COSTEP MA Resilience Symposium for Cultural Institutions

Presentation slide decks

Session 1: Climate Change and Resilience for Cultural Institutions

10:30am - 12:00pm

Presentations in order of appearance:

1. Presentation given by Ben Haavik, Team Leader of Property Care for Historic New England
2. Presentation given by Rodney Rowland, Director of Special Projects and Facilities, Strawbery Banke Museum
3. Presentation given by Matthew Siegal, Chair, Conservation and Collections Management, Museum of Fine Arts, Boston

Perez Art Museum Miami Florida

In 2013, the Pérez Art Museum Miami moved into a cutting-edge facility that was specifically designed to withstand hurricanes. The museum is raised on an elevated platform above the flood plain and features the largest sheets of hurricane-resistant glass in the U.S. Its art storage space is more than 46 feet above sea level, and its signature hanging gardens are reinforced with enough steel to withstand category-five hurricane winds. The museum also features an advanced backup-electricity system with generator systems designed and situated as to be refueled by barge when inaccessible by land.

Climate Change
Building Museum Resilience

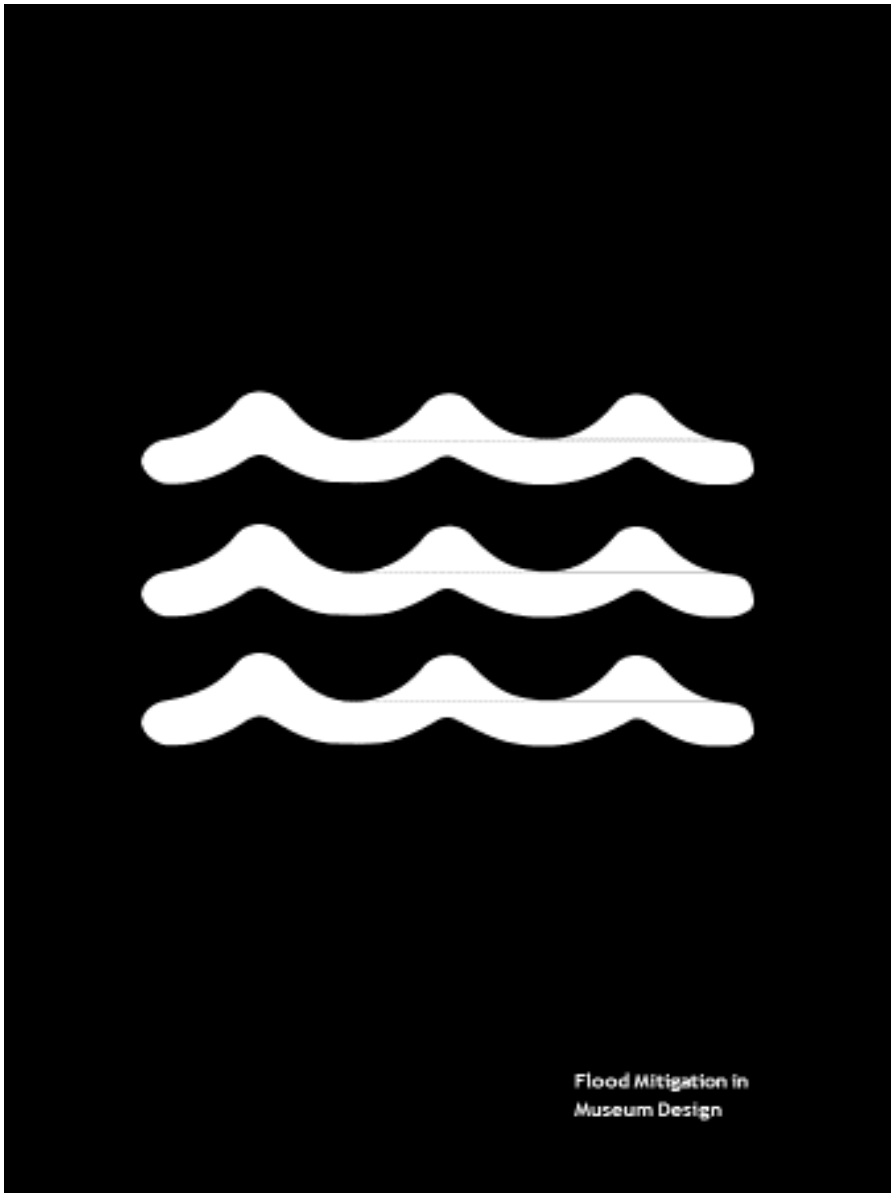
Case Study – the Whitney Museum of American Art

