JEA sm

Building Community sm

System Resiliency Assessment

JEA's Framework to Resiliency

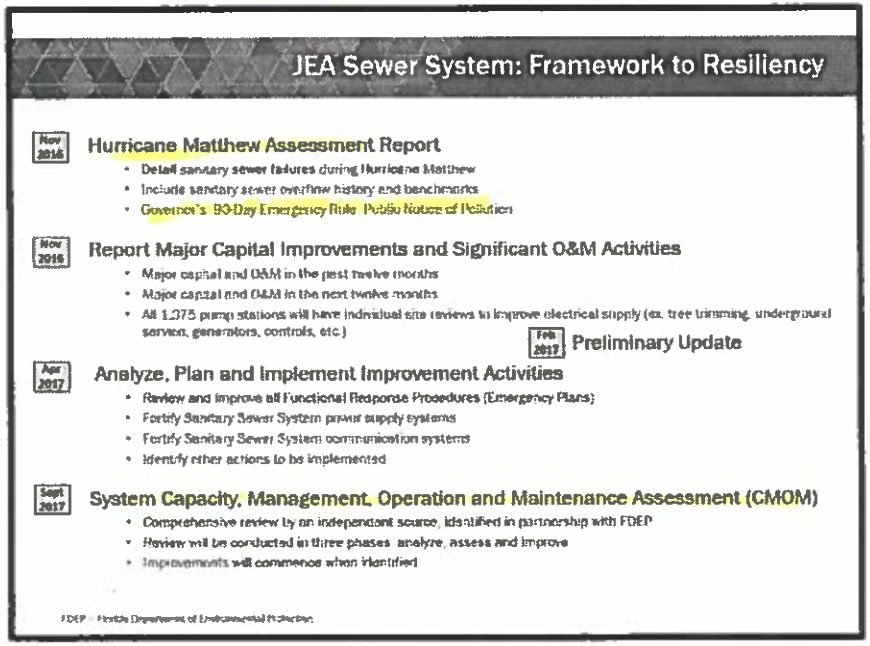
Water and Sewer System

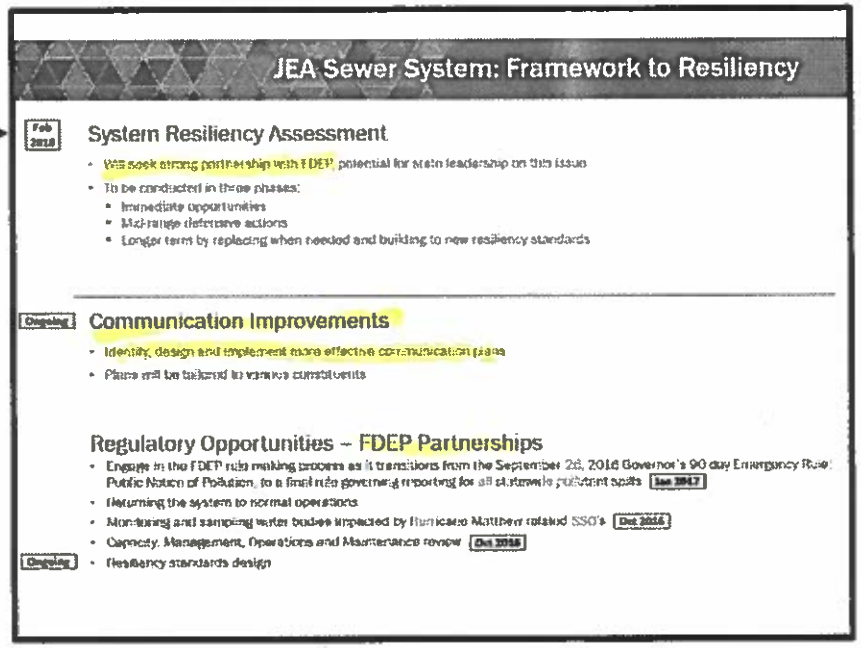
Waterways Commission

March 14, 2018

JEA Sewer System: Framework to Resiliency

Established October 2016



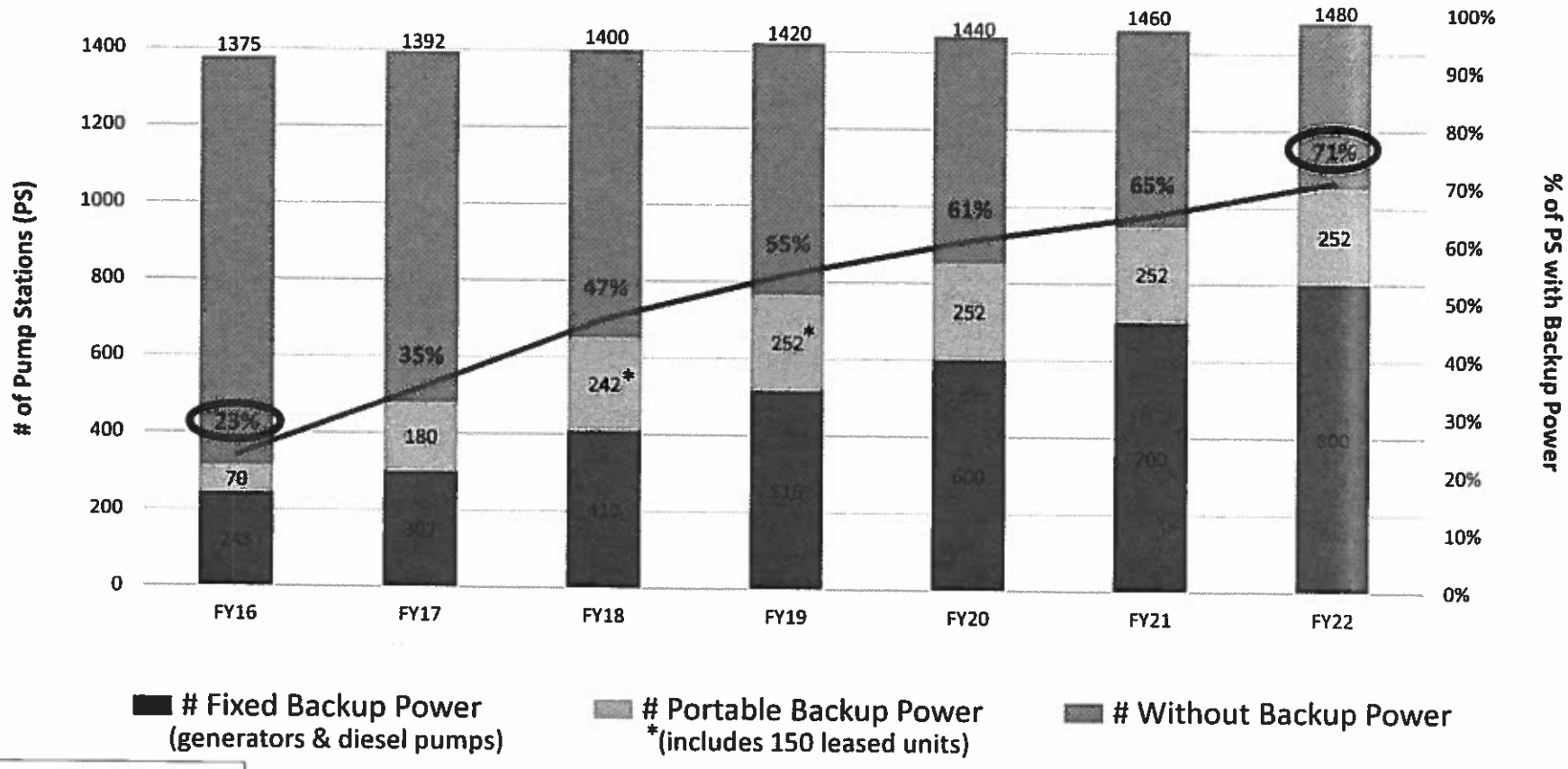


- **Hurricane Matthew Assessment Report:** Established baseline for initiative ✔
- **Communication:** Stakeholder updates with JEA.com as the centralized information source ✔
- **Analyze, Plan and Implement Improvement Activities:** Pre-2017 Hurricane Season ✔
- **Regulatory:** CMOM Assessment under FDEP oversight – Completed September 2017 ✔
- **System Resiliency Assessment:** Mid-Range Defensive Actions and Longer-Term Standards

