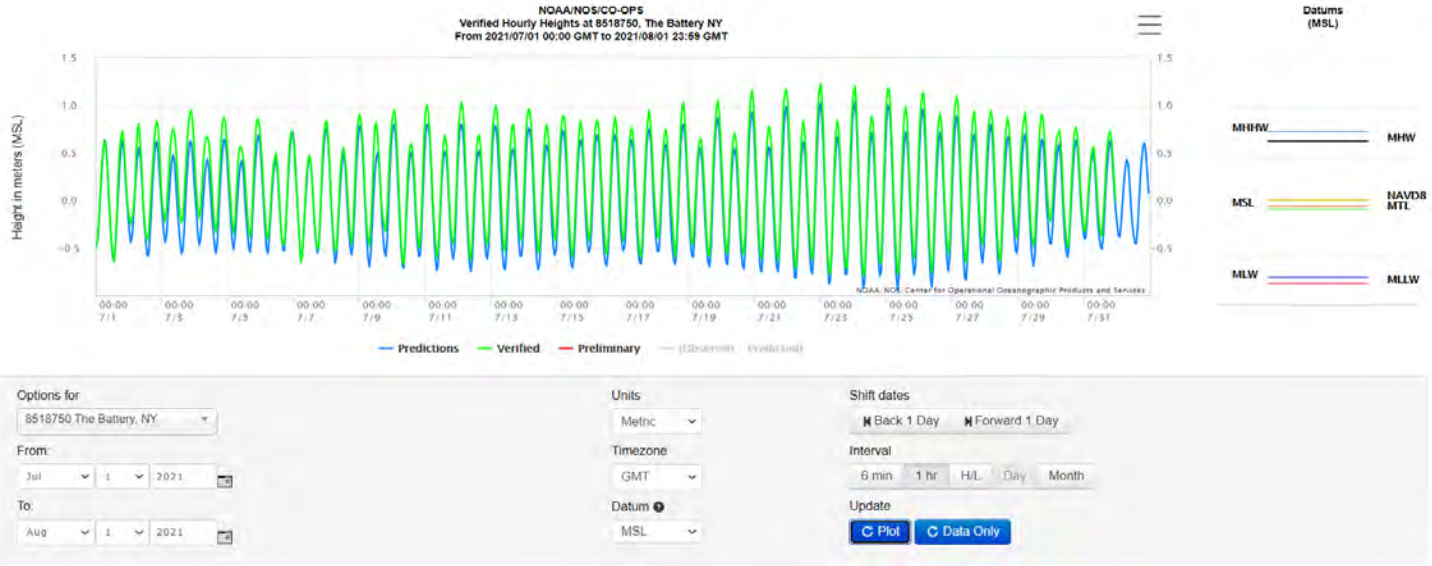
```
000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     JULY
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  89  73  81   4   0  16 0.94  0.0    0  5.7 23 290   M    M   9 138    30 290
 2  81  64  73  -4   0   8 1.53    T    0  7.6 22 300   M    M  10 1358   28  70
 3  70  61  66 -11   0   1 0.05  0.0    0  8.9 18  30   M    M  10 18     24 360
 4  84  64  74  -4   0   9 0.00  0.0    0  6.1 15 110   M    M   7        19 350
 5  89  66  78   0   0  13 0.00  0.0    0  7.8 20 240   M    M   5 18     24 230
 6  97  73  85   7   0  20 0.55  0.0    0 13.4 45 310   M    M   7 138    58 320
 7  97  72  85   7   0  20    T  0.0    M  9.4 17 270   M    M   4 8      24 250
 8  88  75  82   4   0  17 0.08  0.0    0  6.7 21 360   M    M   9 38     26  30
 9  91  73  82   4   0  17 1.60  0.0    0 11.1 26 340   M    M   9 13     31 230
10  86  72  79   1   0  14    T  0.0    0  7.0 16  10   M    M   6        20  10
11  82  73  78   0   0  13    T  0.0    0  7.7 16 140   M    M   9 1      21 100
12  93  72  83   5   0  18 0.69  0.0    0  5.7 23 270   M    M   9 138    26 270
13  78  71  75  -3   0  10 0.01  0.0    0  5.9 10  20   M    M  10 18     14 100
14  93  72  83   5   0  18 0.07  0.0    0  6.3 24 290   M    M   8 138    32 280
15  91  74  83   5   0  18    T  0.0    0  5.9 16 170   M    M   6        20 180
16  96  77  87   9   0  22 0.00  0.0    0  8.3 20 260   M    M   5        23 260
17  93  71  82   4   0  17 2.28    T    0  6.6 44  20   M    M   7 135    57  40
18  86  74  80   2   0  15    T  0.0    0 10.8 23 230   M    M   8 3      28 240
19  86  73  80   2   0  15    T  0.0    M  8.1 20 340   M    M   7 8      24 340
20  90  72  81   3   0  16 0.00  0.0    0  6.5 13 260   M    M   4 8      17 270
21  85  73  79   1   0  14 0.05  0.0    0  8.2 21 330   M    M   7 38     24 320
22  85  67  76  -2   0  11 0.00  0.0    M  9.4 18 290   M    M   5 8      24 300
23  86  68  77  -1   0  12    T  0.0    0  6.1 23 360   M    M   6        31 350
24  85  65  75  -3   0  10 0.00  0.0    0  7.0 17 200   M    M   5        21 200
25  87  69  78   0   0  13 0.37  0.0    0  9.5 17 230   M    M   8 1      22 210
26  93  70  82   4   0  17 0.08  0.0    0  6.7 16 330   M    M   7 38     21 320
27  94  71  83   5   0  18    T  0.0    0  6.7 30 330   M    M   4 8      39 320