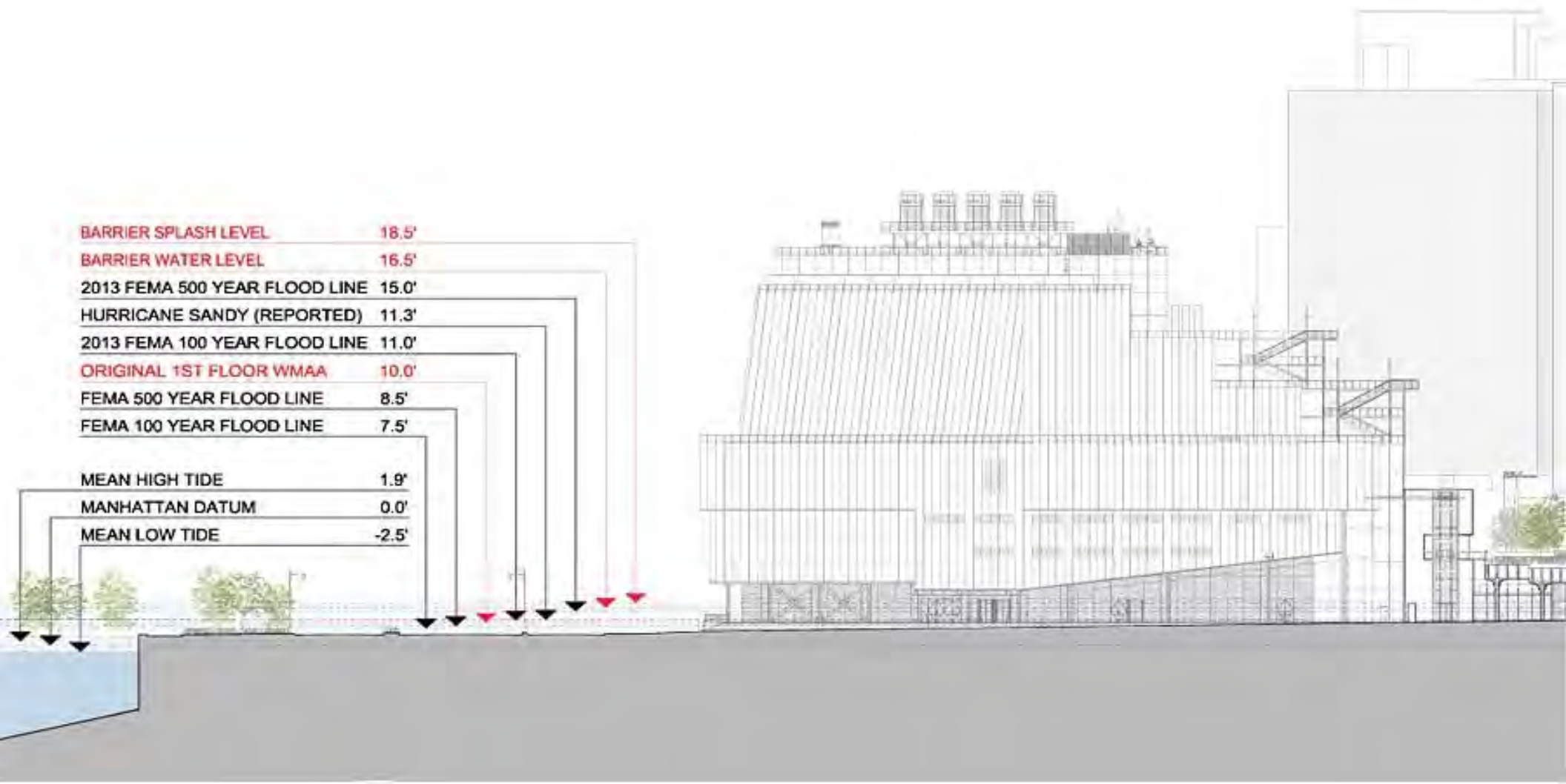
The new Whitney Museum of American Art - 99 Gansevort Street NYC opened 2015

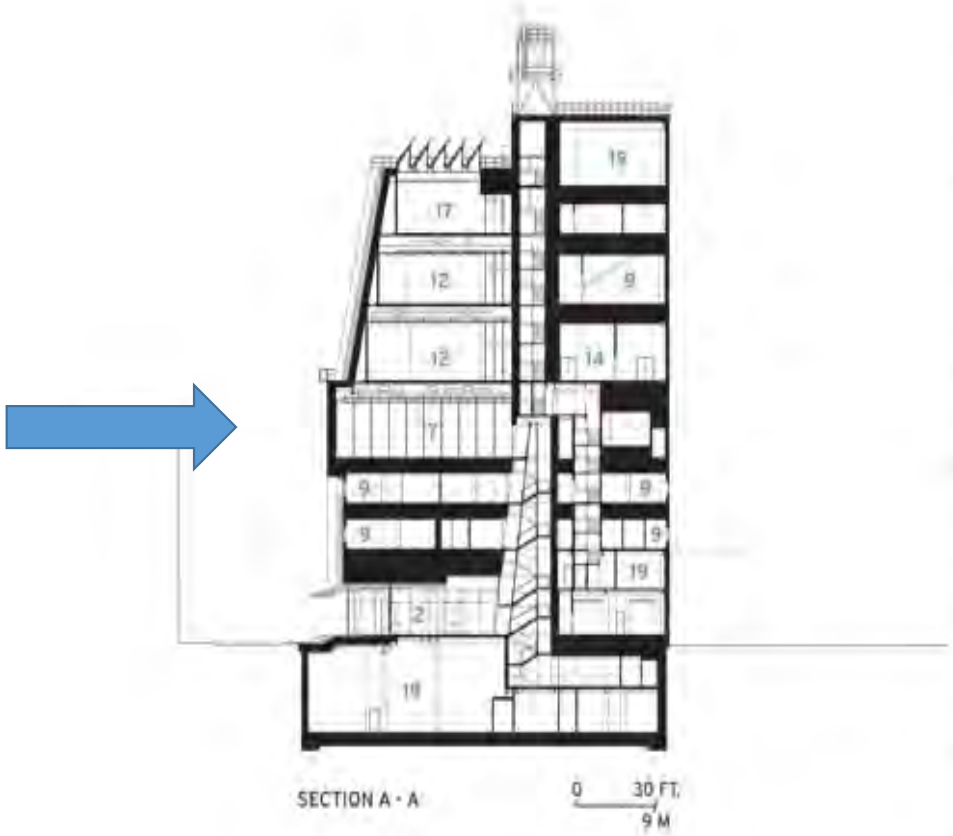
The Whitney was designed to meet standards set by the American Society of Civil Engineers (ASCE) for structures in flood hazard areas to meet or exceed the requirements of the National Flood Insurance Program (NFIP), which is administered by FEMA. These standards derived from ASCE 24, *Flood Resistant Design and Construction*, and included the anchoring of the pile foundation and building structure to "resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements" of the New York City Building Code.

Under construction in October 2012 Hurricane Sandy inundated the Whitney job site with six million gallons of the Hudson River, prompting a substantial redesign and fundraising for an additional $40 million to pay for it.

