

# MEETING ATTENDEES

1633-MN

City of Raleigh

PBC+L/AECOM

Critical Public Safety Facilities Project

Session: Workshop 6 – Programming/Blocking/Stacking Workshop



DATE: November 05, 2012

A meeting was held on November 05, 2012 at the Convention Center.

Attendees included the following:

Name:	Company	Email Address	Phone
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Walt Fuller	RWECC	walt.fuller@raleighnc.gov	919-996-5012
Josh Creighton	Wake Co	joshua.creighton@wakegov.com	919-856-6485
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R.J. Hope	BMCD	rjhope@burnsmcd.com	913-638-9349

The following items were discussed:

## November 5, 2012, Workshop

### Raleigh Critical Public Safety Facility (CPSF) Programming, Blocking Concepts and Site Concepts

The space program and power point presentation for this session are attached to this conference summary for reference.

#### General

1. The design team reviewed the outcome of the previous workshops with the users.
2. Different site plan alternatives were discussed:
  - a. Options A-B, showed the CPSF building; RF equipment, the Tower and the Remote Delivery Facility outside of the secure zone.
  - b. Option C-D showed the North East District Police (NEDP), the CPSF building, remote facility and tower. Having the NEDP on the site would require structured parking to accommodate additional parking needs and in turn increase budget costs.

#### **PBC+L Architecture**

333 Fayetteville St. Suite 1000 PO Box 951 Raleigh, North Carolina 27602 tel: 919.836.9751 fax: 919.836.1751

- c. The design team was directed to remove the NEDP program from the scope of this project.

### **Program Review**

The updated space program spread sheet was reviewed with the users.

3. The combined City and County EOC spaces are included in the program:
  - a. CPSF Gross building area with only City EOC totals 91,122 SF with the Remote Delivery Facility and RF Equipment Building at 1,875 and 1,584 SF each.
  - b. Gross building area with City and County EOC total 97,601 SF with the same ancillary building components.

### **Press Room:**

4. Michael Williams with public affairs made the following suggestions:
  - a. Two entrances are needed to the press room: One public (media) entrance from the lobby and a separate employee entrance from the secure area;
  - b. The podium should be on a short riser;
  - c. There should be an audio/video link back to the Raleigh Television Network (RTN) studio, for the City's direct access to the public;
  - d. There should be an audio multi feed box from the PA system, so that neither radio nor TV media outlets have to put a microphone on the podium;
  - e. Provide a feed from a camera in the operations room that the media will be able to record, and show it on a large monitor in the media room,
  - f. Provide at least two TV lights aimed at the podium for TV stations. LED lights are preferred.

### **Emergency Communication Center (ECC) Administration:**

5. It was noted that administrative support area is relatively small at 64 SF and should be increased to 96 SF. The administration support reception and the administration staff support spaces can possibly be combined (2.09.02 - 2.09.03).
6. Administrative conference rooms can be shared with other groups in the building.

### **ECC Operations:**

7. It was noted that the current allocated space will accommodate growth up to 25 years. Future expansion to cover ECC needs for up to 50 years will require an addition.

### **ECC Staff Support:**

8. The number of mail slots needs to be increased from 160 to 240.

### **City Emergency Operations Center (EOC):**

9. Public Information Office (PIO) workstations can be left at 20 as shown in program. This space can be flexible.

### **Combined EOC**

10. The video wall (5A.03.06) and all support spaces will be shared.
11. It was noted that separate storage rooms would be required for City and County stored property.
12. There is no need to separate City and County lockers and half lockers can be used for both. These lockers will be located in public areas of the building. There will be an additional six (6) changing lockers in each of the men's and women's shower areas.

### **Traffic Control Center:**

13. No change, plotter and conference rooms can be shared with EOC.

### **Shared staff support:**

14. It was noted that the number of EOC lockers at 120 seems high and can potentially be reduced in number. (It was decided to leave this number in the program for now)
15. It was noted that a number of the multiple use or training spaces can be used for bunking.
16. The design team was asked to look into how the combined EOC will affect the size of break room/dining area vs. a city only EOC.
17. The design team was asked to review the number and distribution of toilets in relation to the whole building.

### **Information technology:**

18. A question was raised about the difference between 120 SF and 150 SF office spaces. Brian Super explained that 120 SF office space will accommodate a desk and two guest chairs. The 150 SF space will accommodate additional storage space.

19. Both the Network Operations Center (NOC) manager and the security manager spaces need to be changed to 120 SF instead of 150 SF. (9.01 and 9.09)

**Data Center:**

20. It was noted that there is enough space and racks for future growth. There is no need to separate the City and County racks.

**Building systems and support:**

21. Once the stacking and adjacency diagrams are finalized and the project moves into the schematic design phase, the design team will revisit the space allocation for the mechanical systems and locate the vertical shafts.
22. A concern was raised that the UPS capacity and redundancy were not sufficient especially following storm Sandy that hit the northern states last week. Terry Dodge, the electrical engineer will give feedback in the following workshop session on November 6th.

**RF Equipment Building:**

23. Several questions were asked about the impact of a combined City and County EOC on the radio equipment including; will this be a Prime site? How will the County move forward with their P25 compliant radio system? No answers were provided during this meeting but additional information will be provided when it becomes available during the detailed design phase.

**NE Police station:**

24. The NEDP station will not be included in the scope of this project.

**Parking**

25. The parking counts were reviewed.
26. The academy class was increased from 40 to 52, but it was noted that they would not have class during an EOC activation.
27. Power and data pedestals (aka, shore power) for City EOC and County EOC were increased to 8 spaces each. The combined EOC powered spaces total 16.