28  87  72  80   2   0  15 0.04  0.0    0  7.4 16 330   M    M   6        19 330
29  81  70  76  -2   0  11 0.57  0.0    0  8.2 21 200   M    M   7 13     26 190
30  87  67  77  -1   0  12 0.00  0.0    0 14.2 24 330   M    M   3 18     32 310
31  81  61  71  -7   0   6 0.00  0.0    0  7.1 21 340   M    M   2        25 340
==============================================================================
SM 2711 2175         0 436  8.91    T    246.0          M      209
==============================================================================
AV 87.5 70.2                                7.9 FASTST   M    M   7    MAX(MPH)
                                  MISC ---->    45 310                58 320
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **August** **2021**	*Assessment Required?*

Rainfall Event Data:

Max Rainfall (in): 2.51 Date: 8/22/2021
50-Year, 24-Hr event? NO

Note:
(1) A max rainfall of 1.25 inches was observed on 08/11/2021 and 1.28 inches on 08/21/2021, both were also not classified as 50-year, 24-hr events.

NO

Storm Surge Event Data:

Max Increase Above Predicted Normal Tidal Cycling (m): 0.442 Date: 8/28/2021 Time: 13:00
Exceeds event trigger criteria? NO

Max Tide Gauge Reading (m): 1.246 Date: 8/22/2021 Time: 0:00
Exceeds event trigger criteria? NO

10-year storm surge event defined as a hurricane? NO

NO

Wind Event Data:

Max Wind (mph): 23 Date: 8/12/2021
Exceeds trigger criteria? NO
Wind direction over 6-hr period: WSW OK

NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: ORZ

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

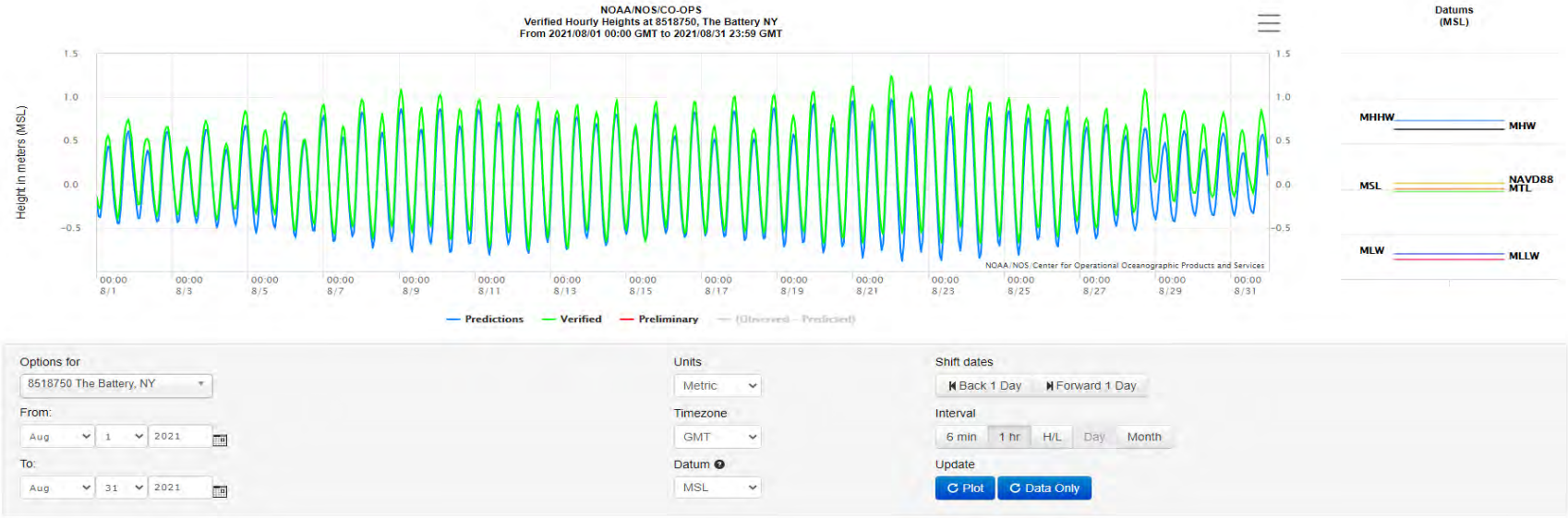
```
000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     AUGUST
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  80  65  73  -5   0   8 0.13  0.0    0  5.4 15 160   M    M   7        19 150
 2  84  63  74  -4   0   9 0.00  0.0    0  7.7 14 320   M    M   4 8      23 340
 3  82  62  72  -6   0   7 0.00  0.0    0  3.4  9 170   M    M   7        12 170
 4  80  68  74  -4   0   9 0.00  0.0    0  5.0 13  20   M    M  10        15  30
 5  86  69  78   0   0  13 0.00  0.0    0  8.8 15  20   M    M   7        20 350
 6  92  67  80   2   0  15 0.00  0.0    0  7.4 15 200   M    M   3        19 150
 7  91  70  81   4   0  16    T  0.0    0  7.5 16 200   M    M   8        21 190
 8  86  68  77   0   0  12 0.19  0.0    0  8.8 18  20   M    M   9 1      27  60
