



74<sup>th</sup> Street Project Report  
for  
Public Health and Health Planning Council  
Ad HOC Advisory Committee on Environmental and Construction Standards  
Regarding  
Storm Mitigation Design

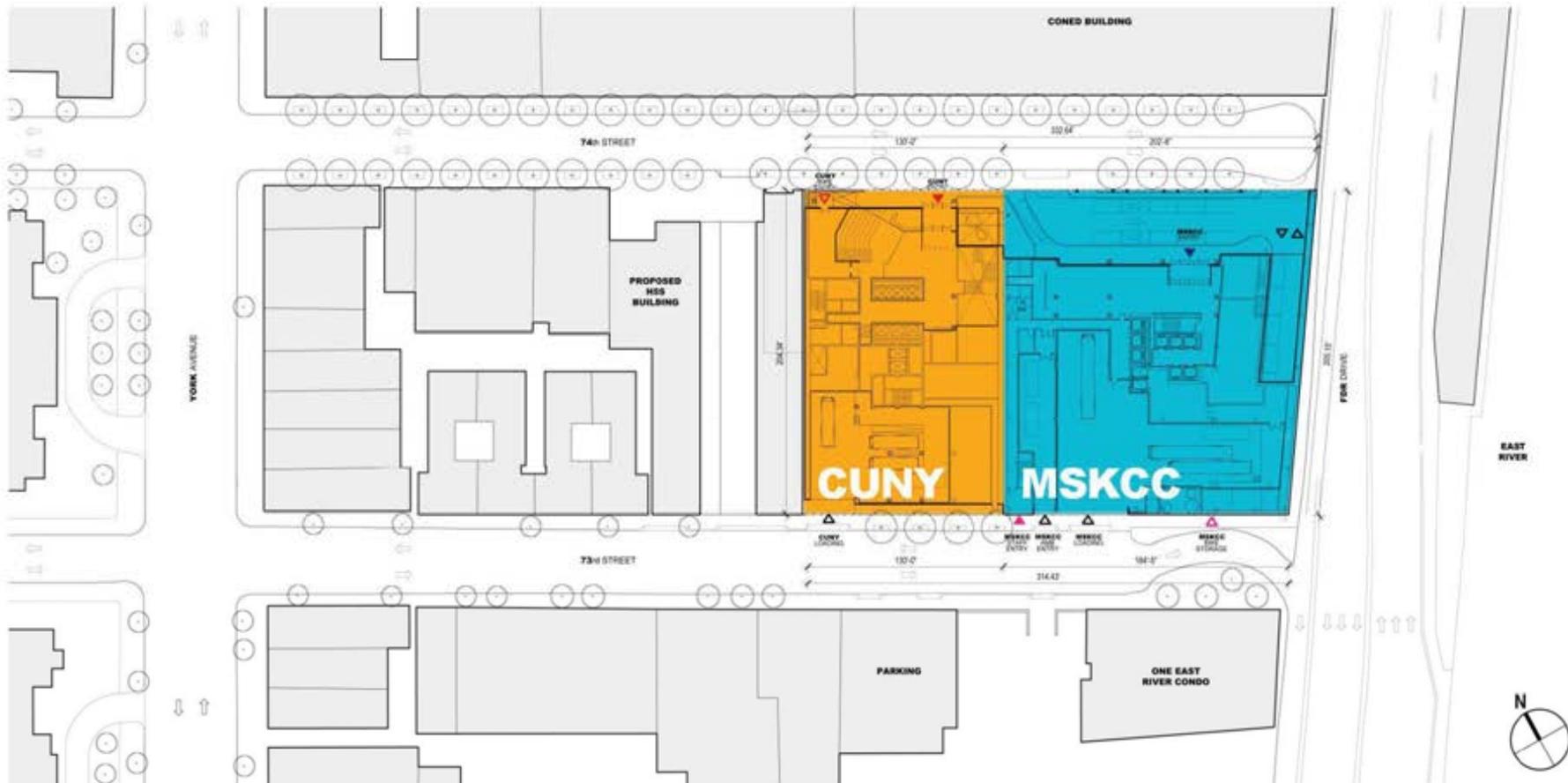
June 27, 2013

# Report Content

- Site Plan, Exterior Rendering , Building Section
- Project Narrative
- Program Listing / Building Gross Area
- Storm Mitigation Design Strategy
  - Exhibit - Flood Barriers at Property Line Exhibit
  - Exhibit - Mission Critical Clinical Programs and Support Functions Located Above 100 & 500 Year Flood Elevations
- Public Health and Health Planning Council
  - Ad HOC Advisory Committee on Environmental and Construction Standards
  - Design Response to Critical & Commercial Buildings Systems Matrix