**Adjacencies and Concept Blocking Diagrams** - Refer to Adjacency Diagrams in the Power Point presentation.

1. Reviewed overall adjacencies of all building systems.
2. The NEDP station is no longer included in the project.
3. Option E and F stacking and blocking diagrams were reviewed.
  - a. Option E - Building Systems on the lower floor, Data Center and Information Technology are on the first floor, Combined EOC and Traffic Control Center are on second floor, ECC Administration and ECC Classroom on the third floor, and ECC Operations are on the fourth floor.
  - b. Option F – has a longer building footprint. Data Center, Information Technology, and Building Systems are on the first floor, combined EOC and Traffic Control Center are on the second floor, ECC Operations are on the third floor, and ECC Administration is on the fourth floor. There is room for future expansion on the roof adjacent to the fourth floor.
4. One option was discussed to put the Data Center on the 2<sup>nd</sup> floor to reduce the length of feeds to critical equipment in ECC and EOC.
5. Placing the EOC on the first floor would provide better connectivity to the press room.
6. Data Center equipment can be heavy and may affect clear spans if EOC on the first floor.
7. It was some of the group's opinion that it would be more important to have ECC and EOC close to each other to maximize shared conference rooms, (one level up or down). This adjacency is more important than data cabling and may reduce redundancy in staff support spaces and maximize shared spaces.
8. A question was raised about separating the receiving area from the CPSF building. For security reasons, deliveries are handled away from the secure critical facility. Covered staff walkway will connect back to the secure building. This allows for the receiving area to be built at a lower cost than the main facility as well.
9. A question was raised regarding the typical floor to floor spacing which is shown at 14 to 15 feet. Double floors could be 28 to 30 feet high. The height of the room will depend on the type of technology used on the video wall. In

addition these rooms tend to be large and would require higher ceiling for a better room proportion and visibility. It was stated that double height floors are not desired.

**Site Options** - Refer to Site Options in the Power Point presentation.

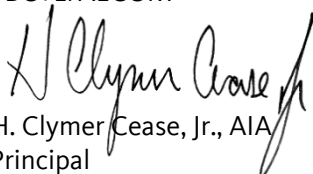
1. Previous site plan options A through D were shown for reference.
2. The latest option E was reviewed. The CPSF building occupies the north east corner of the site. The mechanical yard, RF equipment, and remote delivery are located to the south, with the tower occupying the south east corner. The remote delivery is shown outside the secure building area.
3. Two security setbacks are shown, a 10 meter setback where no automobiles are allowed and a 25 meter setback where no public vehicles are permitted.
4. Security fence/wall is shown at the edge of site. It was noted that the existing retaining walls at the northeast corners of Raleigh and Brentwood will be replaced with new walls.
5. Major site access will be off of Westinghouse Road, with secondary access from Raleigh Boulevard. (right in right out)
6. Staff and visitor parking and access to CPSF building were discussed.
7. Truck deliveries will come from secondary road access on Westinghouse and/or from existing adjacent commercial property to the south.
8. Parking spaces total 346: 281 parking spaces plus 65 reinforced grass parking to serve when activation occurs.
9. A question was raised about the distance from Media trucks parking to the lobby. It was measured at approximately 82 feet. Design team need to add a security fence or bollards where the media trucks park.
10. 3D views of site and buildings were reviewed.
11. Due to grading, the lower level floor will have building systems at north east corner of the site. Most of these spaces can be day lit and can be accessed at grade.
12. Data Center, Information Technology and the lobby are on the first floor.
13. Combined EOC and Traffic Control Center are on the second floor.
14. ECC classroom and ECC Admin are on third floor.
15. ECC Operations and Staff Support are on the fourth floor.
16. 3D views of the CPSF building were shown from different corner of the site. These serve to show the new building height as compared to the neighboring light industrial buildings.

Items to be considered by the design team:

1. Floor to ceiling heights.
2. Is the added height for ECC and traffic support needed?
3. Revise the stacking plan to move the EOC down to first level and Data Center up to the second level.
4. Access floor option for data center.

*The above represents the author's understanding of the content of discussion held during the meeting. Any corrections or additions are to be forwarded to PBC+L within seven (7) days of receipt. If no written objections are received within this period the above will become the official record of decisions made in this meeting.*