 9  85  70  78   1   0  13 0.01  0.0    0  8.4 18  10   M    M   8        21  10
10  88  74  81   4   0  16 0.55  0.0    0  4.8 21 300   M    M   7 13     24 310
11  95  74  85   8   0  20 1.25  0.0    0  9.1 30 240   M    M   7 3      59 240
12  98  75  87  10   0  22    T  0.0    0  9.6 24 230   M    M   4 3      31 240
13  99  78  89  12   0  24 0.00  0.0    0  6.7 14 250   M    M   6 8      19 200
14  92  78  85   8   0  20    T  0.0    0  9.9 18 350   M    M   7        23 350
15  87  71  79   2   0  14 0.00  0.0    0  8.2 18  20   M    M   8        22  30
16  83  69  76   0   0  11 0.00  0.0    0  6.5 12 180   M    M   8        15 140
17  83  75  79   3   0  14    T  0.0    0  7.9 15 120   M    M   9        21 130
18  85  76  81   5   0  16    T  0.0    0  7.8 16 140   M    M   9        23 130
19  90  78  84   8   0  19 0.23  0.0    0 13.7 25 260   M    M   8 13     31 270
20  85  76  81   5   0  16    T  0.0    0  6.3 15 350   M    M   8        19 340
21  83  73  78   2   0  13 1.28  0.0    0  5.0 17  10   M    M   8 13     20 340
22  78  73  76   0   0  11 2.51  0.0    0 10.4 18 240   M    M   9 13     24 240
23  90  73  82   6   0  17 0.93  0.0    0 12.2 22 190   M    M   8 1      31 180
24  93  75  84   9   0  19 0.00  0.0    0  8.3 17 280   M    M   2        21 260
25  96  73  85  10   0  20 0.00  0.0    0  4.8 12 160   M    M   4        17 140
26  97  75  86  11   0  21 0.11  0.0    0  6.4 16 210   M    M   4 3      21 240
27  96  77  87  12   0  22    T  0.0    0  4.1 23 100   M    M   6 3      32  80
28  82  70  76   1   0  11    T  0.0    0 10.9 20  40   M    M   9        28  30
29  78  70  74   0   0   9    T  0.0    0  4.5 10  60   M    M  10 1      13  70
30  91  74  83   9   0  18    T  0.0    0  6.8 16 240   M    M   7 1      24 270
31  89  74  82   8   0  17 0.00  0.0    0  5.5 16 320   M    M   7        19 310
==============================================================================
SM 2724 2233         0 472  7.19  0.0    231.8          M      218
==============================================================================
AV 87.9 72.0                                7.5 FASTST   M    M   7    MAX(MPH)
                                 MISC ---->    30 240                 59 240
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **September 2021**	*Assessment Required?*