FDEP: Florida Department of Environmental Protection

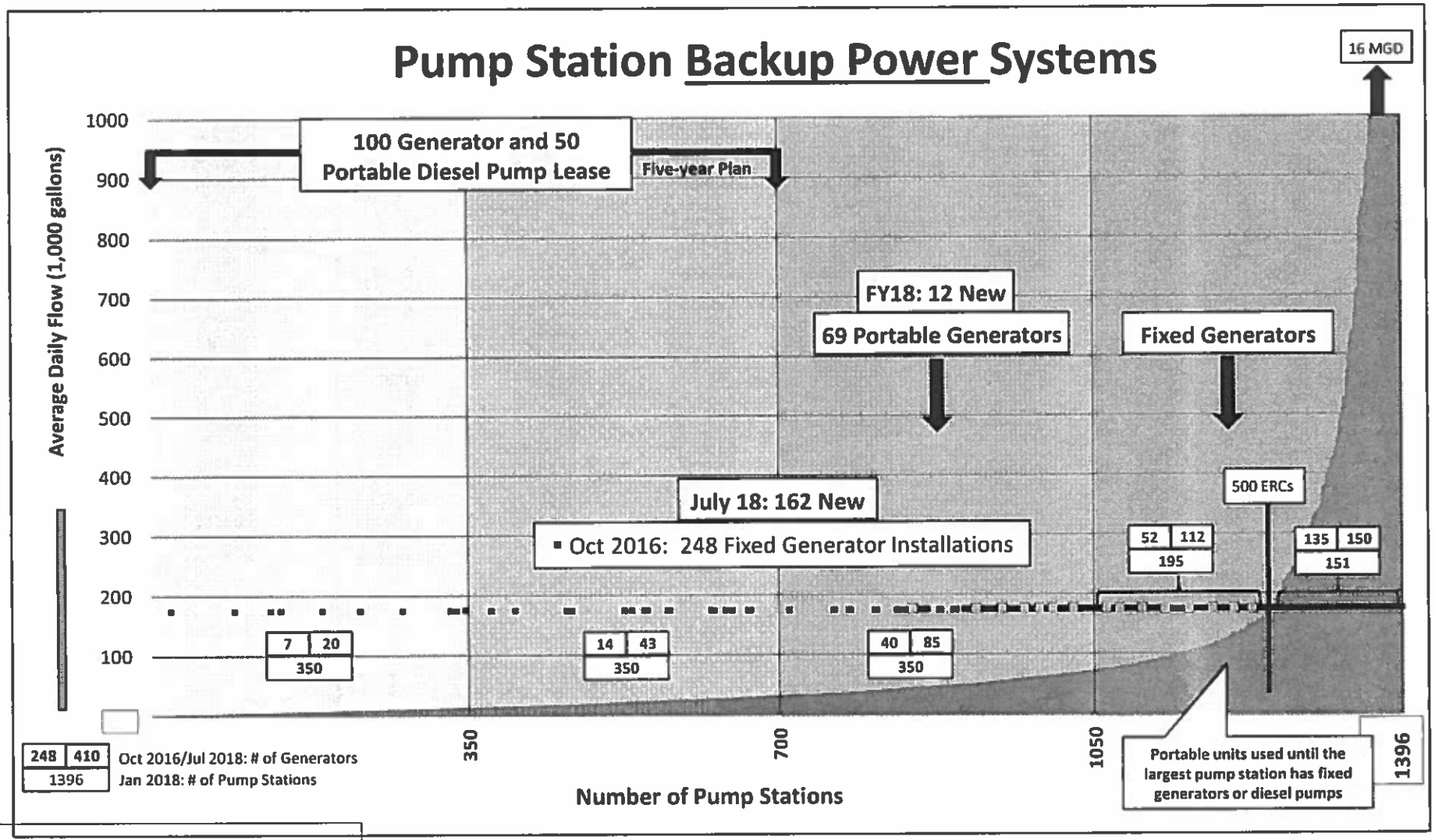
Framework to Resiliency: Sewer Pump Stations