# Site Plan

Ground Floor Plan



# Rendered Elevation

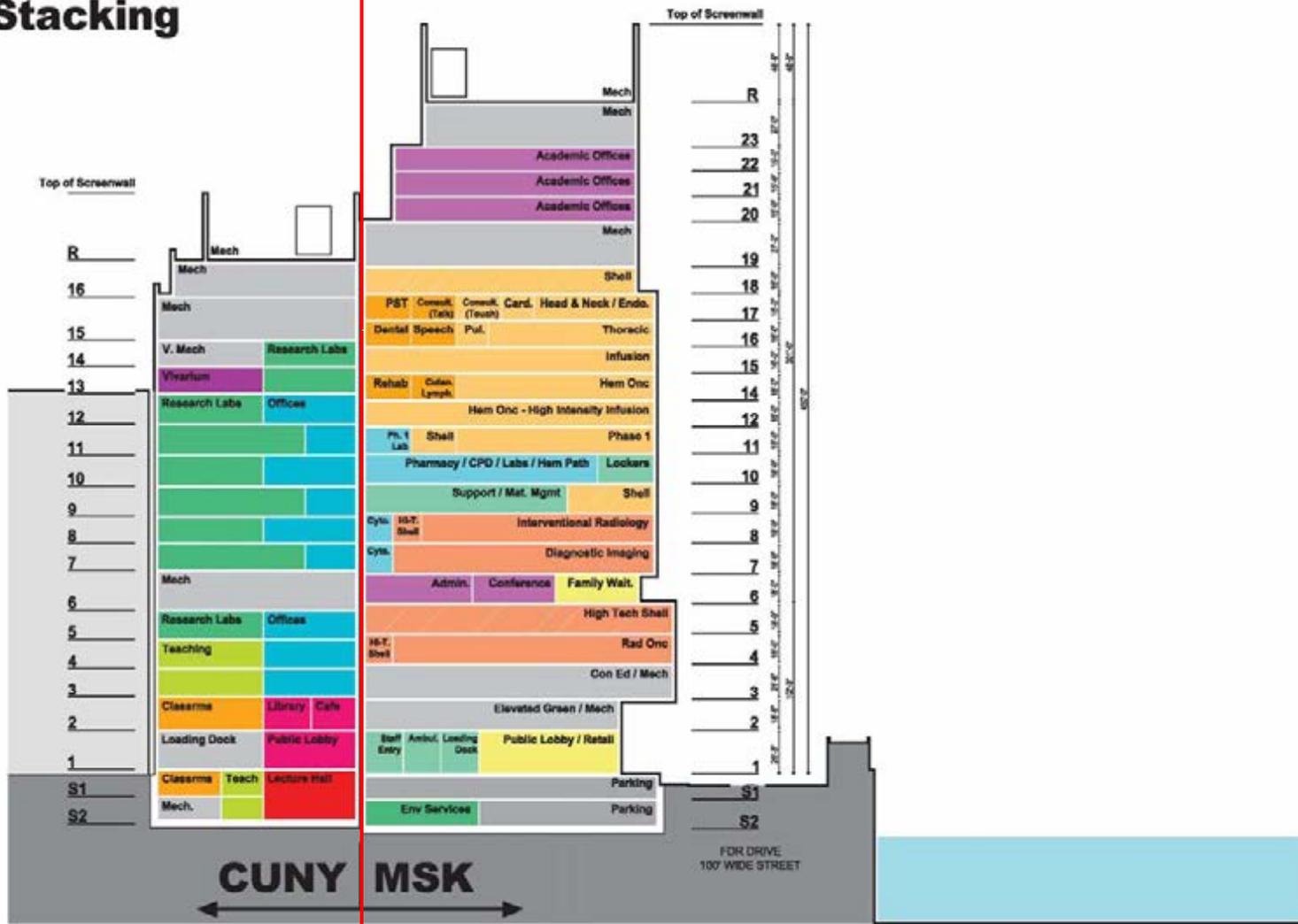
North



# Grid Line H – Future Bldg Removal

*Grid "H"*

## Project Stacking



## Project Narrative

- The proposed Memorial Sloan Kettering Ambulatory Care Center at 74<sup>th</sup> Street will be an ambulatory care center specifically for the diagnosis and treatment of cancer. The 23-story center will contain approximately 759,615 square feet. It will provide sufficient space to meet the current demand for ambulatory care, as well as anticipated growth projections through 2026. The center will be located on the far-east end of the block between 73<sup>rd</sup> and 74<sup>th</sup> Streets and York Avenue and the FDR Drive in Manhattan.
- By 2026, the building is projected to accommodate over 1,300 patients, 2,600 visitors and 1,600 staff per day. The hours of operation for the facility will primarily be 7 AM – 10 PM, Monday through Friday, with a small volume of bone marrow transplant patients on Saturday/Sunday (no more than 20 patients/day).

# Program Listing

- Square Footage = 726,274 BGSF
- The building will include
  - Clinic space for Hematologic, Thoracic, Endocrinology, Head and Neck and other oncology services, including an outpatient bone marrow transplantation program;
  - Infusion Rooms for standard chemotherapy and early stage trials of new drugs and biologic agents
  - Consultative services including, Dental, Speech and Swallowing, Cardiology, Pulmonary, Pre-surgical Testing, Cutaneous Lymphoma and Outpatient Rehabilitation
  - A Radiation Oncology program including: three linear accelerators, one MRI Simulation Suite and one CT Simulation Suite
  - A Diagnostic Imaging program including: three CTs, two PET/CTs, two MRIs, two General X-ray Units and four Ultrasound Rooms
  - An Interventional Radiology Program including: three Angio/CT Units and one PET/CT
  - Clinical Support Services to meet building needs including:
    - Chemotherapy and Retail Pharmacies, Laboratory Medicine and Pathology services
  - Academic and Administrative Offices/Conference Center

## Storm Mitigation Design Strategy

- The project has taken a proactive approach to flood protection, as the site is located on the edge of a FEMA designated flood plain. *The site is protected up to the FEMA 500 year flood level by flood barriers at the property line.*
- Door and drive openings are protected with operable flood gates.
- The waterproof foundation is designed to resist the pressure of the water and extends above grade where needed to maintain the barrier.
- *All mission critical clinical programs and support functions have been located above the fourth floor.*