Rainfall Event Data:

Max Rainfall (in): 8.41 Date: 9/1/2021
50-Year, 24-Hr event? YES

Note:

(1) A max rainfall of 1.22 inches was observed on 9/23/2021, which was not classified as 50-year, 24-hr event.

YES

Storm Surge Event Data:

Max Increase Above Predicted Normal Tidal Cycling (m): 0.706 Date: 9/2/2021 Time: 2:00
Exceeds event trigger criteria? YES

Max Tide Gauge Reading (m): 1.194 Date: 9/9/2021 Time: 15:00
Exceeds event trigger criteria? NO

10-year storm surge event defined as a hurricane? NO

NO

Wind Event Data:

Max Wind (mph): 76 Date: 9/30/2021
Exceeds trigger criteria? YES
Wind direction over 6-hr period: NNW OK

(1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.

NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: ORZ

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

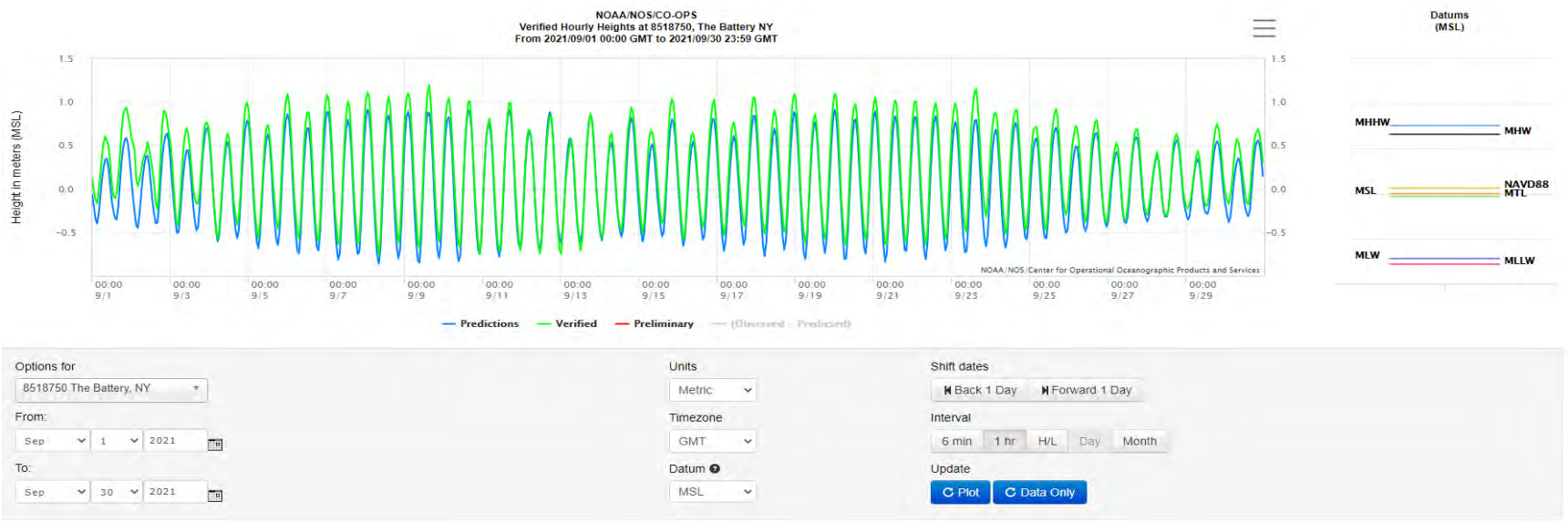
```
000
CXUS51 KOKX 011350
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     SEPTEMBER
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                     12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  79  65  72  -2   0   7 8.41  0.0    0 14.3 37 360   M    M  10 13     44  40
 2  80  63  72  -2   0   7 0.03  0.0    0 15.3 31  10   M    M   5 1      36  10
 3  78  60  69  -4   0   4 0.00  0.0    0  8.8 20 310   M    M   3        24 300
 4  82  61  72  -1   0   7 0.00  0.0    0  5.8 15 240   M    M   4        17 250
 5  77  64  71  -2   0   6    T  0.0    0  8.7 18 200   M    M   9        23 190
 6  86  70  78   6   0  13    T  0.0    0 10.5 25 250   M    M   5        30 260
 7  84  63  74   2   0   9 0.00  0.0    0  6.8 16 260   M    M   2        22 260
 8  87  68  78   6   0  13 0.00  0.0    0 11.3 21 180   M    M   6        27 170
 9  78  70  74   2   0   9 0.15  0.0    0  5.8 15 240   M    M   9 1      18 230
10  78  64  71   0   0   6 0.00  0.0    0 12.2 26 310   M    M   4        35 330
11  81  57  69  -2   0   4 0.00  0.0    0  7.3 18 250   M    M   3        24 250
12  86  66  76   5   0  11 0.00  0.0    M 13.3 22 240   M    M   5        27 240
13  88  70  79   9   0  14 0.20  0.0    0  9.7 25 320   M    M   7 3      37 320
14  81  68  75   5   0  10 0.00  0.0    0  5.1 13 120   M    M   7        17 130
15  91  72  82  12   0  17 0.00  0.0    0  9.4 22 190   M    M   7        29 190
16  80  71  76   7   0  11 0.00  0.0    0  9.8 18  40   M    M   9        22  40
17  77  71  74   5   0   9    T  0.0    0 10.5 16  40   M    M   9        19  50
18  88  70  79  11   0  14 0.00  0.0    0  7.8 16 340   M    M   5        20 330
19  80  64  72   4   0   7 0.00  0.0    0  9.7 20  30   M    M   2        25  20
20  78  59  69   1   0   4 0.00  0.0    0  6.8 14 170   M    M   4        18 170
21  80  63  72   5   0   7 0.03  0.0    0  6.4 13 130   M    M   8 18     18 130
22  83  74  79  12   0  14    T  0.0    0  9.5 18 140   M    M   9        24 140
23  82  66  74   7   0   9 1.22  0.0    0 12.1 25 140   M    M   9 13     36 130
24  76  59  68   2   0   3 0.28  0.0    0  8.2 16 240   M    M   5 1      20 270
25  79  58  69   3   0   4 0.00  0.0    0  4.6 10 250   M    M   4        15 250
26  76  63  70   5   0   5 0.00  0.0    0 11.6 24 270   M    M   3        31 280
27  83  58  71   6   0   6 0.00  0.0    0 13.1 26 230   M    M   5        32 230
28  76  62  69   5   0   4 0.18  0.0    0  9.7 17 230   M    M   7 3      24 310
29  72  55  64   0   1   0 0.00  0.0    0 10.6 20 320   M    M   5        27 290
30  70  57  64   0   1   0 0.00  0.0    M    M  M   M   M    M   6         M   M
==============================================================================
SM 2416 1931         2 234 10.50  0.0    274.7          M      176
==============================================================================
AV 80.5 64.4                                9.5 FASTST   M    M   6    MAX(MPH)
                                  MISC ---->    37 360                44  40
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=

ATTACHMENT B.4
Q4 2021 HYDRAULIC AND HYDRODYNAMIC EVALUATION SUMMARIES

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **October 2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 3.68 Date: 10/26/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 1.334 Date: 10/30/2021 Time: 3:00 Exceeds event trigger criteria? YES Max Tide Gauge Reading (m): 1.425 Date: 10/9/2021 Time: 15:00 Exceeds event trigger criteria? YES 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 29 Date: 10/27/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: N OK (1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: ORZ

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

