

Emergency Response at the Bayshore Regional Sewerage Authority
During Hurricane Sandy



NJWEA Annual Conference and Exhibition
May 13, 2013

On October 29th, Hurricane Sandy flooded our plant with up to 4 feet of water

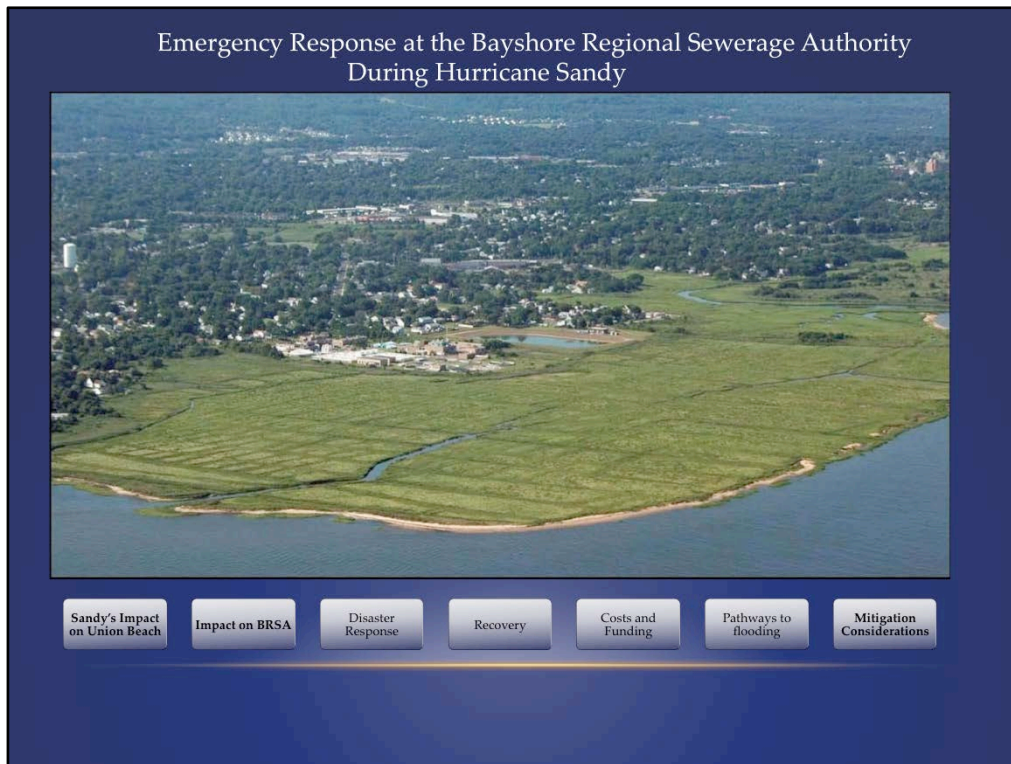
**In the process it completely destroyed 4 major motor control centers
Partially destroyed 2 others, wiped out our incinerators, damaged miles and miles of electrical wiring**

Left us without sewage pumping, activated sludge, sludge handling, electric, phones, internet, fax, process control, automated chlorination, an administration building

Were it not for Verizon cell phones we would have been completely isolated from all communication and our recovery efforts would have been severely delayed.

It flooded our administration building, laboratory building, maintenance garage, primary pump stations, secondary pump stations, blower buildings and incineration facilities. It was inches from 13,200 volt distribution center's, and transformers.

For the month of November we averaged 85% removal for BOD and 86% TSS.



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#15 Jeanne – 2004 - \$8 billion