Submitted by:  
PBC+L/AECOM



H. Clymer Cease, Jr., AIA  
Principal

cc: File

# CITY OF RALEIGH CRITICAL PUBLIC SAFETY FACILITY

05 November 2012



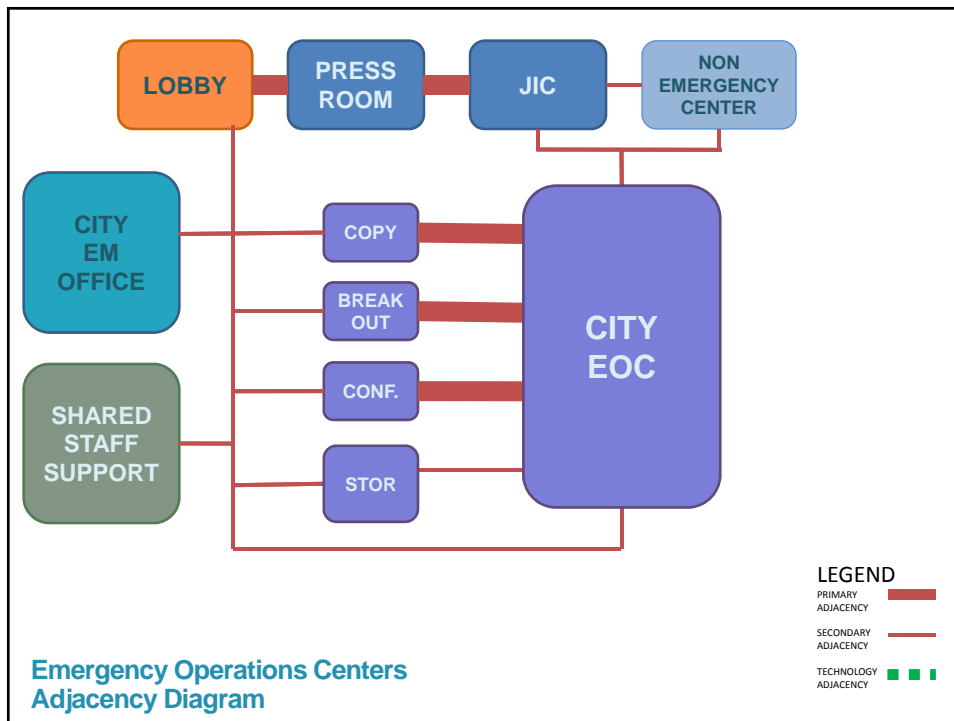
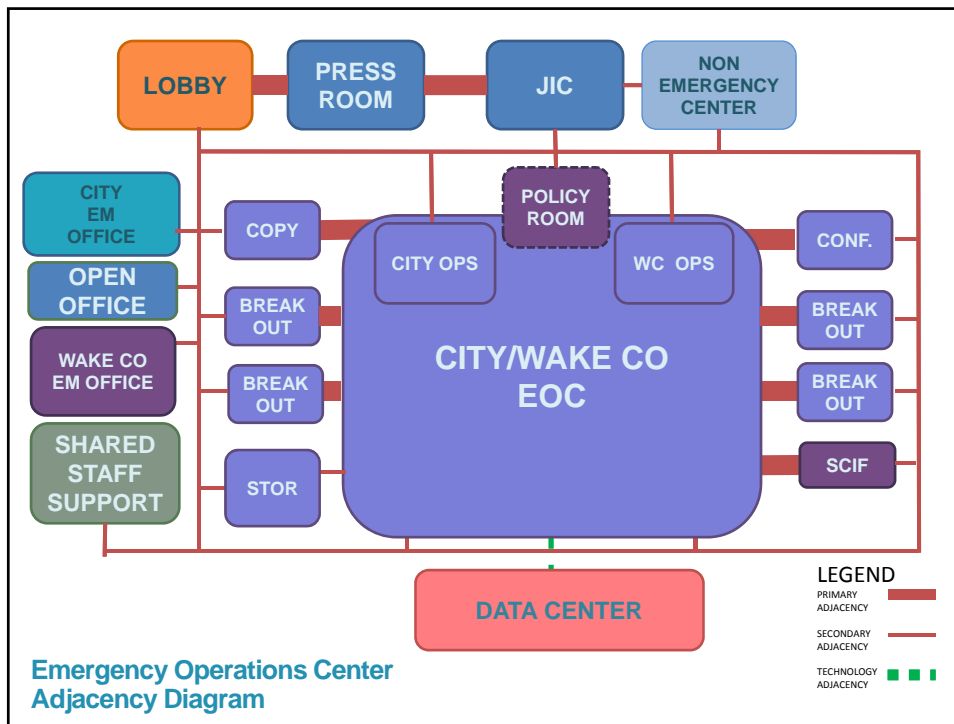
City of Raleigh

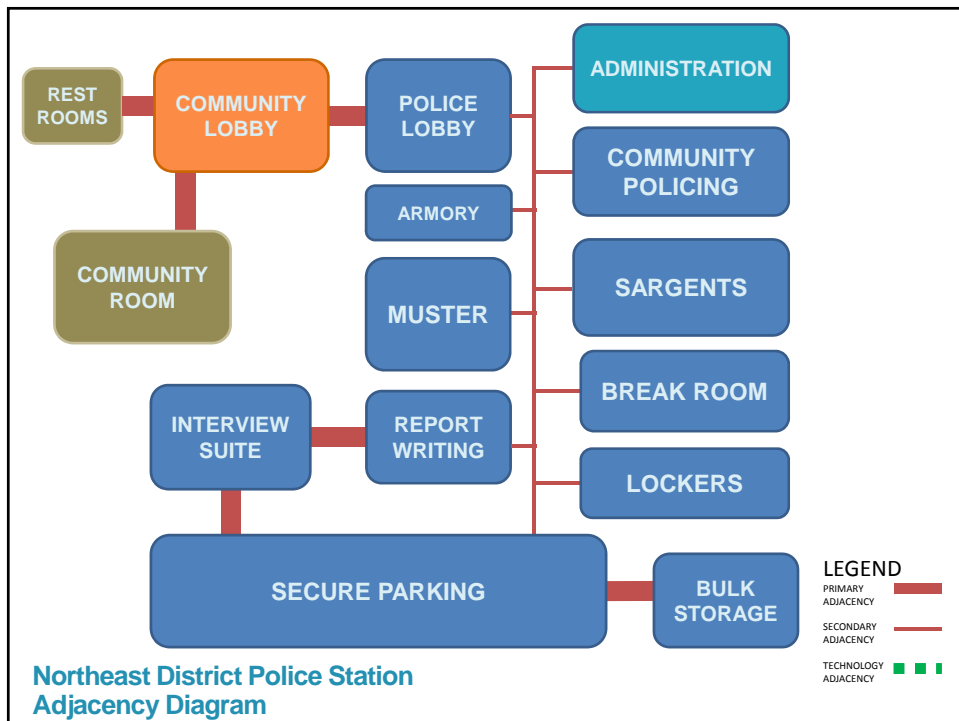
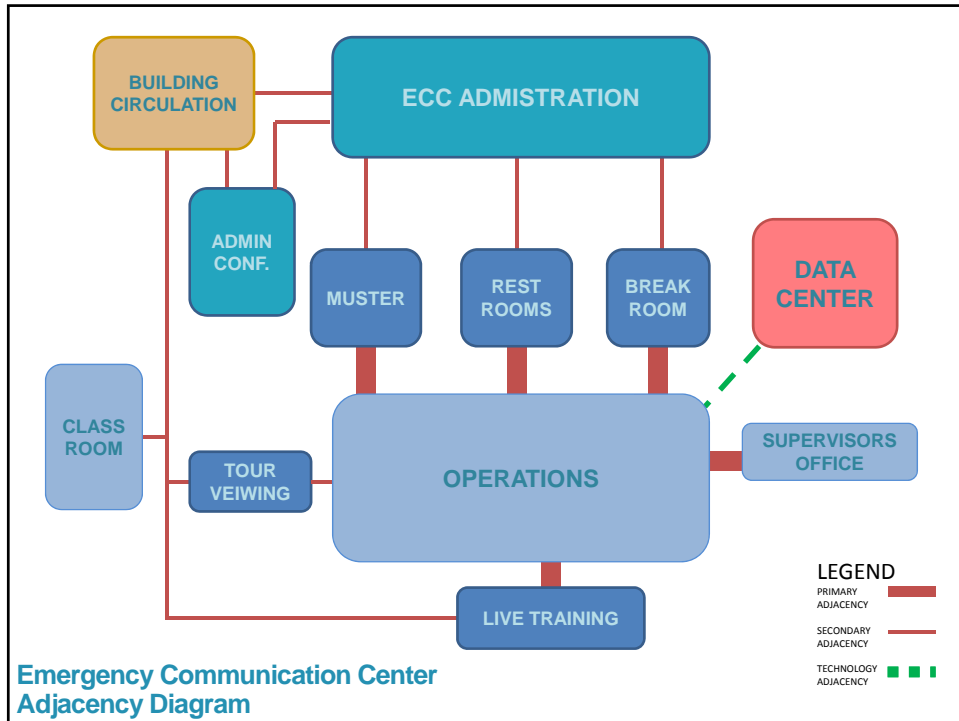
Pearce Brinkley Cease + Lee | AECOM