Cooper Robertson
123 William Street
NYC




BARRIER SPLASH LEVEL 18.5'
BARRIER WATER LEVEL 16.5'
2013 FEMA 500 YEAR FLOOD LINE 15.0'
HURRICANE SANDY (REPORTED) 11.3'
2013 FEMA 100 YEAR FLOOD LINE 11.0'
ORIGINAL 1ST FLOOR WMAA 10.0'
FEMA 500 YEAR FLOOD LINE 8.5'
FEMA 100 YEAR FLOOD LINE 7.5'
MEAN HIGH TIDE 1.9'
MANHATTAN DATUM 0.0'
MEAN LOW TIDE -2.5'



SECTION A - A

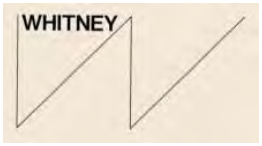
0 30 FT.
9 M

1 ENTRY
2 LOBBY
3 MUSEUM SHOP
4 RESTAURANT
5 LOBBY GALLERY
6 LOADING
7 TEMPORARY EXHIBITIONS
8 CRATE STORAGE
9 OFFICE
10 FILM AND VIDEO BLACK BOX
11 OUTDOOR GALLERY
12 COLLECTION GALLERY
13 CONSERVATION CENTER
14 WORKS ON PAPER CENTER
15 CONFERENCE
16 CAFÉ
17 SPECIAL PROJECTS GALLERY
18 TERRACE
19 MECHANICAL

Draft as of 7/29/15

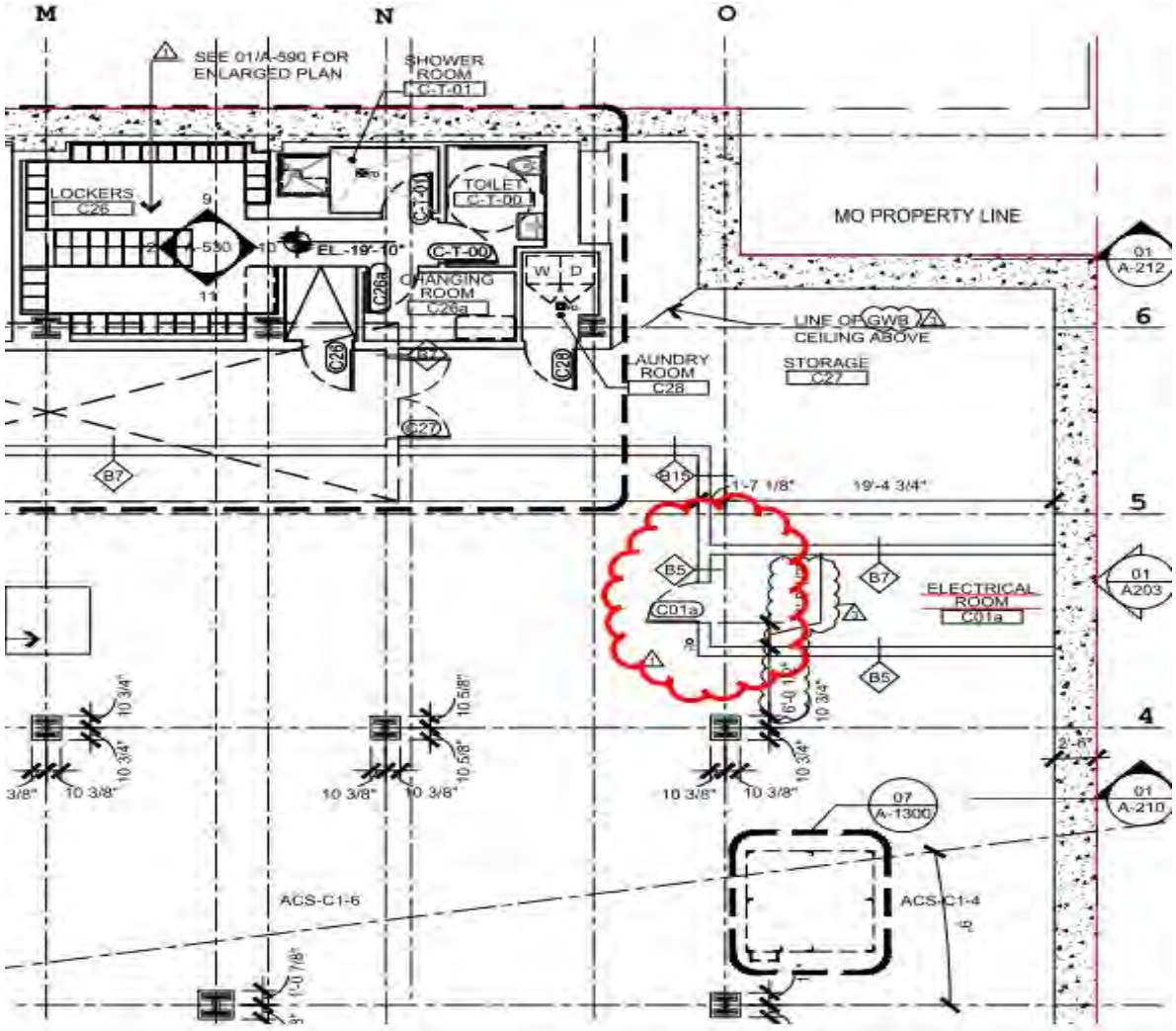
SOP

Standard Operating Procedures
Flood Protection



Whitney Museum of American Art
99 Gansevoort Street
New York, NY 10014

4. Electrical Room Cellar
Close barrier in front of the electrical room



- 6.1.2 Tasks BSTW team

- 6.1.2.1 Mechanical / Electrical / Plumbing systems

  - Wall penetrations (pipes, vents etc.) open during regular operation of the building, located below
  - 16.5 ft and not protected by a flood gate or barrier must be shut/closed/sealed prior to an expected flood event.
  - Operational readiness of the emergency power supply system must be ensured.

1. Emergency Power Supply

   ☐ Schedule a delivery of diesel fuel oil to ensure the fuel oil tank is filled to capacity

2. Pipes / Valves

   ☐ Place MEP systems into “Flood Mode #1” by enabling this mode on the BMS system. “Flood Mode #1” will automatically complete the following:

   a. Valves 1 & 5 on storm pipes will close.
   b. Valves 10 & 11 on inlet to Storm Water Discharge Pumps adjacent to storm tank will open.
   c. Valve 12 on domestic water fill to storm tank will close.
   d. Valve 13 on storm pipe inlet to storm tank will close.