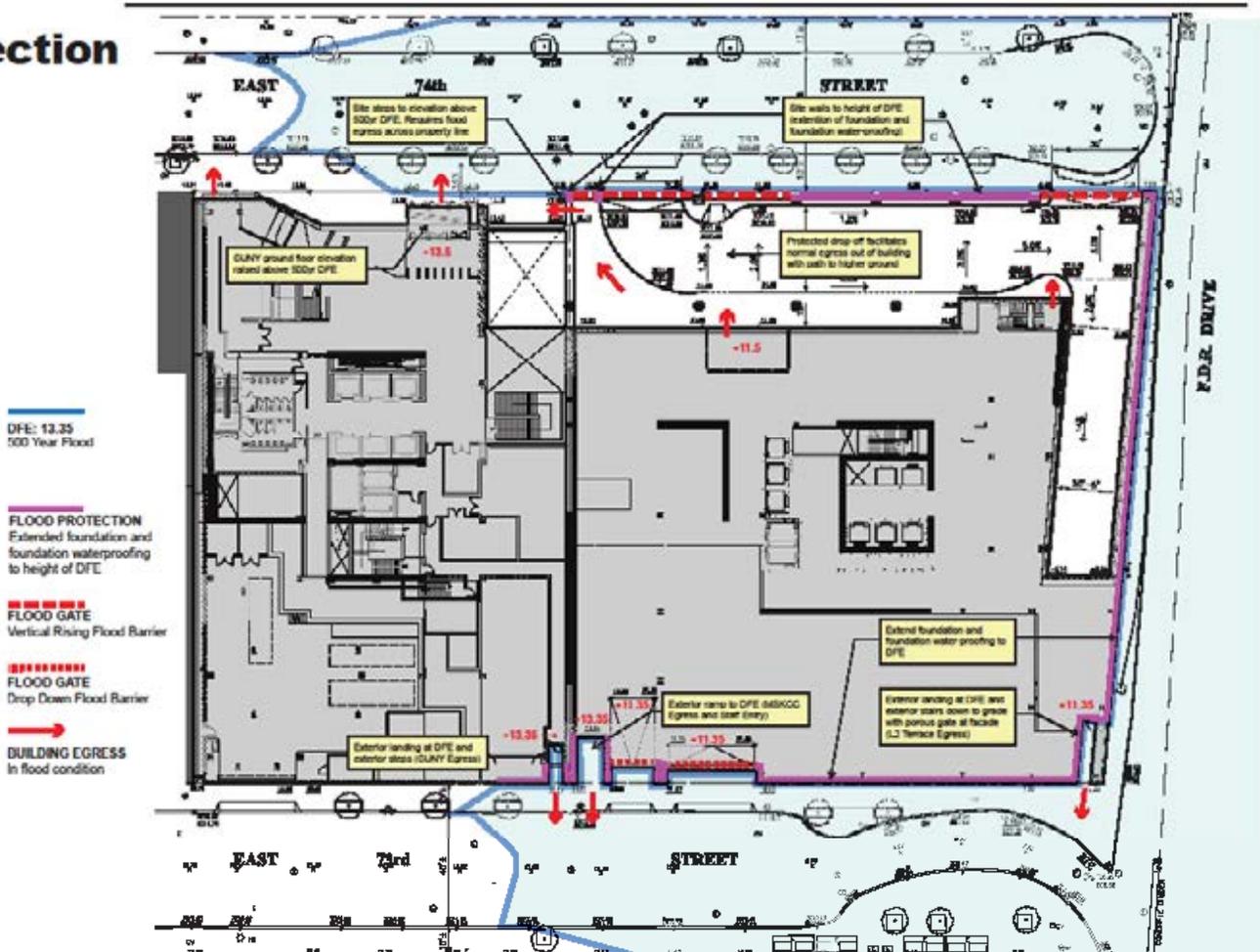
# Storm Mitigation Design Strategy

- *Infrastructure systems have been located above flood elevations.*
  - Con Ed vaults, network compartments and switch gear are all on the second level.
  - An electrical distribution closet on the ground floor serves the lower levels.
  - All chillers and air handlers are located on the second floor and higher.
  - IT, the MDF and UPS are located on the third floor and the IDF serving the cellar levels and ground floor will be located on the second floor.
  - The fire pump, gas meter and medical gas system are all located on the second floor or higher.
- *Only elements which cannot be moved above grade, by code or weight, are located in the cellar levels.*
  - The fuel oil tank supplying the emergency generator (located on the roof) is located in the sub cellar within a water tight containment room.
  - The storm water detention tank is in the sub-cellar, due to its weight.
  - All utility point of entries will be done with waterproof fittings.