## Adjacency Diagrams

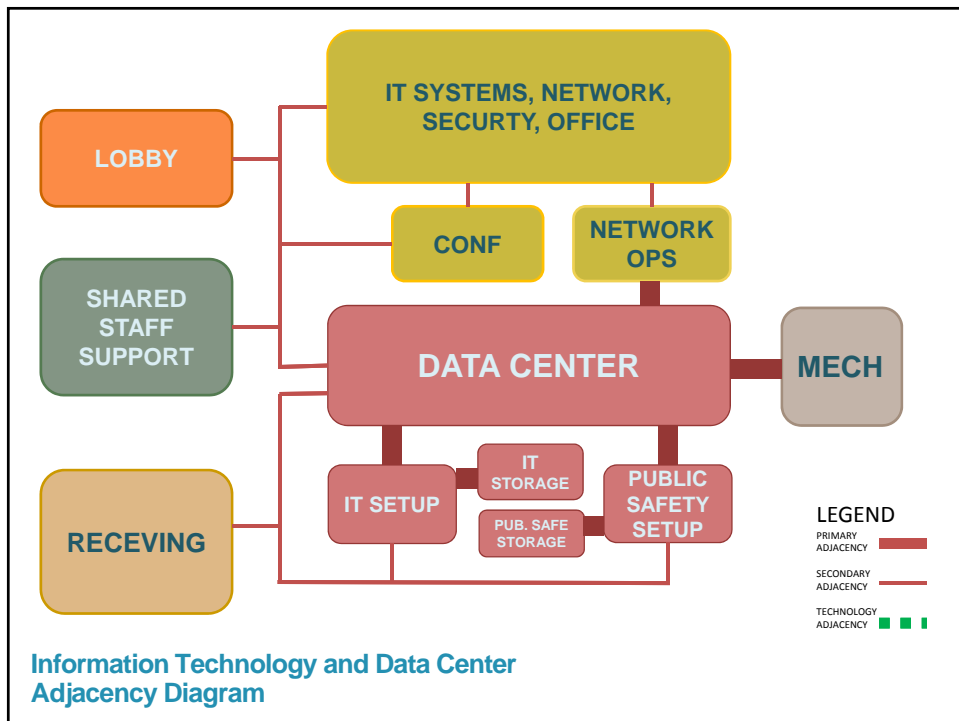
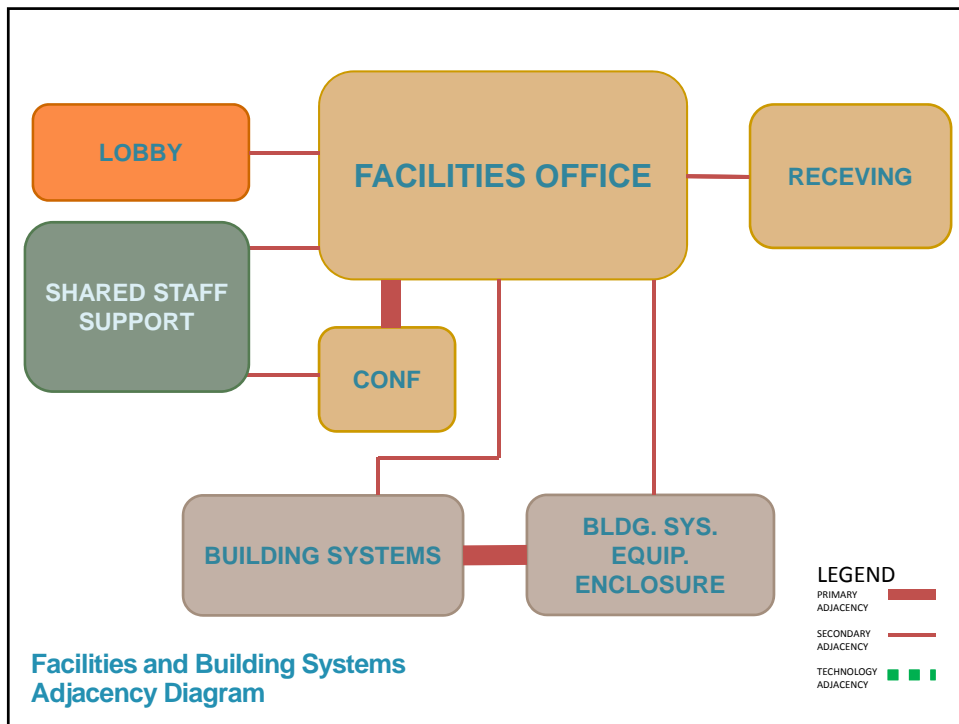
# Adjacency Diagrams