Pump Station Backup Power Coverage



JEA has 1396 Pump Stations – the most of any wastewater utility system in the country

Sewer Resiliency: Additional Generator Deployment



MGD: Million Gallons per Day, annual average daily flow
ERC: Equivalent Residential Connections

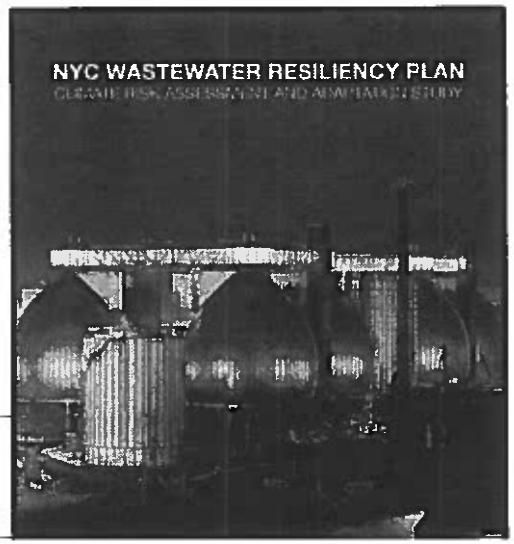
Capital Budget Projection

($'s 000s)	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Fixed Generators for Pump Stations (PS)	500	6,000	5,000	4,000	4,000	3,000	2,000
Class I & II PS Fixed Diesel Pumps	300	500	3,000	4,000	4,000	4,500	5,000
Class III & IV PS Fixed Diesel Pumps	300	500	2,500	4,000	5,000	5,000	3,000
Portable Generators & Diesel Pumps	300	1,000	1,000	500	500		
Electrical Upgrades		200	500	1,000	2,000	3,000	3,000
Fortify / Elevate Equipment			500	1,000	1,000	1,000	3,000
Water Treatment Facilities				1,000	1,000	1,500	2,000
Program Management & Engineering Services			1000	2,000	2,000	1,500	1,500
JEA Salaries & Benefits		300	500	500	300	300	300
TOTAL	1,400	8,500	14,000	18,000	19,800	19,800	19,800

- $100 million in direct resiliency work is projected in the five-year capital plan
- Enhanced resiliency design considerations have been added to numerous other projects currently in design or construction
- $1.5 million dollars has been included in the O&M Budget on an annual basis for the six month lease agreements for 100 portable generators and 50 portable diesel pumps

Extreme Weather Scenarios

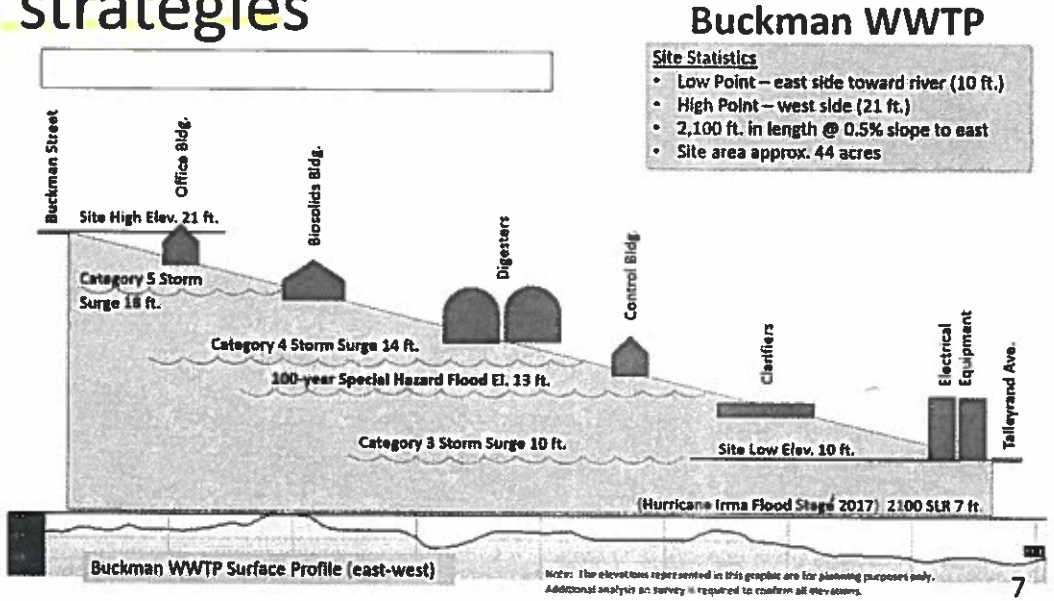
- ❑ Rainfall / Flooding (32" of rainfall in the fourth quarter of FY17)
- ❑ Hurricane / Storm Surge
  - 100 year flood + 1 to 5 feet
  - 500 year flood + 1 to 5 feet
- ❑ Sea Level Rise
  (Potential Climate Impacts)