   ☐ Confirm visually that each of the valves above is closed immediately after enabling “Flood Mode #1”. If BMS received an error that a valve did not close, or if during visual inspection it is confirmed that a valve is not closed, the valve may be manually shut using the chain operation located at the floor directly below the valve.

   - ➔ *Location of valves see plan P-100 (by JB&B)*

When the building has been evacuated & the sanitary system is no longer actively being used, enable “Flood Mode #2” by enabling this mode on the BMS system.
“Flood Mode #2” will automatically complete the following:

a. Valve 3 on sanitary fresh air inlet will close.

Note: In case of emergency, Valve #7 on the sanitary sewer connection to the street can be closed from the BMS. For standard flood proofing, this valve does not need to be closed, as the backwater check valve should provide backflow protection.

6.1.2.3 Flood Gates, Barriers and Stop Log System West Side

1. Loading Dock

Remove ramps in the loading dock area to allow gate to close
Remove gasket covers

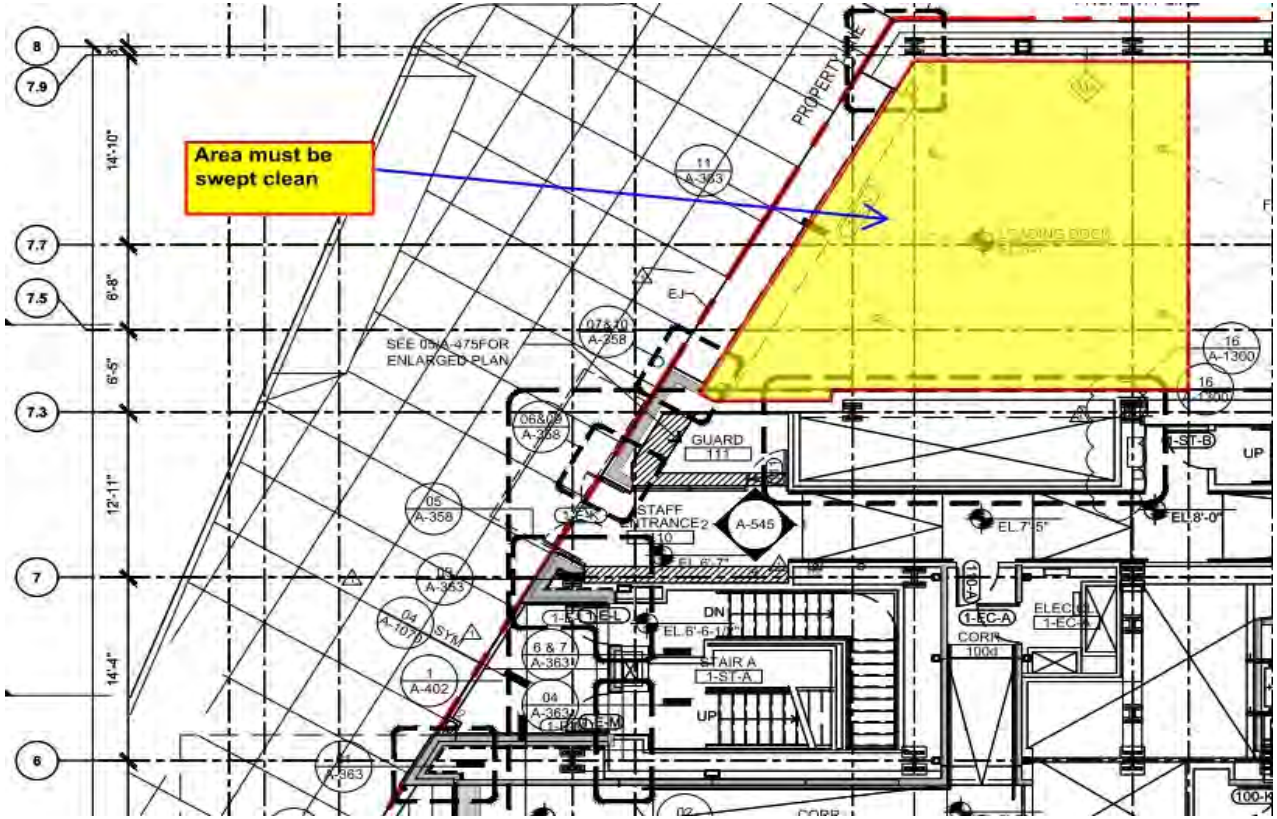
Sweep / clear floor in the loading dock area where the flood gate passes during closing and where the gate will be located in its closed position

Pay special attention to sweeping / clearing the roller track

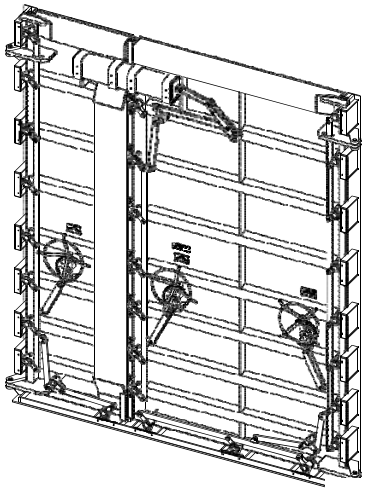
Check bottom frame thoroughly for debris and remove debris

Shut floodgate;