```
000
CXUS51 KOKX 010910
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     OCTOBER
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                     12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  72  52  62  -1   3   0 0.00  0.0    0  6.6 17 280   M    M   2        22 320
 2  79  51  65   2   0   0 0.00  0.0    0  8.0 22 250   M    M   6        27 250
 3  84  56  70   8   0   5 0.00  0.0    0  5.2 10 160   M    M   8        16 270
 4  75  63  69   7   0   4 0.40  0.0    0  7.4 16  10   M    M  10 138    19  10
 5  68  61  65   3   0   0    T  0.0    0  7.5 15  20   M    M  10        18  20
 6  72  63  68   7   0   3 0.00  0.0    0  4.7  9  20   M    M   9        13 340
 7  78  62  70   9   0   5 0.00  0.0    0  4.8 12 350   M    M   7        16 330
 8  79  60  70  10   0   5 0.00  0.0    0  4.6 12  80   M    M   7 18     15  80
 9  70  61  66   6   0   1    T  0.0    0 10.2 16  30   M    M   9        21  60
10  69  62  66   6   0   1 0.36  0.0    0 12.6 17  10   M    M  10 1      23  30
11  76  62  69  10   0   4    T  0.0    0 11.2 20  40   M    M   8        24  50
12  74  61  68   9   0   3 0.00  0.0    0  5.4 10  20   M    M   7        14  40
13  73  64  69  11   0   4 0.00  0.0    0  5.3 12 250   M    M   9        15 250
14  82  64  73  15   0   8 0.00  0.0    0  6.4 17 350   M    M   7        24 290
15  84  63  74  16   0   9 0.00  0.0    0  4.3 14 210   M    M   5        18 200
16  82  59  71  14   0   6 0.23  0.0    0 10.2 28 270   M    M   8        33 280
17  65  52  59   2   6   0 0.03  0.0    0 11.8 25 260   M    M   4        34 300
18  65  46  56  -1   9   0    T  0.0    0 13.5 32 300   M    M   5        40 290
19  70  48  59   3   6   0 0.00  0.0    0 13.4 22 260   M    M   1        29 270
20  80  58  69  13   0   4 0.00  0.0    0 11.5 21 260   M    M   3        24 270
21  79  55  67  11   0   2 0.00  0.0    0  8.6 18 230   M    M   5        24 230
22  73  56  65  10   0   0 0.00  0.0    0 10.0 16 250   M    M   7        20 270
23  64  50  57   2   8   0 0.01  0.0    0  8.1 17 330   M    M   8        21 340
24  63  45  54   0  11   0 0.01  0.0    0  4.6 13 280   M    M   6        16 250
25  78  57  68  14   0   3 0.10  0.0    0  6.5 16 230   M    M   9 13     22 180
26  66  57  62   8   3   0 3.68  0.0    0 14.2 29  10   M    M  10 1      34  10
27  67  54  61   8   4   0 0.10  0.0    0 17.8 31  10   M    M   8        40  10
28  61  48  55   2  10   0 0.00  0.0    0  8.2 17 360   M    M   5        21  10
29  61  48  55   2  10   0 0.47  0.0    0 12.9 26  70   M    M   8 13     36  60
30  67  57  62  10   3   0 0.12  0.0    0  8.4 22  70   M    M   9 1      30  80
31  69  55  62  10   3   0 0.14  0.0    0 11.3 22 250   M    M   8 1      27 250
==============================================================================
SM 2245 1750        76  67  5.65  0.0    275.2          M      218
==============================================================================
AV 72.4 56.5                                8.9 FASTST   M    M   7    MAX(MPH)
                                MISC ---->    32 300               # 40 290
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **November 2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 0.41 Date: 11/12/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 0.578 Date: 11/12/2021 Time: 14:00 Exceeds event trigger criteria? NO Max Tide Gauge Reading (m): 1.326 Date: 11/7/2021 Time: 15:00 Exceeds event trigger criteria? NO 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 38 Date: 11/13/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: W OK (1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: ORZ