Buckman Wastewater Treatment Plant

Assessment Approach

- ❑ Model extreme weather scenarios
- ❑ Identify at-risk systems, facilities and equipment
- ❑ Quantification of risks with costs
- ❑ Prioritize mitigation requirements and investments
- ❑ Implement adaptation strategies
  - Preventative
  - Protective
  - New Standards



Engineering Services Scope

1. **Program Management and Quality Assurance**
2. **System Resiliency Assessment**
3. **Enhanced Design and Construction Standards**
   - ❑ Redundant interstate pipe crossings
   - ❑ Fortify Class III & IV pump stations (> 1000 gpm)
   - ❑ Elevation of Equipment, flood barriers
4. **Engineering Design Services**
   - ❑ Inflow and Infiltration (I&I) analysis
   - ❑ Manhole monitoring
   - ❑ Electric Instrumentation and Controls (I&C)
   - ❑ Wastewater plant emergency outfalls

Ensure synchronization of transfer switches, generators, VFD's, relays and other electronics such that back-up power systems operate as designed when primary power supply fails

5. **Integrate with JEA's Capital Plan**
   - ❑ $100 million Large Diameter Pipe Replacement Program
   - ❑ $1 billion five-year capital program
   - ❑ Water Supply Sustainability Plan
6. **Benchmark Assessment**
7. **Publications, Exhibits and Presentations**
8. **Coordinate Design Changes with Other Infrastructure**