#12 Francis - 2004 – \$10.2 billion



#9 Rita – 2005 - \$11.8 billion



#14 Floyd – 1999 – \$9.2 billion



#11 Betsy - 1965 - \$11.2 billion



#8 Hugo – 1989 – \$12.7 billion



#13 Camille – 1969 - \$9.2 billion



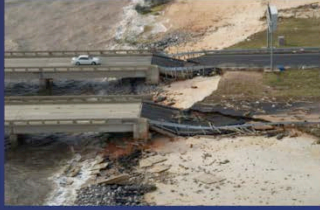
#10 Agnes – 1972 - \$11.7 billion



#7 Charley – 2004 - \$16 billion



#6 Ivan - 2004 - \$20 billion



#3 Andrew - 1992 - \$45 billion



#5 Wilma - 2005 - \$20 billion



#2 Sandy - 2012 - \$60 billion



#4 Ike - 2008 - \$27.7 billion



#1 Katrina - 2005 - \$100 billion

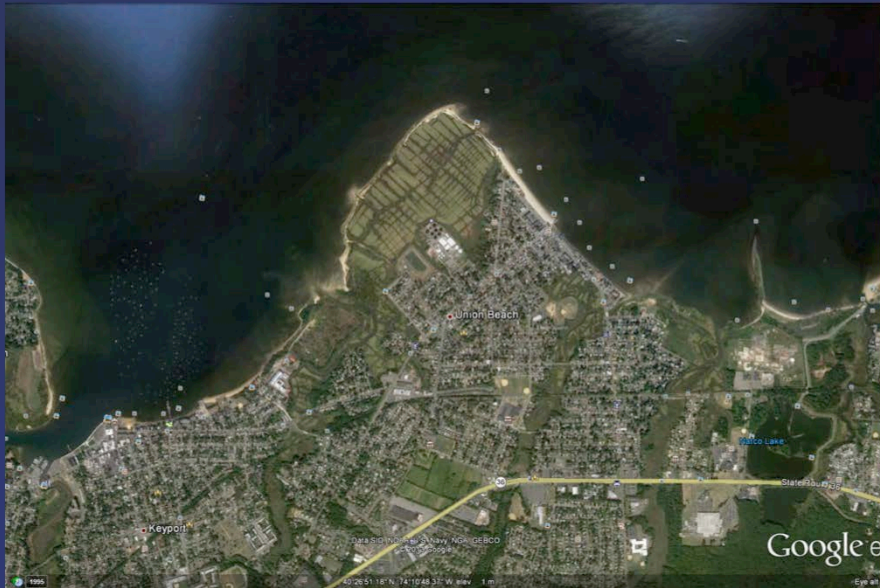






**Bayshore Regional Sewerage Authority is located on the South Shore of the Raritan Bay.
In the Borough of Union Beach directly across from Staten island.**

Impact on Union Beach



We are situated on what is known as Conaskonk Point

Our facility sits on 24 acres

Surrounded by salt marsh

Union beach is 1.5 miles in area and is one of the lower lying communities along the shore.

Prior to the storm we prepared:

additional staffing

generator fuel topped off

generators run under load

pump stations staffed

extra Chlorine delivered

assembled portable generators, pumps hoses

reviewed all primary phone contacts

Facility has never been flooded before.

Impact on Union Beach



Overlay is taken from the USGS website

**300 to 400 homes will be demolished
Close to 90% of the town was underwater**

Employees waded through 3-foot deep water to get to Main Pump Station and Main Generator Facility to de-energize the equipment in an effort to limit damage from flood waters.

Employees sat huddled in loft as flood waters rose below.

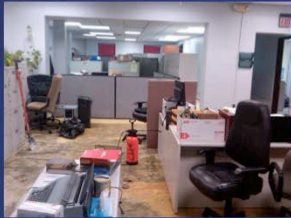
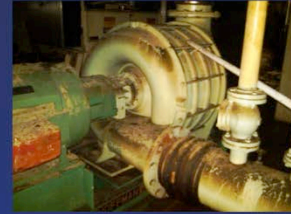
We were able to energize one main pump and the emergency generator on the 30th as a result of the protective measures taken by the operators and mechanics.