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

```
000
CXUS51 KOKX 011010
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     NOVEMBER
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                      12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  64  50  57   5   8   0 0.00  0.0    0  9.3 24 290   M    M   4        28 310
 2  56  44  50  -1  15   0    T  0.0    0  7.3 18 230   M    M   9        22 250
 3  56  39  48  -3  17   0 0.00  0.0    0  8.1 20 300   M    M   3        27 300
 4  54  36  45  -6  20   0 0.00  0.0    0  6.5 13 340   M    M   7        16 330
 5  55  36  46  -4  19   0 0.00  0.0    0  7.3 16 350   M    M   2        24 360
 6  56  34  45  -5  20   0 0.00  0.0    0  4.7 10  20   M    M   2        13  30
 7  57  35  46  -4  19   0 0.00  0.0    0  5.5  9  10   M    M   7        13 340
 8  68  43  56   7   9   0 0.00  0.0    0  6.3 18 350   M    M   2        23 360
 9  74  44  59  10   6   0 0.00  0.0    0  5.2 15 250   M    M   1        19 250
10  69  46  58   9   7   0    T  0.0    0  8.1 28 340   M    M   4        33 330
11  64  41  53   5  12   0 0.00  0.0    0  8.1 20 120   M    M   7        30 110
12  69  48  59  11   6   0 0.41  0.0    0 11.3 29 210   M    M   7 1      36 130
13  66  40  53   5  12   0 0.31  0.0    0 10.0 41 270   M    M   3 3      52 270
14  48  35  42  -5  23   0    T  0.0    0  9.8 22 230   M    M   6        26 220
15  51  38  45  -2  20   0 0.01  0.0    0 11.8 29 290   M    M   7        39 280
16  52  36  44  -3  21   0 0.00  0.0    0 10.1 18 250   M    M   2        24 270
17  59  34  47   1  18   0 0.00  0.0    0  4.1 14 140   M    M   6        20 130
18  72  47  60  14   5   0 0.03  0.0    0  8.5 30 290   M    M   4        35 310
19  51  41  46   0  19   0 0.01  0.0    0 14.9 29 310   M    M   4        38 300
20  49  33  41  -5  24   0 0.00  0.0    0  6.1 12 190   M    M   5        16 160
21  57  42  50   5  15   0 0.01  0.0    0  6.4 16 210   M    M   9        21 210
22  55  37  46   1  19   0 0.01  0.0    0 11.5 24 330   M    M   8        30 350
23  46  34  40  -4  25   0 0.00  0.0    0 12.8 26 300   M    M   3        34 290
24  48  32  40  -4  25   0 0.00  0.0    0  9.4 17 320   M    M   3        24 310
25  59  34  47   3  18   0    T  0.0    0  5.7 12 230   M    M   7        17 250
26  48  38  43  -1  22   0 0.09  0.0    0 14.7 29 280   M    M   9 1      36 260
27  43  36  40  -3  25   0 0.00  0.0    0 15.3 30 290   M    M   7        37 280
28  42  33  38  -5  27   0    T  0.1    T  3.9 17 240   M    M   9        19 240
29  47  33  40  -3  25   0    T    T    0 10.4 24 330   M    M   6        33 300
30  42  27  35  -7  30   0    T    T    0  6.5 18 240   M    M   7        24 250
==============================================================================
SM 1677 1146       531   0  0.88  0.1    259.6          M      160