# Flood Barriers at Property Line

## Flood Protection

DFE 13.35' 500 Year



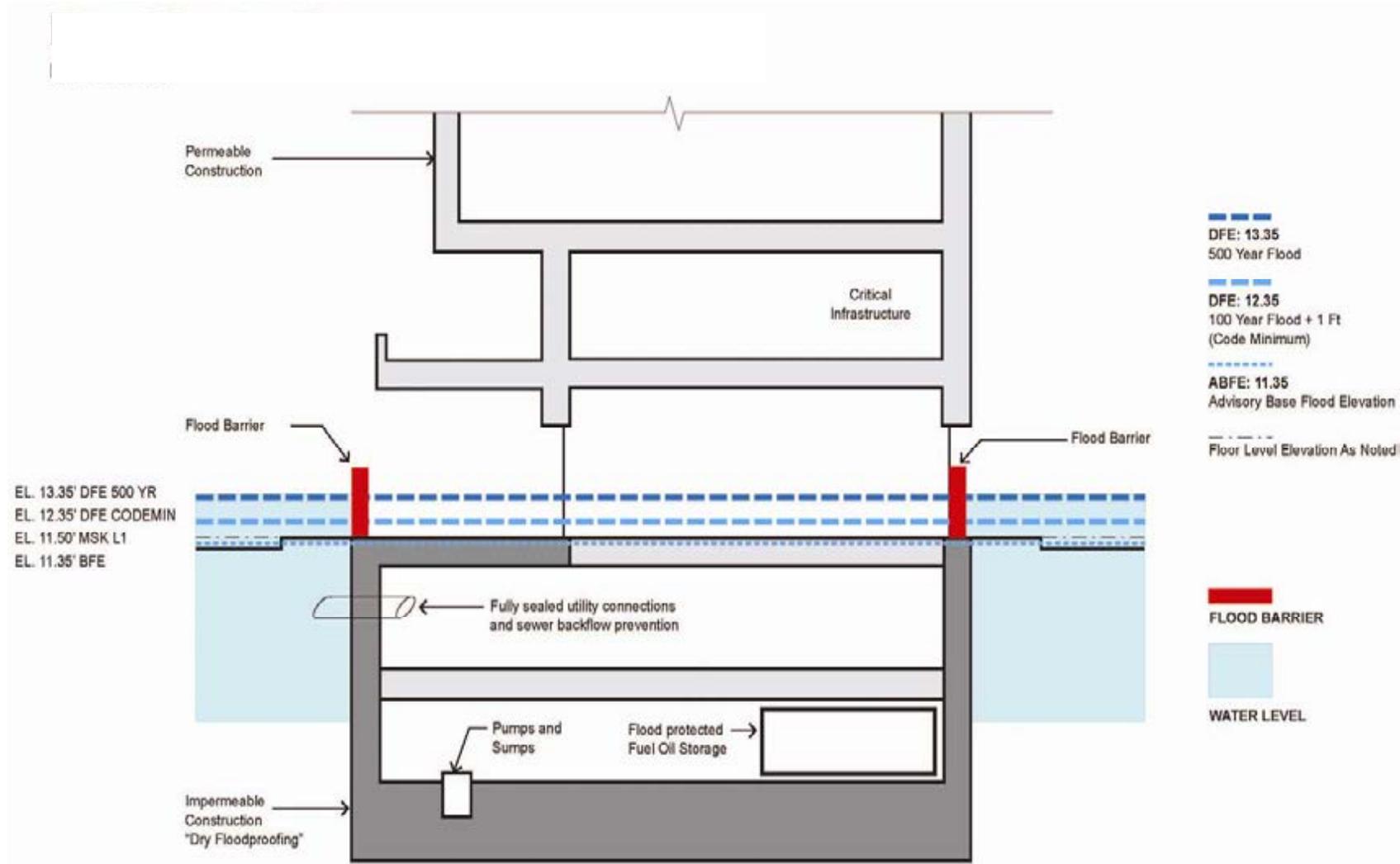
**MSKCC**

Memorial Sloan Kettering 74<sup>th</sup> Street Ambulatory Care Center



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## Mission Critical Clinical Programs and Support Functions Located Above 100 & 500 Year Flood Elevations



Memorial Sloan Kettering 74<sup>th</sup> Street Ambulatory Care Center



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# Operable Flood Barriers

## Flood Protection

Barrier Types

### Demountable / Stackable Flood Barrier



- Requires Manual Installation
- Easy to Install
- Requires Storage
- Jamb and/or Foundation mounted
- Intermediate supports / connectors available

### Bottom Hinged Flood Panel



- Automatic Operation
- Water Actuated or Electric/Manual Override
- Requires horizontal space at grade
- Dimensionally challenging (coordination with foundation wall, drains, property line)

### Recessed / Lifting Flood Barrier



- Automatic Operation
- Water Actuated or Electric/Manual Override
- Requires vertical space below grade
- Dimensionally challenging (coordination with foundation wall)

**All egress must be maintained with flood barriers in place**



Memorial Sloan Kettering 74<sup>th</sup> Street Ambulatory Care Center



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## System Matrix Options and Opportunities: Critical & Commercial Buildings

June 20, 2013

This matrix illustrates the kind of changes that can be integrated into code, using healthcare facilities as a category of building.