Impact on BRSA



Administration Building- 12"
Incinerator basements flooded
Sludge pump station 1 flooded
Blower building 1- 30"
Return Pump station 1 flooded
Main pump station flooded
Blower building 2 - 6"
Sludge pump station 2 - basement - 2'
Return sludge station 2 - basement - 4 "
Laboratory-Office Bldg - 4"
6 vehicles destroyed
Lost phones - fax-internet-power-up to 21 days



The flooding left us with:

No pumping of sewage

No pumping of sludge

No aeration system

No sludge management

No process control

No communication

No office at first

Disaster Response

Control – Direction - Feedback

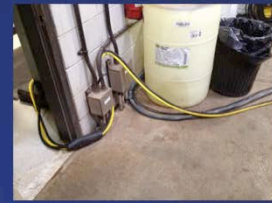
1. Established a Command Center
 - A. Control Central
2. Established an Incident Command Structure
 - A. Roles and responsibilities
3. Established a Status Board
 - A. Visual Progress



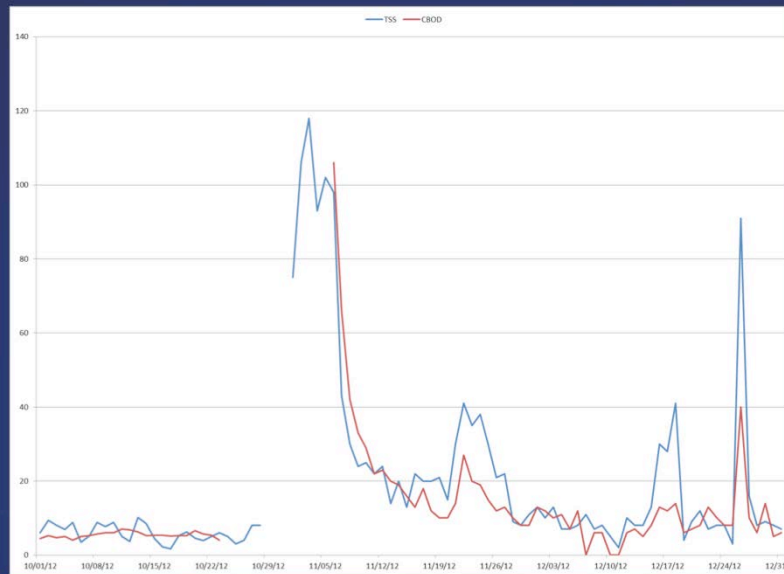


Steady state timeline

1. October 31 (30) after storm Emergency Pumping
2. October 31 Chlorination
3. November 1 Primary Clarifiers
4. November 4 Aeration
5. November 6 Return Sludge
6. November 10 &11 Effluent Compliance
7. November 24 Sludge Thickening



Recovery



Missing data for first couple of days due to field samplers floating away with the flooding.

Chart shows quick recovery of plant to meet conventional pollutants of BOD and TSS.

Having Licensed , Experienced Staff, having Engineers who are familiar with the facility are key to recovery. BRSA has a staff engineer, licensed electrician, licensed operators and certified journeymen on staff. Consulting Engineer has been with facility for over 7 years.