==============================================================================
AV 55.9 38.2                                8.7 FASTST   M    M   5    MAX(MPH)
                                 MISC ---->    41 270                 52 270
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=

SA-7 Sediment Remedy
Long-Term Monitoring Program
Hydrologic Data Review

Monitoring Period: **December 2021**	*Assessment Required?*
Rainfall Event Data: Max Rainfall (in): 0.25 Date: 12/6/2021 50-Year, 24-Hr event? NO	NO
Storm Surge Event Data: Max Increase Above Predicted Normal Tidal Cycling (m): 0.473 Date: 12/29/2021 Time: 14:00 Exceeds event trigger criteria? NO Max Tide Gauge Reading (m): 1.245 Date: 12/31/2021 Time: 11:00 Exceeds event trigger criteria? NO 10-year storm surge event defined as a hurricane? NO	NO
Wind Event Data: Max Wind (mph): 30 Date: 12/6/2021 Exceeds trigger criteria? NO Wind direction over 6-hr period: W OK (1) The averaged wind speed for the 6-hour period during which the maximum wind speed was recorded does not exceed the threshold criteria.	NO

CRITERIA FROM LTMP:

"Post-High Energy Event Monitoring Activities" will take place promptly following High Energy Events. The Consent Order defines "High Energy Events" as follows:

i. "A 50-year rainfall event defined by the National Weather Service as a 24-hour period of rainfall exceeding the maximum 50-year/24-hour accumulation (i.e., 7.2 inches of rainfall over a 24-hour period), as recorded at Newark Airport;

- See https://w2.weather.gov/climate/index.php?wfo=okx

ii. A 10-year storm surge event defined as a hurricane event (not a "nor'easter") resulting in an increase in ocean level of either 0.64 meters above normal tidal cycling at the Battery Park tide gauge or 1.40 meters above mean sea level (MSL); or

- Note: Hurricane events are defined by NOAA.
- See http://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750

iii. A wind event achieving 34 to 40 knots (39.13 to 46.03 mph), coming from the south through the west, averaged over 6 hours, as recorded at Newark Airport."

- https://w2.weather.gov/climate/index.php?wfo=okx

CHECKED BY: ORZ

National Weather Service - Climate Data - Microsoft Edge

https://w2.weather.gov/climate/getclimate.php?wfo=okx

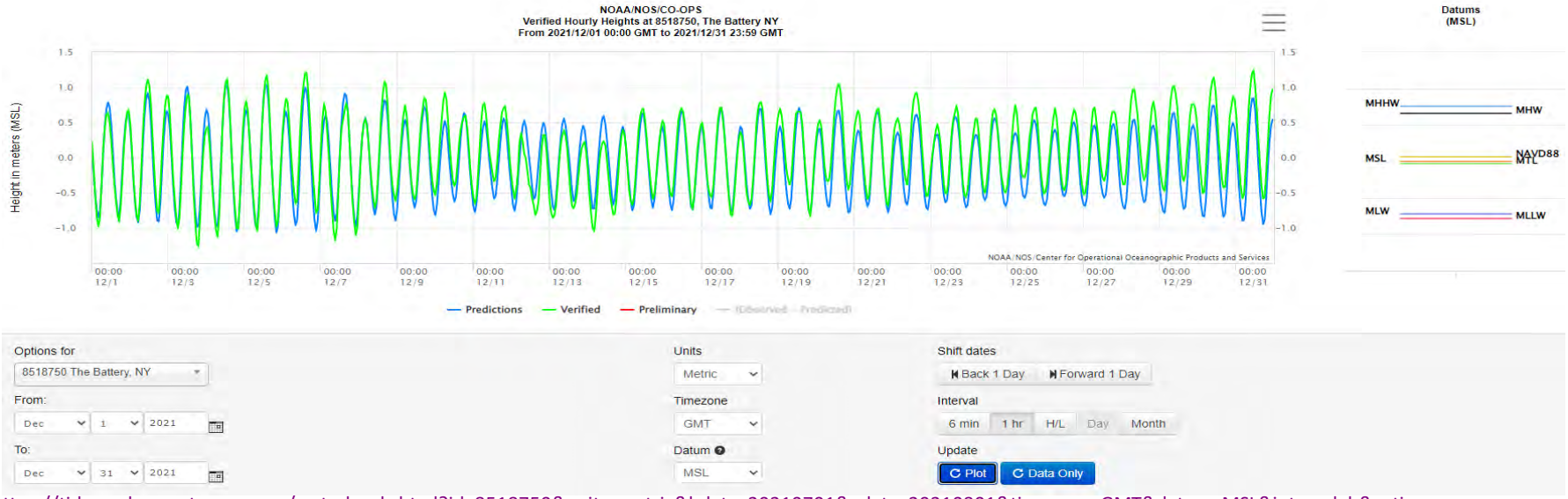
```
000
CXUS51 KOKX 011010
CF6EWR
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:   NEWARK NJ
                                          MONTH:     DECEMBER
                                          YEAR:      2021
                                          LATITUDE:   40 42 N
                                          LONGITUDE:  74 10 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                     12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==============================================================================