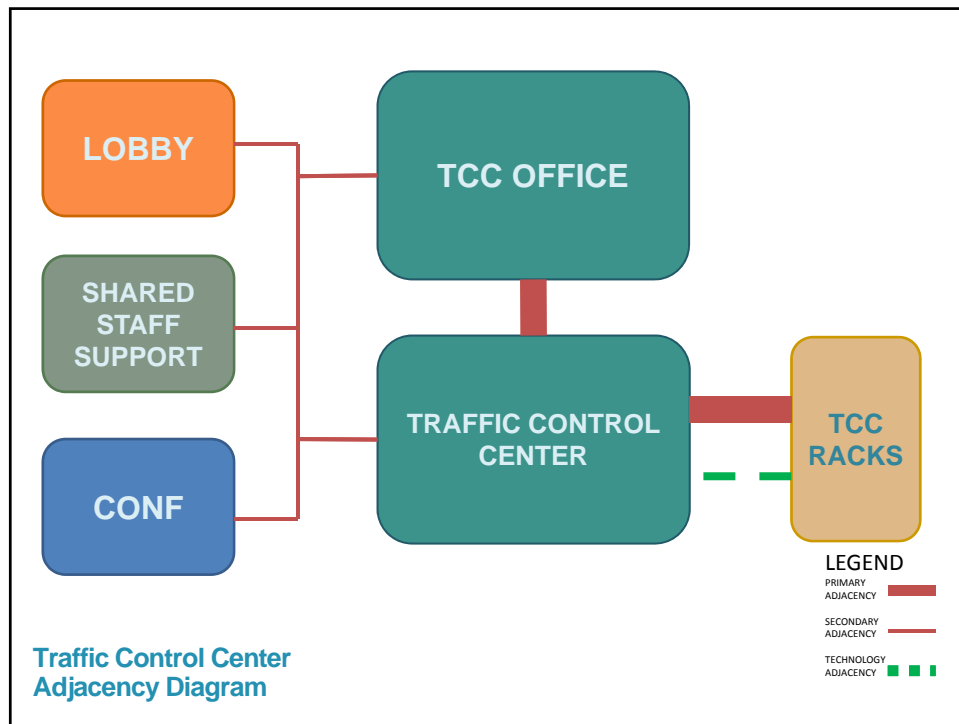




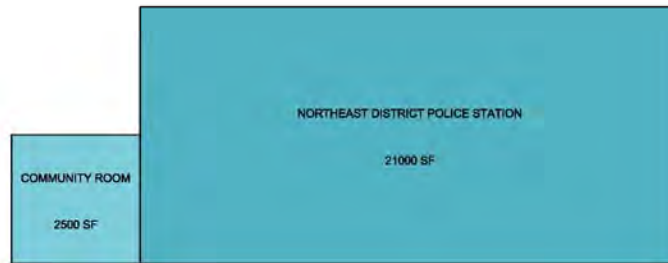




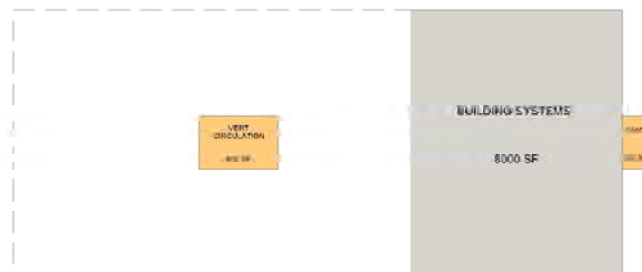




## Blocking and Stacking



**Option A – Northeast District Police Station  
Stacking & Blocking Diagram**



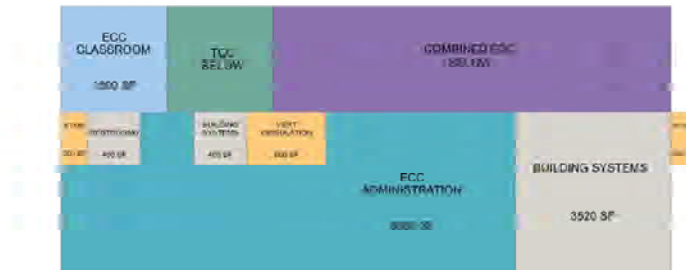
**Option E – Lower Level  
Stacking & Blocking Diagram**