Motor Control Center Damage and Response

October 2012



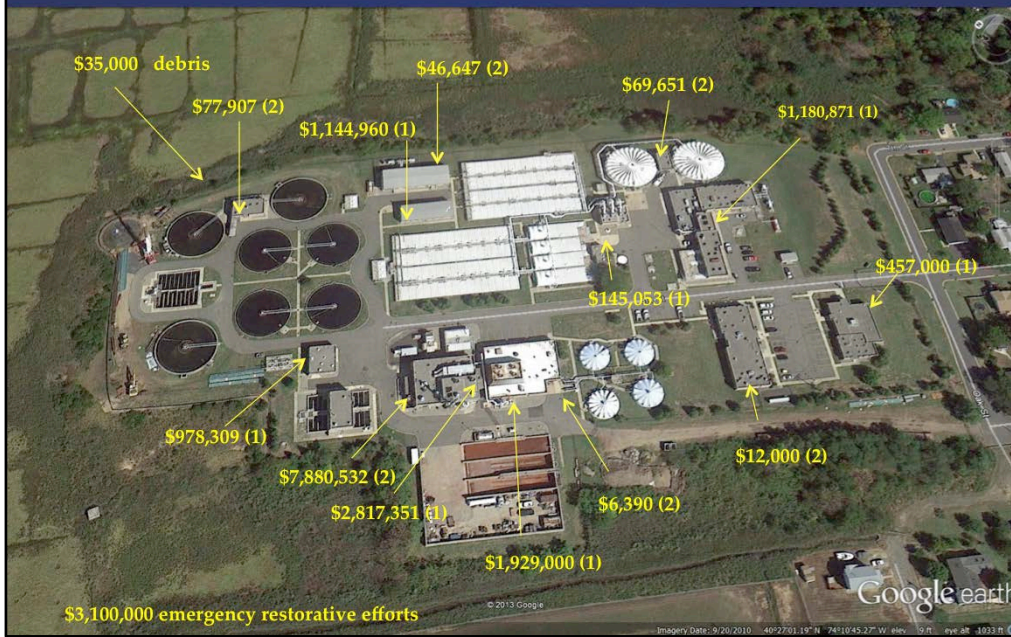
February, 2013



Today



Damage Assessment and Funding



Funding sources



FEMA Categories of Work

Emergency Work Cat A & B

Category A Debris -	\$32,000
Category B Emergency Protective Measures -	\$3, 200,000

Permanent Work

Category E Buildings and Equipment	
Category F Utilities	\$18,000,000

Mitigation

404 State and 406 Federal Hazard Mitigation	\$10 - \$20million
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Expected Funding Sources

Insurance	\$3,500,000
FEMA	\$15,900,000
Surplus/user fee	\$2,600,000
Total	\$22,000,000

Funding to Date

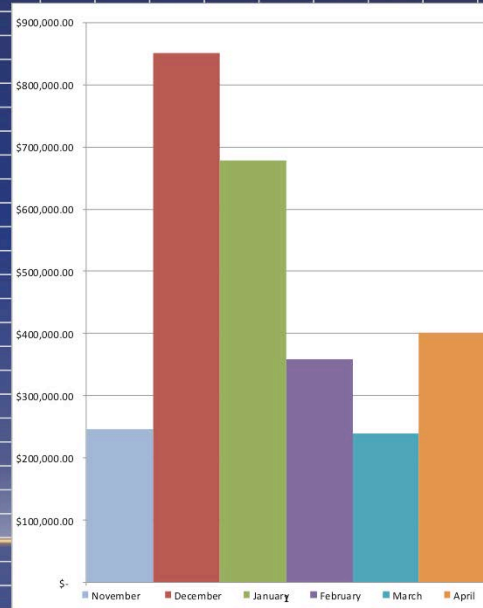
Insurance	\$600,000
FEMA	\$1,234,000
Surplus / user fee	\$942,116
Total	\$2,776,116

Damage Assessment and Funding

Hurricane Sandy Expenses as of 4/15/13

November	\$ 246,236.35
December	\$ 851,477.94
January	\$ 678,824.48
February	\$ 359,272.52
March	\$ 239,269.29
April	\$ 401,035.43
Total	\$ 2,776,116.01

		%
Supplies	\$ 6,493.23	0.2
Debris Removal	\$ 9,406.74	0.3
Labor	\$ 29,503.76	1.1
Fuel	\$ 30,295.03	1.1
Chemicals	\$ 30,646.97	1.1
Materials	\$ 40,388.95	1.5
Service	\$ 142,832.72	5.1
Equipment Rental	\$ 248,875.03	9.0
Plant Equipment	\$ 355,095.65	12.8
Engineering & Cons	\$ 392,901.26	14.2
Emergency Service	\$ 462,397.17	16.7
Cake Hauling & Dis	\$ 505,564.50	18.2
Sludge Hauling & D	\$ 521,715.00	18.8
Total	\$ 2,776,116.01	



Pathway to Flooding

BRSA facility has 2 treatment trains – 8 mgd each
Train 1 built 1972 at elevation 11.1
Train 2 built 1996 at elevation 12.6



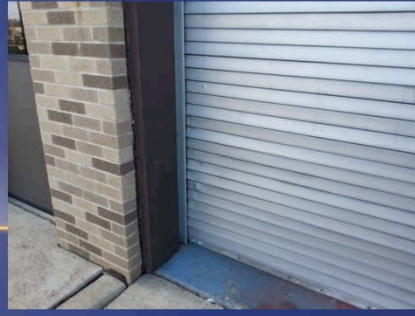
At the BRSA site Sandy was 250 year flood



New ABFE Coastal Zone A

100 year flood 14'
500 year flood 17'

Paths to Flooding



Mitigation Considerations