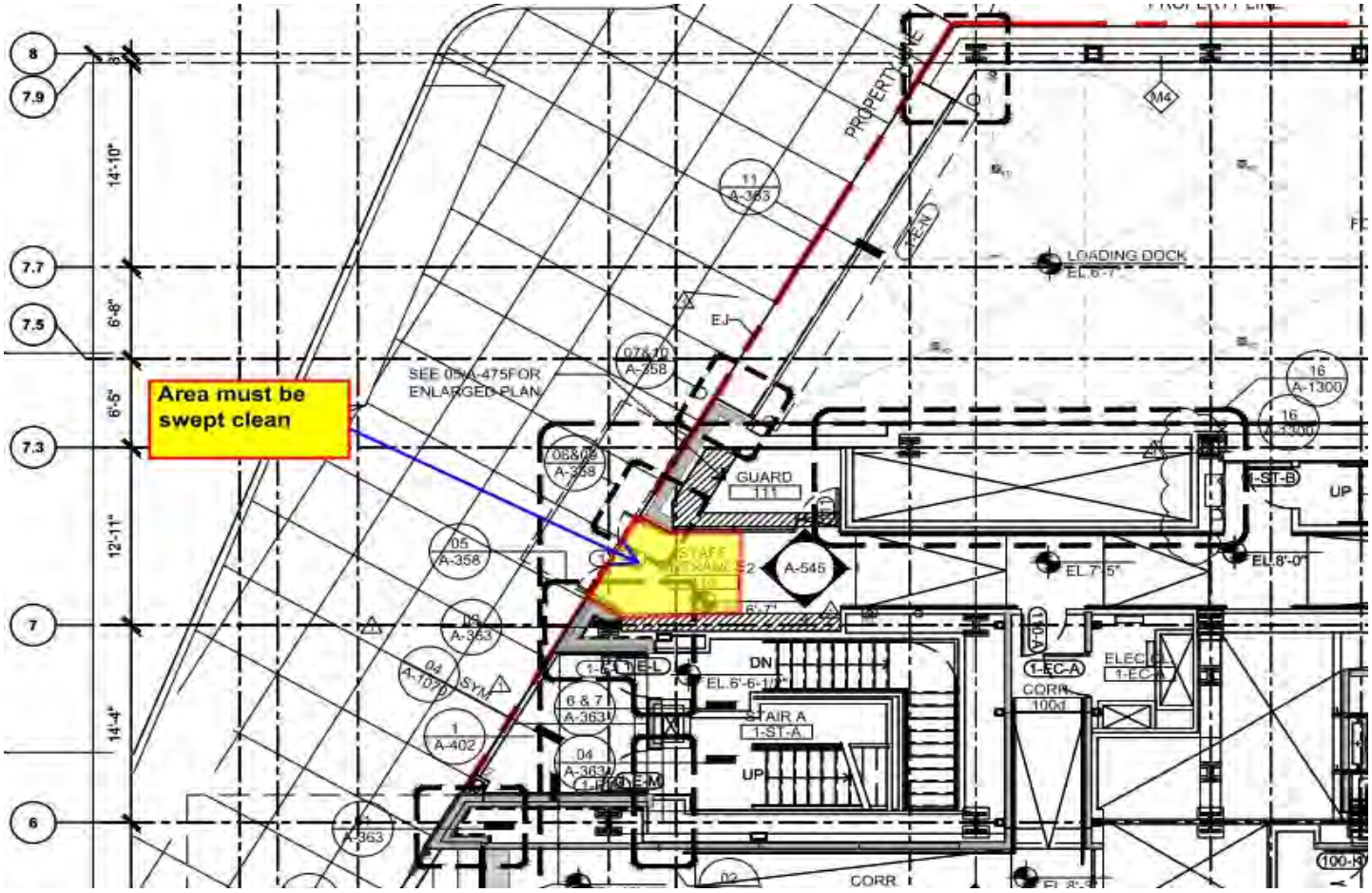
Dog gate via handwheels



Copper Robertson called on Walz and Krenzer, a Connecticut based engineering firm specializing in watertight enclosures for the maritime industry to design flood barrier systems. The loading dock door pictured is 27 feet long, 14 feet high and weights 15,500 lbs. It can be manually operated by one to two people.