Option E – First Floor  
Stacking & Blocking Diagram



Option E – Second Floor  
Stacking & Blocking Diagram



Option E – Third Floor  
Stacking & Blocking Diagram



Option E – Fourth Floor  
Stacking & Blocking Diagram



**Option E – Fifth Floor  
Stacking & Blocking Diagram**



**Option F – First Floor  
Stacking & Blocking Diagram**



Option F – Second Floor  
Stacking & Blocking Diagram



Option F – Third Floor  
Stacking & Blocking Diagram

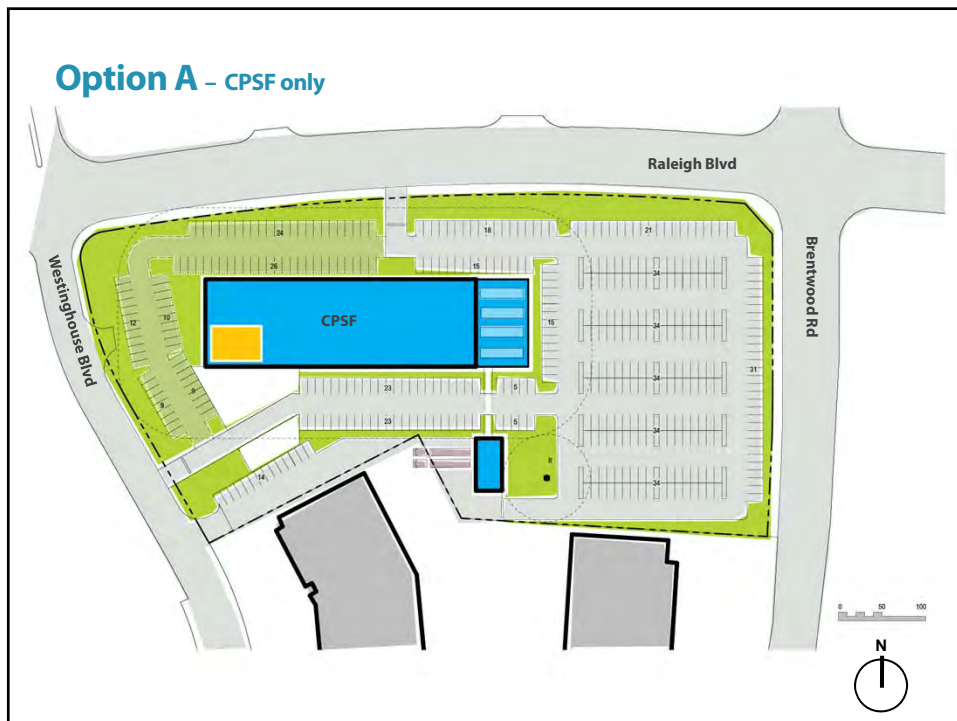


Option F – Forth Floor  