 1  51  39  45   3  20   0    T  0.0    0  8.4 16 240   M    M   7        21 260
 2  59  45  52  10  13   0 0.07  0.0    0 11.3 38 320   M    M   9        47 320
 3  51  38  45   4  20   0 0.00  0.0    0 12.7 24 280   M    M   3        33 290
 4  51  35  43   2  22   0 0.00  0.0    0  4.6 14 230   M    M   5        17 230
 5  52  35  44   3  21   0 0.00  0.0    0  4.8 12 120   M    M   8        18 110
 6  66  44  55  14  10   0 0.25  0.0    0 12.5 39 280   M    M   9 1      50 280
 7  45  36  41   1  24   0 0.00  0.0    0  9.9 25 300   M    M   8        31 290
 8  44  34  39  -1  26   0 0.02    T    0  6.4 16 260   M    M  10 1      22 290
 9  41  32  37  -3  28   0 0.00  0.0    0  8.3 20 320   M    M   7        27 300
10  51  39  45   5  20   0 0.00  0.0    0  4.9 15 230   M    M   8        18 250
11  69  44  57  18   8   0 0.19  0.0    0 11.4 36 240   M    M  10 1      47 250
12  55  39  47   8  18   0 0.00  0.0    0 14.4 30 290   M    M   4        38 320
13  55  37  46   7  19   0 0.00  0.0    0 13.1 21 240   M    M   3        28 250
14  56  38  47   9  18   0 0.00  0.0    0  7.1 16 290   M    M   5        22 310
15  55  34  45   7  20   0    T  0.0    0  6.0 14 150   M    M   7        21 100
16  65  54  60  22   5   0 0.00  0.0    0 13.9 23 230   M    M   8        28 240
17  62  48  55  17  10   0 0.00  0.0    0 11.3 18 280   M    M   7        27 280
18  49  40  45   8  20   0 0.12  0.0    0  6.2 14  10   M    M  10 18     18  10
19  47  30  39   2  26   0 0.02  0.0    0 14.9 26 340   M    M   6 1      35 310
20  40  23  32  -5  33   0 0.00  0.0    0  7.4 15 340   M    M   2        19 350
21  43  26  35  -2  30   0    T  0.0    0  4.9 10 230   M    M   7        13 240
22  50  34  42   6  23   0 0.13  0.0    0 13.8 29 320   M    M   6 18     37 330
23  39  31  35  -1  30   0 0.00  0.0    0  8.6 20 320   M    M   6        25 330
24  42  32  37   1  28   0 0.01  0.1    T  4.8 14 360   M    M  10 8      17 360
25  55  38  47  11  18   0 0.16  0.0    0  5.2 13 310   M    M  10 1      17 330
26  55  40  48  12  17   0 0.00  0.0    0 13.6 25 330   M    M   5        32 290
27  40  35  38   3  27   0 0.05    T    0  5.8 15  20   M    M   8 1      18 310
28  48  37  43   8  22   0 0.12  0.0    0  5.9 12 250   M    M   9 1      17 270
29  46  42  44   9  21   0 0.04  0.0    0  4.7 10 360   M    M  10 18     13 110
30  50  44  47  12  18   0 0.09  0.0    0  4.7 10 350   M    M  10 18     14 330
31  54  47  51  17  14   0 0.01  0.0    0  5.0 13 230   M    M  10 1      15 240
==============================================================================
SM 1586 1170       629   0  1.28  0.1    266.5          M      227
==============================================================================
AV 51.2 37.7                              8.6 FASTST   M    M   7    MAX(MPH)
                                 MISC ---->    39 280                50 280
==============================================================================
```

https://w2.weather.gov/climate/index.php?wfo=okx



https://tidesandcurrents.noaa.gov/waterlevels.html?id=8518750&units=metric&bdate=20210701&edate=20210801&timezone=GMT&datum=MSL&interval=h&action=