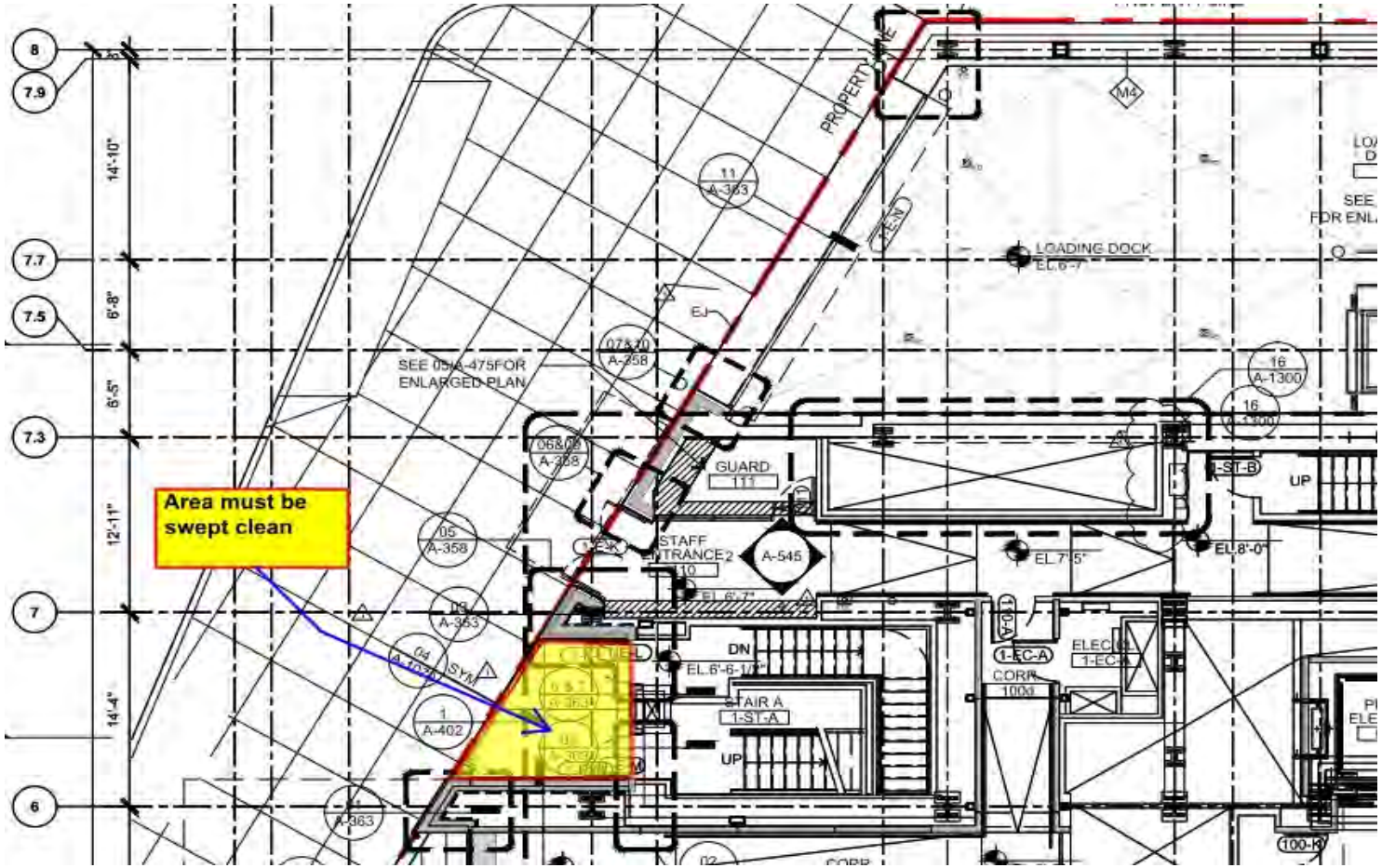


2. Staff Entrance
   Remove gasket covers at the staff entrance
   Remove staff entrance glass doors and store them securely *(at rear of loading dock)*
   Sweep/clean floor in the staff entrance area where the gate passes during closing and where the gate will be located in its closed position / take out door mat
   Check bottom frame thoroughly for debris and remove debris
   Shut floodgate
   Dog gate via handwheels



3. Stair A

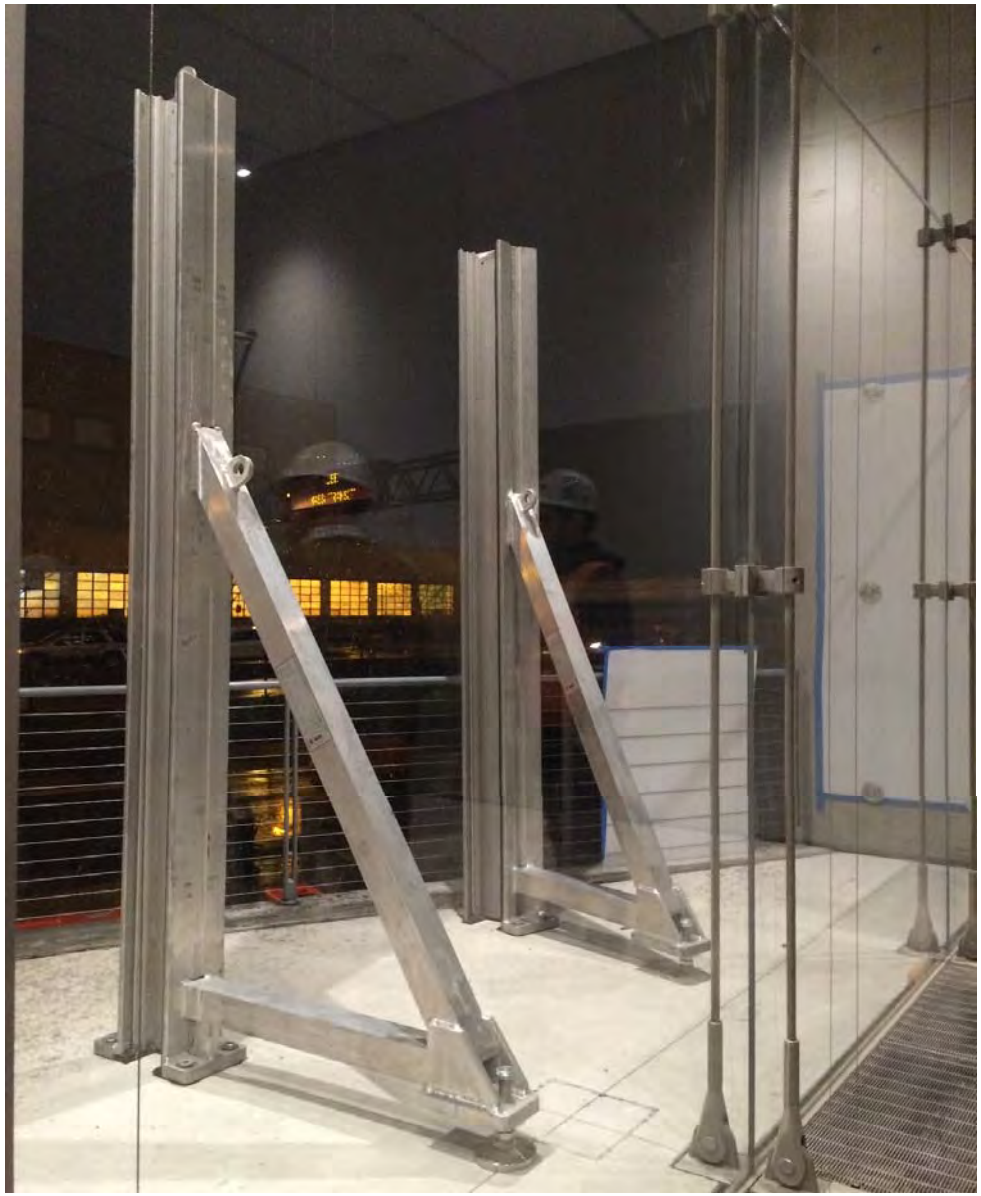
Posts shall be installed permanently and be protected by cover plates.
Remove cover plates
Check if lip seal gasket is in place and intact, replace if not
Sweep/clean floor at Stair A where the mobile system will be deployed
Assemble stop log system at Stair A according to the manual provided by Walz & Krenzer