Stacking & Blocking Diagram

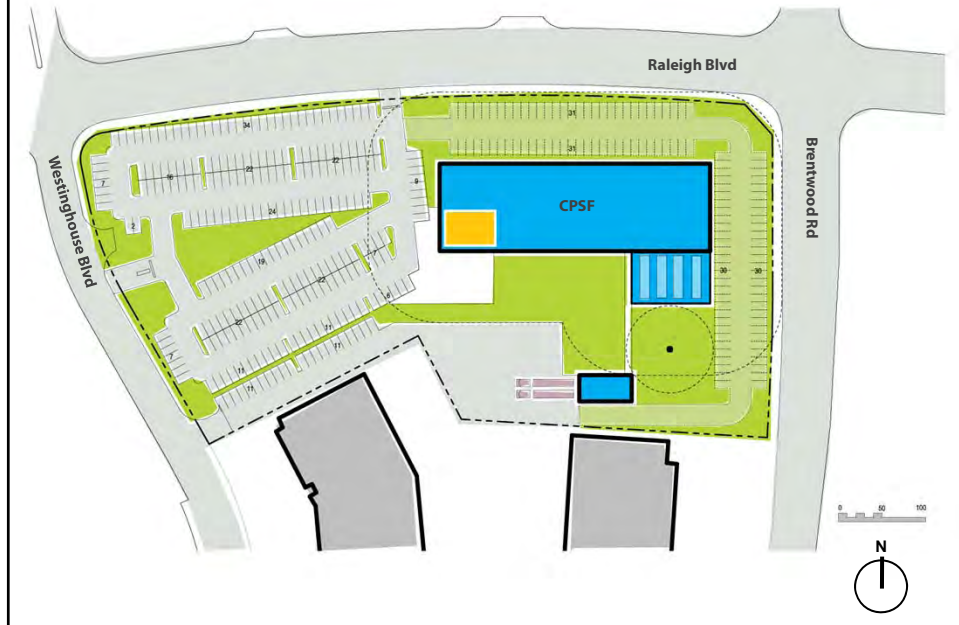


# Site Plan Diagrams

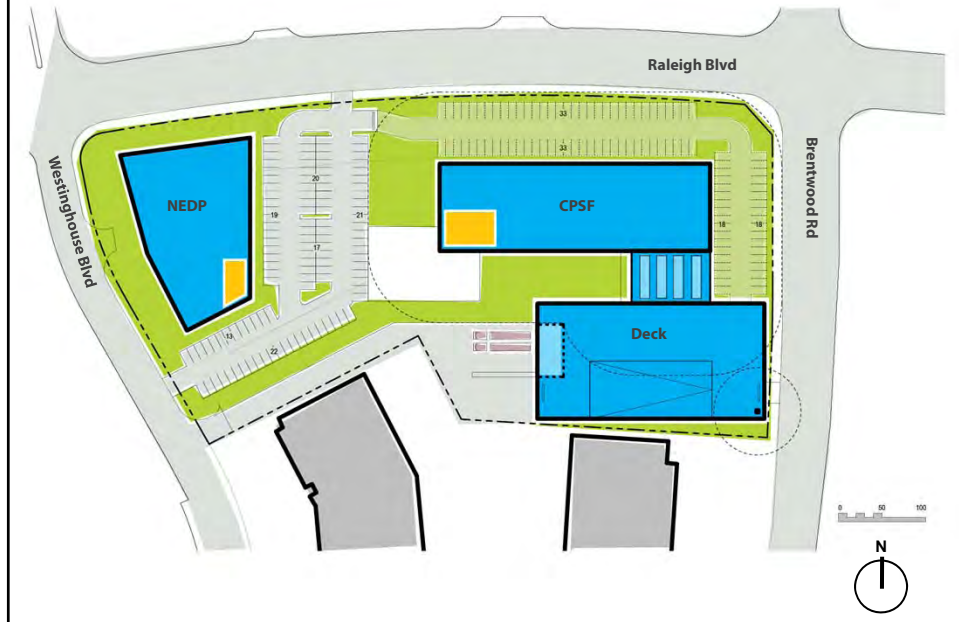
## Review Options A-D



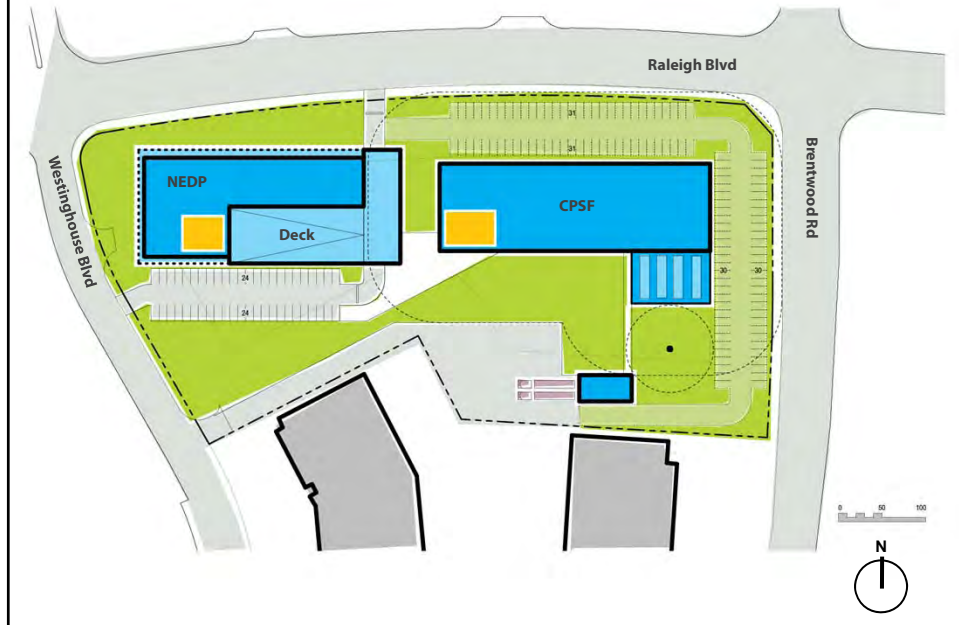
### Option B – CPSF only



### Option C – CPSF and NE District Police



### Option D – CPSF and NE District Police



### Option E

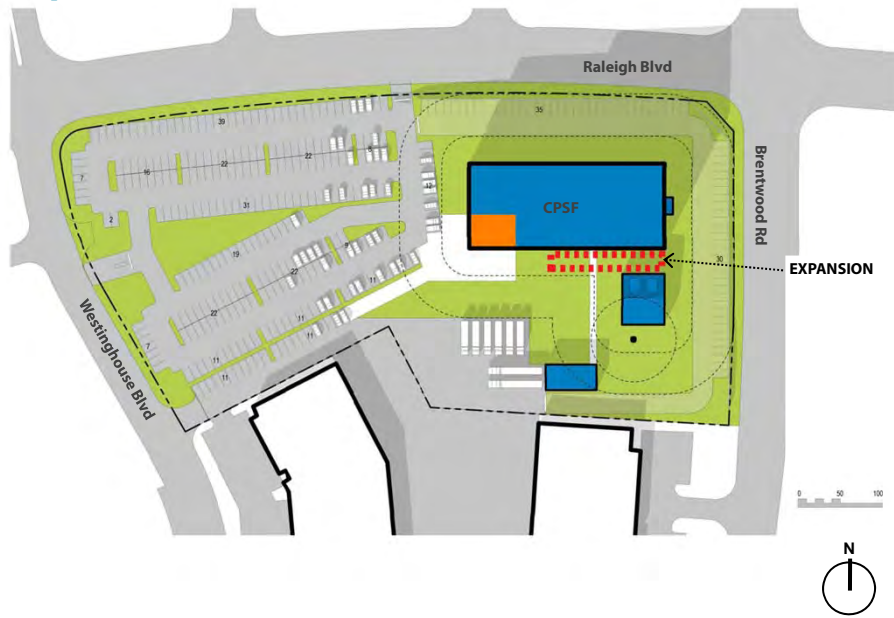
Option E – CPSF combined city/county EOC



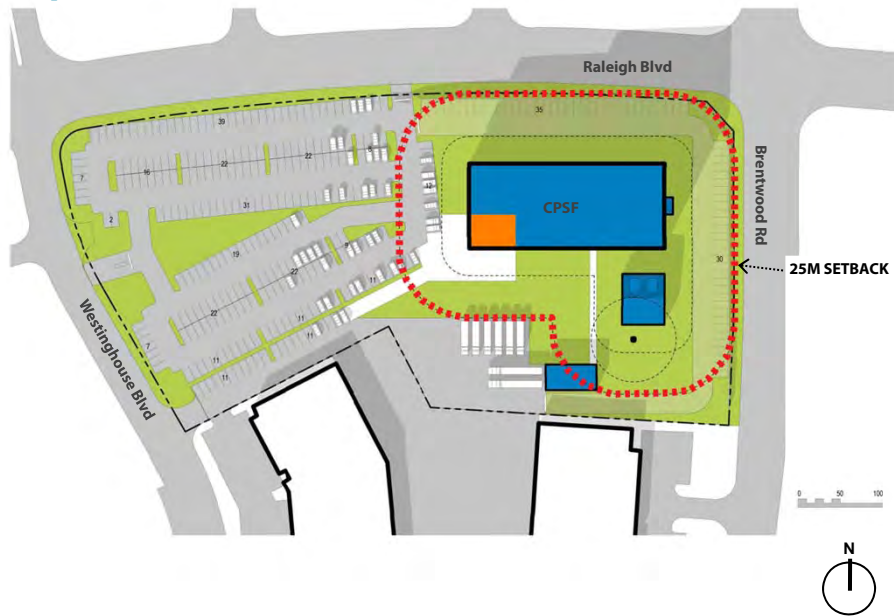
Option E – CPSF combined city/county EOC