LOGISTICS	
	Implemented at 74 <sup>th</sup> Street
	Not Implemented at 74 <sup>th</sup> Street

Utility Services	Risk Addressed	Item	Proposed Measure	Critical Facility		Report Page # Reference
				New	Existing	
Incoming Electric Service	Flood	1a.	Locate or relocate incoming service above FEMA flood evaluation <b>Con Ed interior secondary service is located on the 2<sup>nd</sup> floor.</b>	Req.	BP	Pages 12,13
		1b.	Existing Utility Rooms to be made watertight with bulkhead or submarine doors and extensive waterproofing. Waterproof cable entries below flood plain. <b>Not applicable; Con Ed transformers, network protectors and building main service switchgear is all located on the 2<sup>nd</sup> floor.</b>	N/A	Req.	Pages 12,13
	Extreme Heat Wind	1c.	Existing Utility Rooms to be made watertight with bulkhead or submarine doors and extensive waterproofing. Waterproof cable entries below flood plain. <b>Electrical points of entry are sealed at the foundation wall. High voltage feeders are concrete encased within the building and run express from the POE to the 2<sup>nd</sup> floor electrical service.</b>	Req.	Req.	Pages 12,13
		1d.	Electric Utility Rooms to be provided with ventilation and/or air conditioning to maintain room temperature to stay below equipment temperature ratings. Use ASHRAE Weather Data. <b>Installed in accordance with Con Ed interior vault requirements; transformers are naturally ventilated, network protector rooms are mechanically ventilated and service switchgear rooms are air conditioned.</b>	Req.	BP	Pages 12,13
		1e.	Evaluate overhead distribution (where permissible) versus direct buried based on potential wind and flood events. Design overhead distribution to FEMA Wind Zone Maps. <b>Not applicable; Con Ed electrical distribution in this area is all below grade.</b>	N/A	BP	Pages 12,13
Incoming IT Services (Telephone & Data)	Flood	2a.	Locate or relocate incoming services above FEMA flood evaluation using approved cables. <b>Two discrete points of entry will enter below grade with link seals at the foundation wall. The transition from service provider cable to interior rated cable will happen at a splice point above the DFE within the building; the cable will continue to run to the Point of Presence room located on the 3<sup>rd</sup> floor.</b>	Req.	BP	Page 14
		2b.				
	Provider Interruption	2c.	Existing Utility Rooms to be made watertight with bulkhead or submarine doors and extensive waterproofing. Waterproof cable entries below flood plain. <b>Not applicable; Point of Presence room is located on the 3<sup>rd</sup> floor</b>  <b>If existing Utility Rooms cannot be relocated, consider redundant wireless communication and data system. A cable pathway between the stacking local floor IDF closets has been provided to allow for a microwave antenna on the roof</b>	N/A	Req.	Page 14
Gas Service	Flood	3a.	Locate or relocate incoming gas service above FEMA flood evaluation. <b>Point of entry into the building will be provided with link seals and an isolation valve at the foundation wall. Meter assembly will be located in a room located on the 2<sup>nd</sup> floor.</b>	Req.	BP	Page 15
		3b.	Existing Gas Service Rooms to be made watertight with bulkhead or submarine doors and extensive waterproofing. Waterproof pipe entry. <b>Not applicable.</b>	N/A	Req.	Page 15
Domestic Water	Flood	4a.	Locate or relocate incoming domestic water service above FEMA flood evaluation. <b>Point of entry into the building will be provided with link seals at the foundation wall. Domestic water pumps and fire service pumps will be located on the 2<sup>nd</sup> floor.</b>	Req.	BP	Page 15,18
		4b.	Consider water storage tanks on site. <b>There is a 12,500 gallon suction tank located on the 2<sup>nd</sup> floor for approximately one day of domestic water usage in the event of a utility failure. Two 35,000 gallon combination domestic water/fire protection tanks are located on the roof. A 45,000 gallon storm water detention tank located in the Sub-Cellar provide cooling tower make up water.</b>	BP	BP	Page 15,18
Steam Service	Flood	5a.	Locate or relocate incoming steam service above FEMA flood evaluation. <b>Not applicable; building does not use utility steam.</b>	N/A	BP	n/a