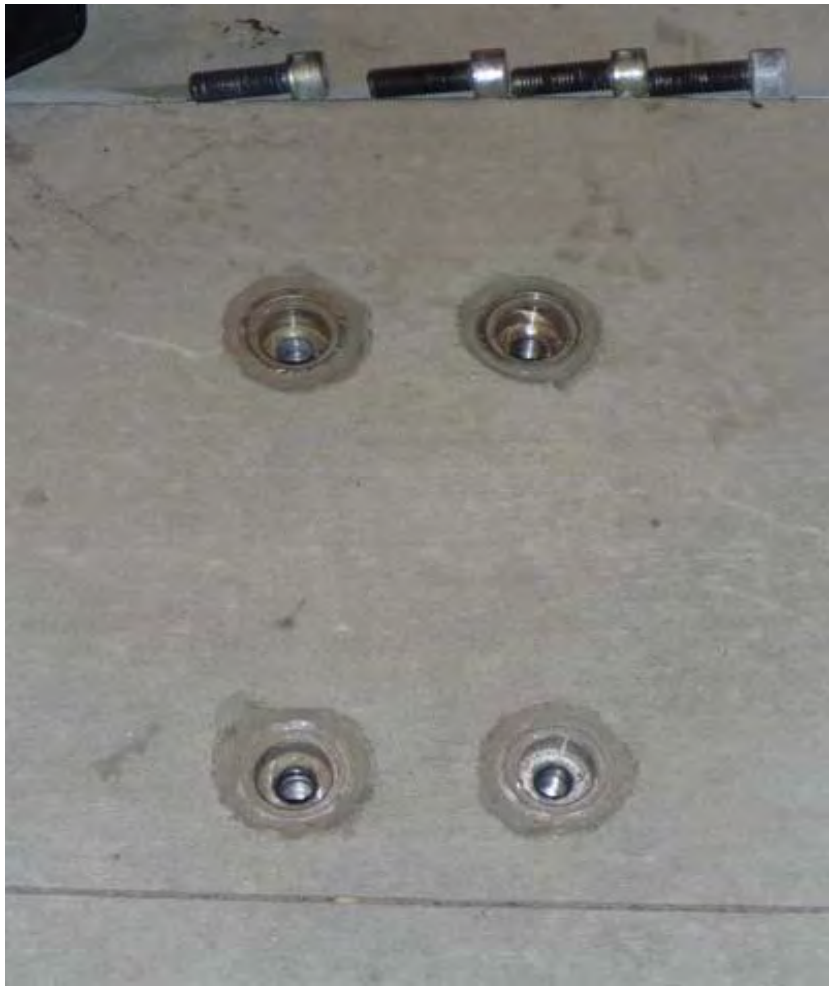
The 500 foot dam system takes approximately 16 to 20 laborers 8 to 10 hours to fully erect.

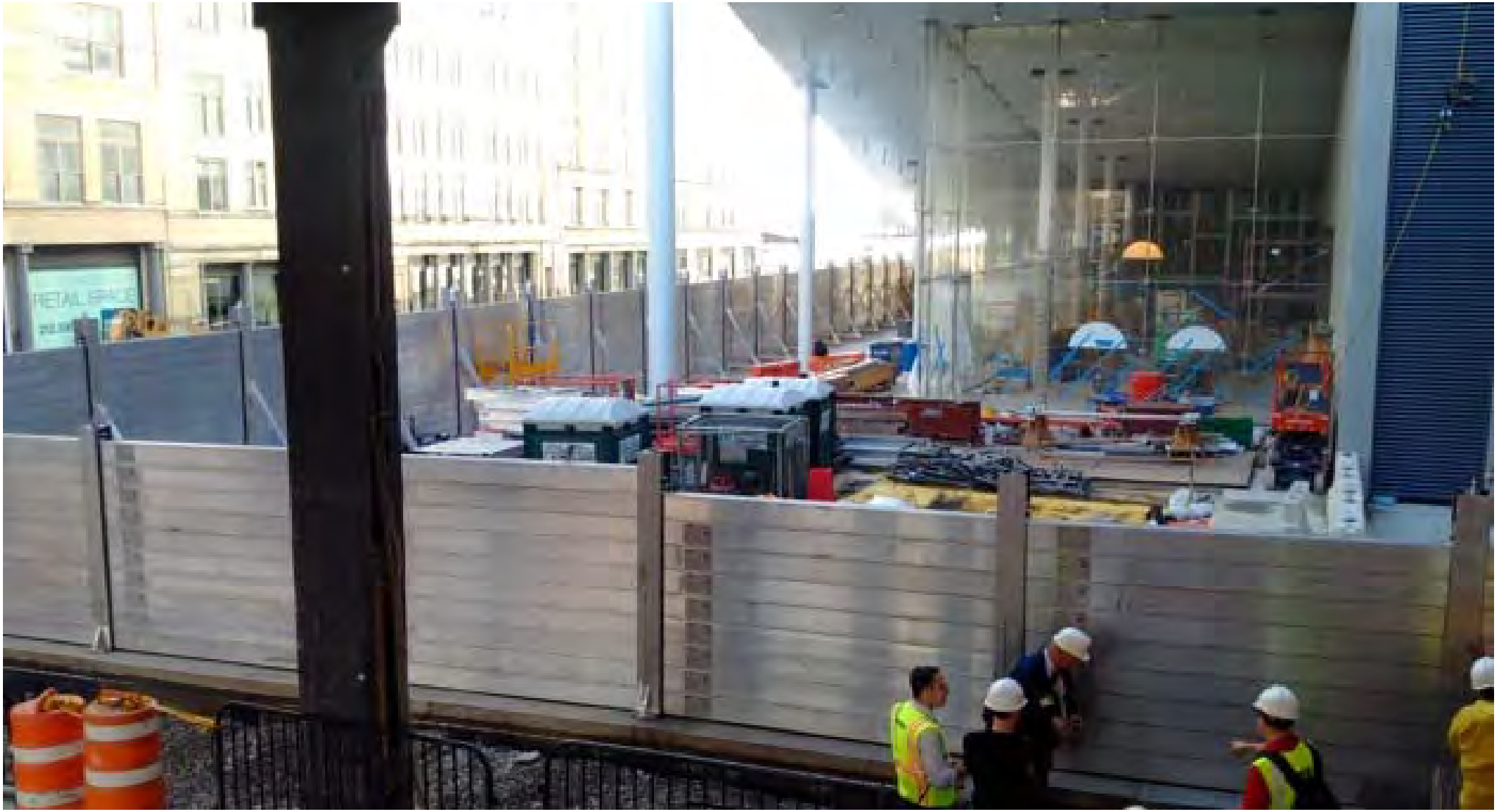
The entire system is stored next door in the meatpacking building on West Street; storage space is approx. 2,135sq ft.