Note: 1000 gpm = 1000 gallons per minute or 1.44 million gallons per day

Utilities

- ❑ Florida
- ❑ National

Sewer/Stormwater

- ❑ NYC DEP
- ❑ DC Water

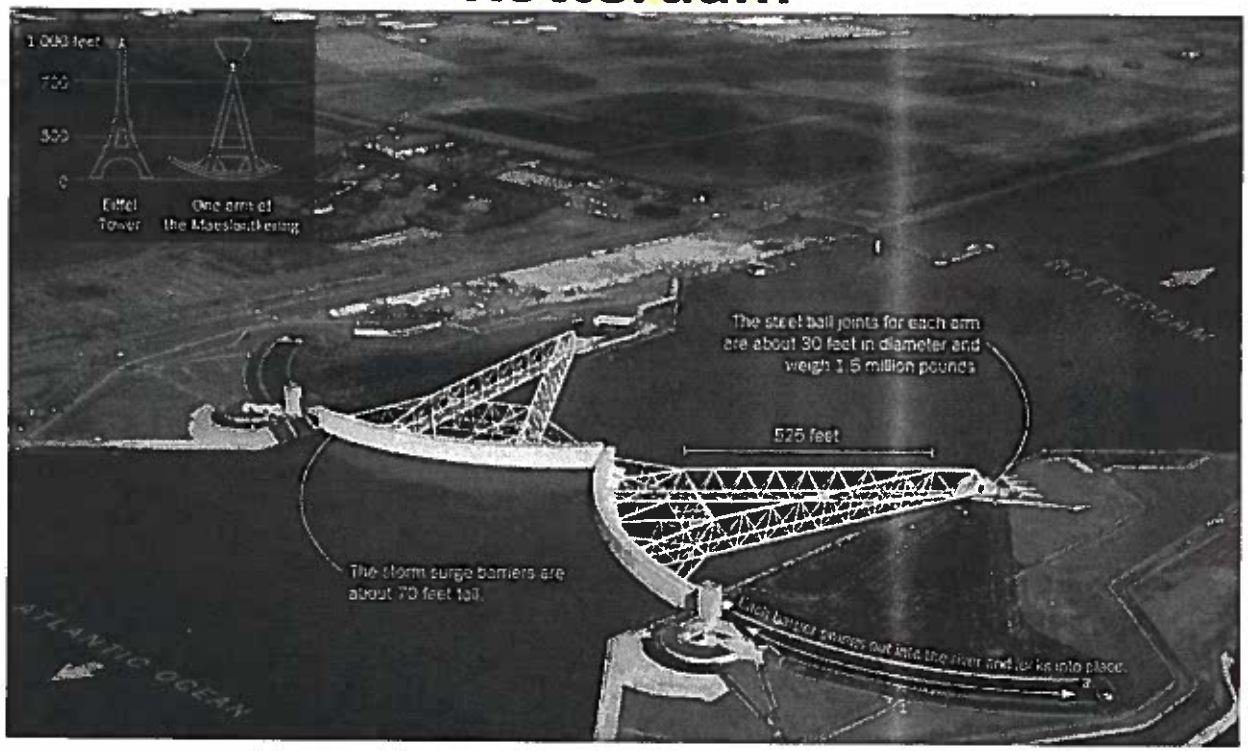
Cities

- ❑ City of Miami
- ❑ City of Boston
- ❑ International

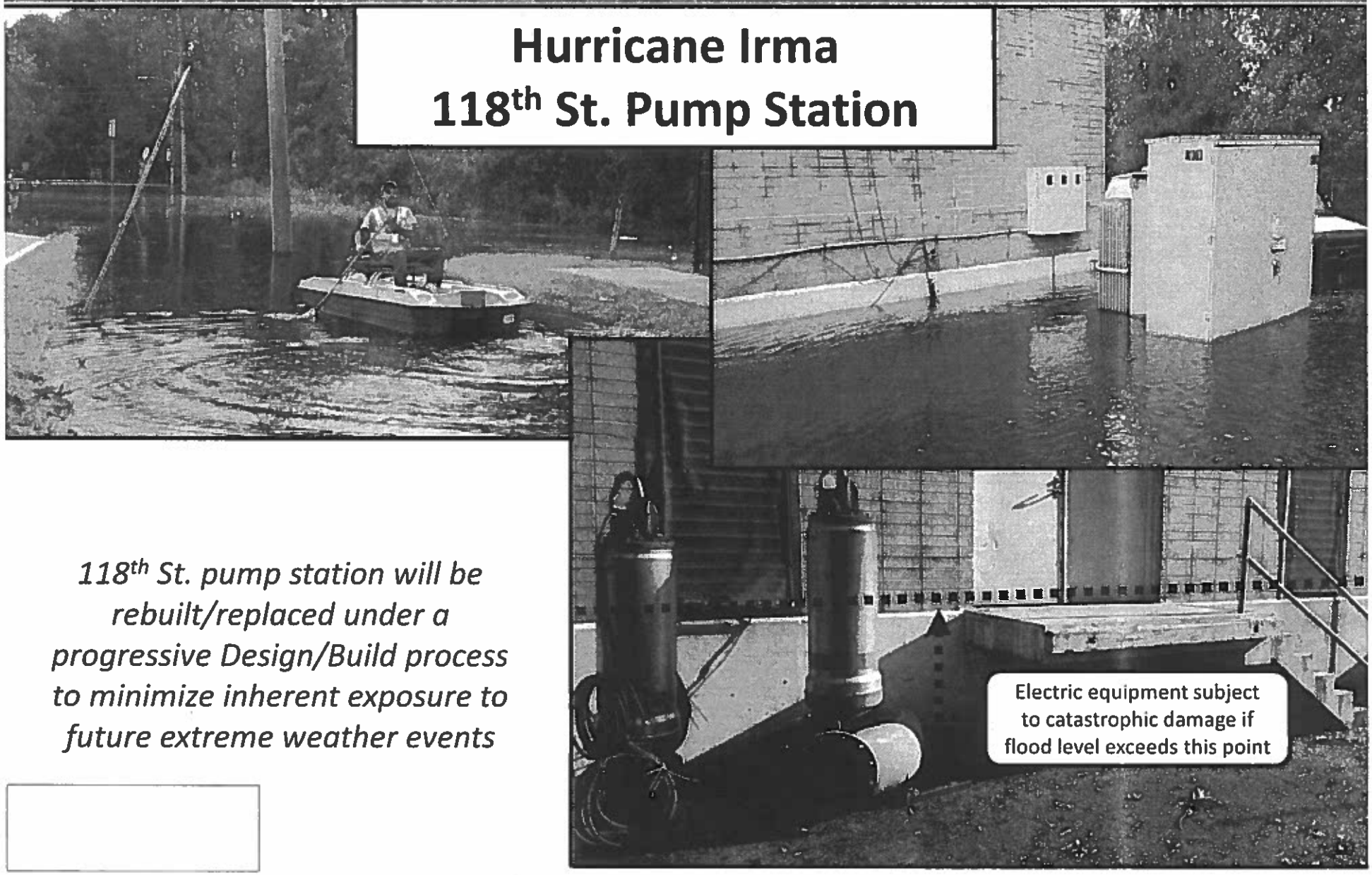
Benchmark

JEA's Water and Wastewater "Framework to Resiliency" will be benchmarked with other utilities' resiliency initiatives

Rotterdam



Hurricane Irma
118th St. Pump Station



118th St. pump station will be rebuilt/replaced under a progressive Design/Build process to minimize inherent exposure to future extreme weather events

Milestones

Nov, 2016	Hurricane Matthew Assessment Report
Nov, 2016	Report Major Capital Improvements and Significant O&M Activities
Feb, 2017	Improvement Activities: Preliminary Update
Apr, 2017	Analyze, Plan and Implement Improvement Activities
Sep, 2017	System Capacity, Management, and Operation, and Maintenance Assessment (CMOM)
Feb, 2018	System Resiliency Assessment → Multi-Year effort to implement: - Mid-Range Defensive Actions - Long Term Design Standards
Ongoing	Communication Improvements
Ongoing	Regulatory Opportunities – FDEP Partnership

- Multi-year assessment, implementation and adaptation strategies
- **Periodically update the Board and Stakeholders**