BP= Best Practice Req.=Required \*N/A for healthcare

## System Matrix Options and Opportunities: Critical & Commercial Buildings

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LOGISTICS	
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Utility Services	Risk Addressed	Item	Proposed Measure	Critical Facility		Report Page # Reference
				New	Existing	
		5b.	Existing Steam Service Utility Rooms to be made watertight with bulkhead or submarine doors and extensive waterproofing. <b>Not applicable</b>	N/A	Req.	
Mechanical Equipment (boilers, chillers, pumps, fans, air conditioning units, storage tanks, etc.) essential for the facility to operate and fulfill its mission	Flood	6a.	Locate or relocate above FEMA flood evaluation. Boilers and hot water pumps are located on the 23 <sup>rd</sup> floor; chillers and associated pumps are located on the 2 <sup>nd</sup> floor; air handling systems are located on the 3 <sup>rd</sup> and 19 <sup>th</sup> mechanical floors, all fan systems that serve the lower levels of the building are located on the 2 <sup>nd</sup> and 3 <sup>rd</sup> floors.	Req.	BP	Page 10,11
	Wind	6b.	Existing Mechanical Rooms to be made watertight where practical with bulkhead doors and extensive waterproofing. External flood barriers should be considered. <b>Not applicable; project is designed with dry flood proofing at property line.</b>	N/A*	BP	Page 5,6
		6c.	All exterior equipment to be properly strapped down to meet FEMA Wind Maps. Exterior equipment will be minimized. <b>Items that are outside will be strapped appropriately.</b>	Req.	Req.	n/a
	Extreme Heat	6d.	Provide barriers to protect against damage from wind-blown projectiles. The 2 <sup>nd</sup> floor, 3 <sup>rd</sup> floor, 19 <sup>th</sup> floor, and 23 <sup>rd</sup> floor mechanical levels are all enclosed by building envelope; the roof mounted "exposed" equipment is located within an enclosed 40ft high well open to above.	Req.	BP	n/a
		6e.	System to be designed to maintain minimum code requirements for occupant and building functionality. Load Shedding to be employed. Use code-mandated ASHREA Weather Data. Systems have been designed for multiple levels of redundancy (ie, 100% redundant fans within each air handling unit; systems are headered together so loss of one unit will not severely impact air conditioning to the floors). Ventilation rates are designed in accordance with FGI 2010 and ASHRAE 170.	Req.		n/a
	Fire Pump	Flood	7a.	Locate fire pumps above FEMA flood plain elevation. If not feasible due to code or inadequate street pressure, provide submersible watertight room. Review with FDNY. Fire pumps are located on the 2 <sup>nd</sup> floor.	Req.	BP
Emergency & Standby Power	Flood	8a.	Locate or relocate generators above FEMA flood evaluation <b>Two 2500KW generators located on the roof.</b>	Req.	Req.	n/a
	Wind	8b.	Protect exterior equipment from wind-blown damage and projectiles. <b>Generators are located within the roof well enclosure.</b>	BP	BP	n/a
	Extreme Heat	8c.	Evaluate capacity to serve life safety loads during extreme heat. <b>Generators are sized in an N+1 redundant mode for life safety loads. Both engines will run in the event of a loss of normal power and thru a load shedding program will maintain life safety loads as the highest priority.</b>	BP	BP	n/a
	Extended Widespread Outage	8d.	Evaluate and add additional loads above Code mandated to fulfill the building's functional requirements during prolonged outages. Provide additional standby generation. <b>5 MW of emergency generators have been designed to pick up the majority of the building's heating, cooling, ventilation and telecommunication systems. In addition, a 1MW cogeneration unit has also been designed for the project and is capable of picking up additional loads in the event of a prolonged power outage.</b>	BP	BP	n/a
Emergency & Standby Generator Fuel Source	Flood	9a	Fuel oil tank's pumps and controls to be located in a submersible watertight room with bulkhead or submarine doors. Fuel pump to be submersible to pump up to transfer tank and pump on level located above the FEMA flood plain elevation. <b>The intent of the building's flood mitigation is dry flood proofing at the 1<sup>st</sup> floor level. However, the fuel oil tank and pump room has been designed with upset access doors in tandem with submarine doors to accommodate a nominal amount of water that may accumulate at the S2 level. An alternate means of ingress/egress via water tight manhole/manway into the</b>	Req.	Req.	Page 9
	Prolonged					

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