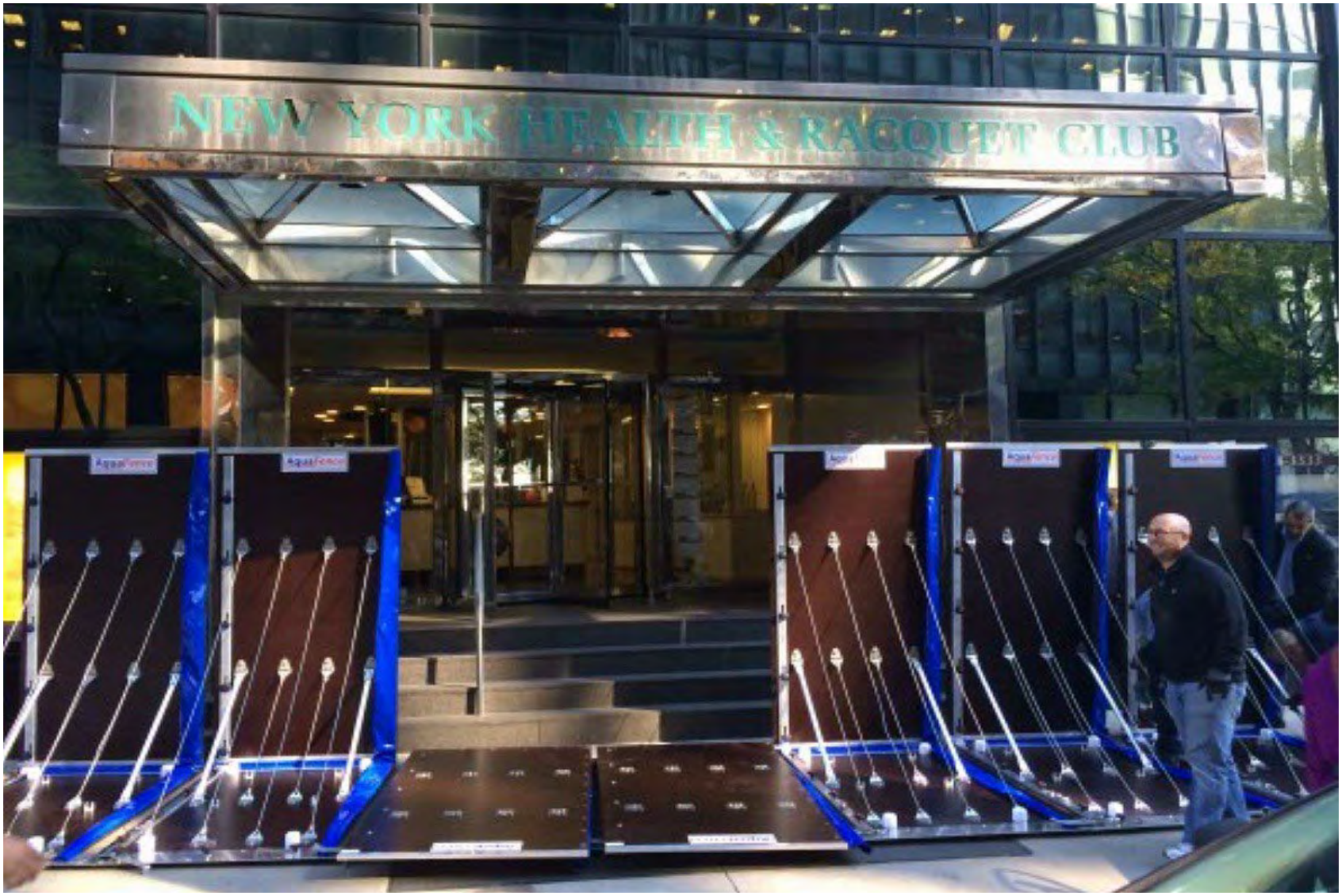
Initially, it took 5 trailers to transport the system from fabrication site in Long Island City to the Whitney site.




T5






NEW YORK HEALTH & RACQUET CLUB

An additional change to the original building design included the rethinking of the building's emergency energy sources. Instead of the 1,000 gallon fuel oil tank originally planned for the museum, the Whitney's insurance advisors suggested accommodating the largest tank possible. Therefore, the building has a 4,000 gallon tank which provides as much emergency fuel as possible. This will allow the building's systems, particularly the pump system, to run for a far greater duration than originally planned. The team did precise calculations to account for numerous flood event scenarios, including the failure of various functions. For example, if the water pumps should fail, it was determined that roughly 14 inches of water may then flood the basement. Therefore, the placement of all electrical equipment was adjusted to sit 14 inches above the finish cellar floor elevation. In cases where this was not possible, a concrete barrier provides perimeter protection.

In the worst case scenario of a flood water level rise above 16.5 feet elevation, the structure is designed to endure flooding of the lobby level, to deflect the force of any debris impact loads, and to prevent any stray building materials from blowing off the structure and causing damage or injury. The severe impact of a flood of this magnitude on the city supersedes the concern for resuming building operations as quickly. The Cooper Robertson design gives the Whitney staff peace of mind that the building will not cause harm to its community during any future unprecedented weather events.