SUPPLEMENTAL

JEA New Standards Class III and IV Pump Stations

Generator
Provides power for stations in event of a line power outage

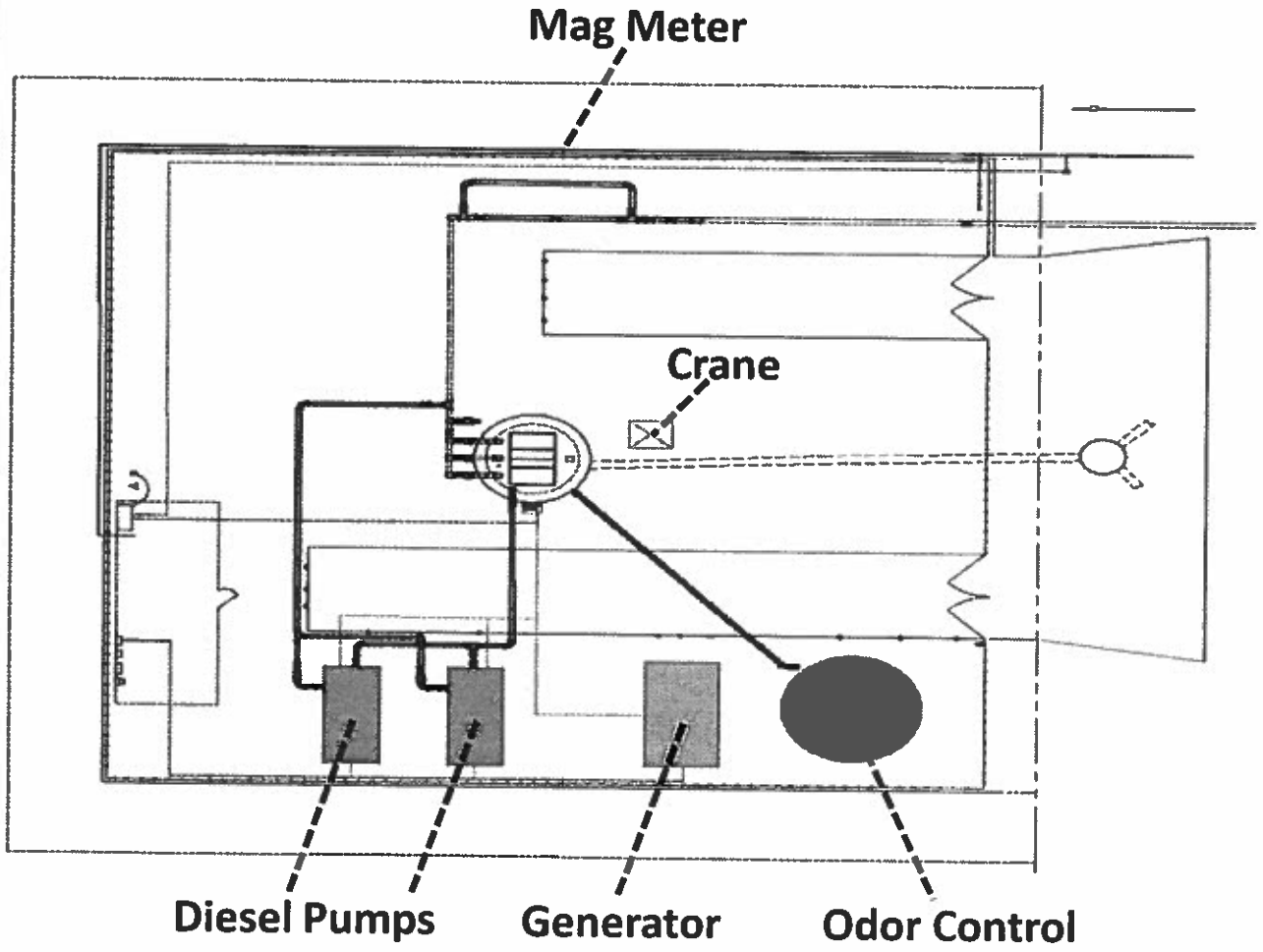
Diesel Pumps
Provides pumping capability when wet well level rises too high due to excessive inflow, line power outage and/or generator failure

Odor Control
Provides odor control for wet well and for solid removal system

Crane
Used for quickly removing malfunctioning pumps

Mag Meter
Allows JEA to monitor flow, alerting to high inflow events

Flood Protection
Elevate sensitive equipment and utilize flood barriers



Notes
1. Class III pump station: > 1,000 gpm & JEA currently has 75
2. Class IV pump station: > 2,000 gpm & JEA currently has 50

CMOM Recommendations

Blue Sky Centric

❑ Specific Infrastructure Action

1. Monitor for Inflow and Infiltration (I&I) within Pump Station Service Areas
2. Initiate Cleaning and Proactive CCTV Programs using SL-RAT Screening Technology
3. Improve Air Release Valve Rehabilitation and Maintenance

❑ Process Management

4. Remain focused on projects associated with JEA's "Framework to Resiliency"
5. Expand SSO Reporting to include Programmatic Overview of Causes and Prevention
6. Resume Data Dashboards for Collection System Maintenance and Rehabilitation
7. Continue ARCADIS Large Diameter Pipe Evaluation where JEA has planned approximately $100 million of pipe replacement, and Expand to Small Diameter Ductile Iron, Cast Iron, and Asbestos Cement (AC) Force Mains

CCTV: Closed Circuit Television
SL-RAT: Sewer Line Rapid Assessment Tool