### Option E – Future Expansion



### Option E – Security Setback 25 meter





### Option E – Security Setback 10 meter



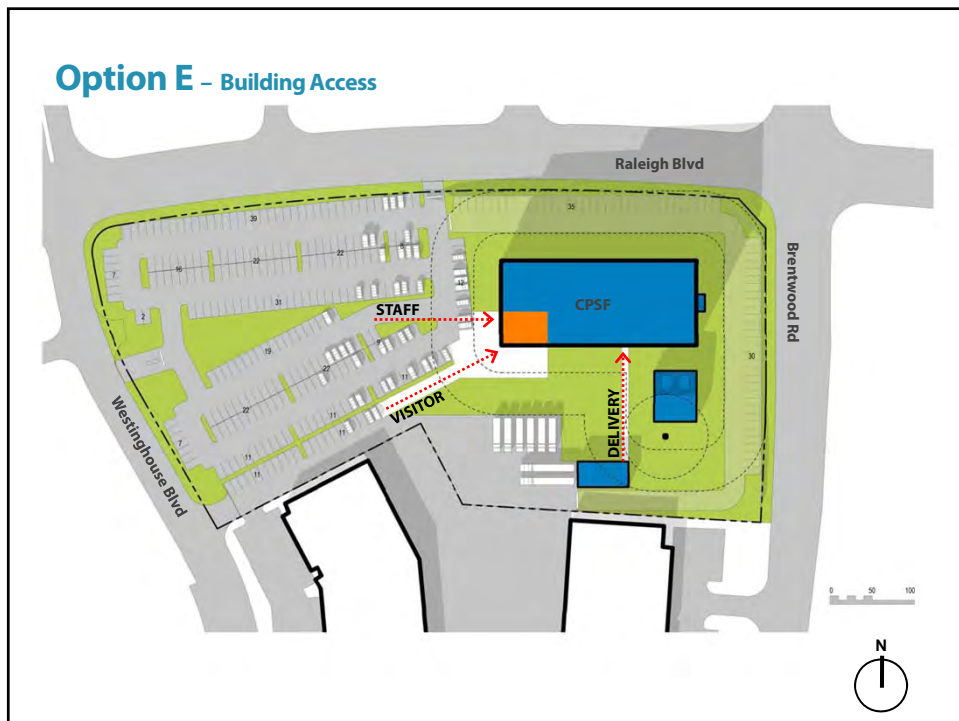
### Option E – Security Fence/Wall



### Option E – Vehicular Access



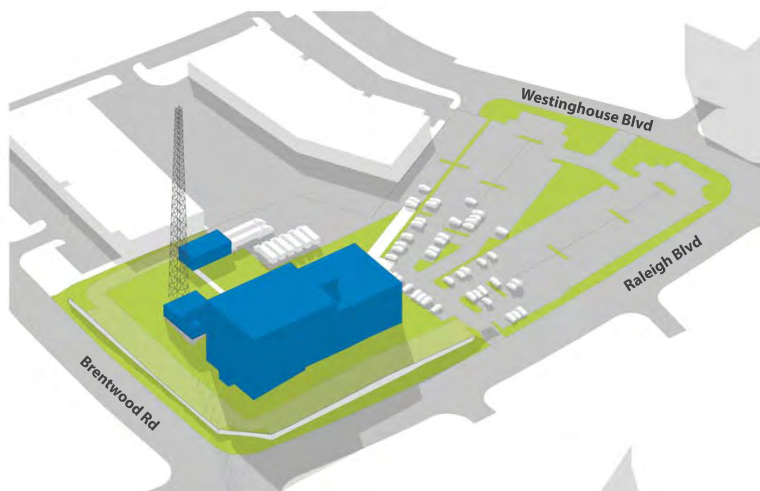
### Option E – Building Access



### Option E – Approx. Parking (346)

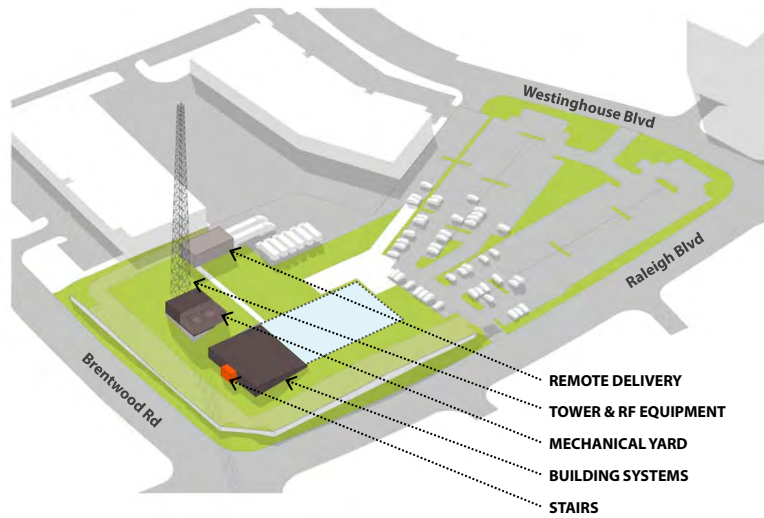


### Option E – Blocking Stacking 3D diagram

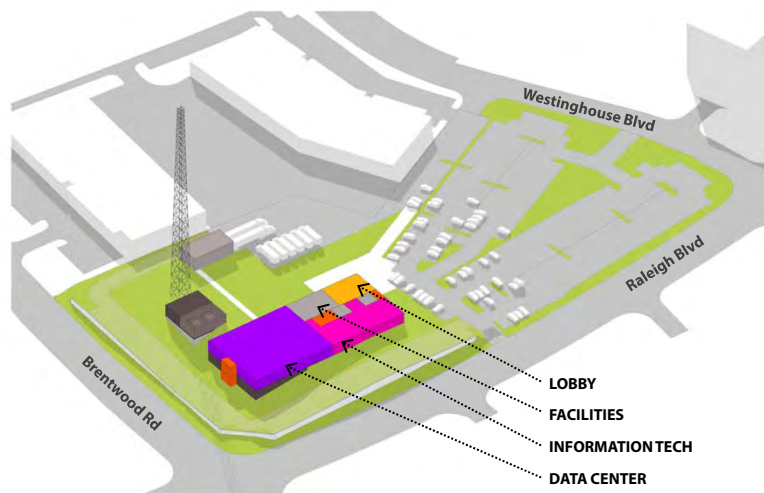




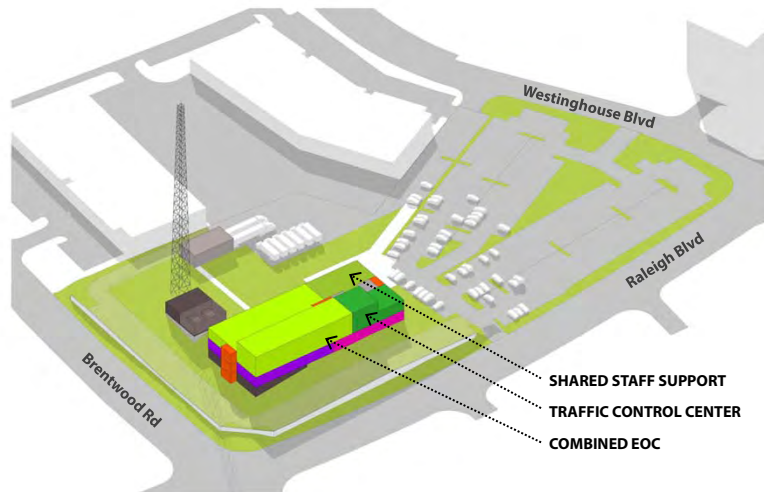
### Option E – Lower Level



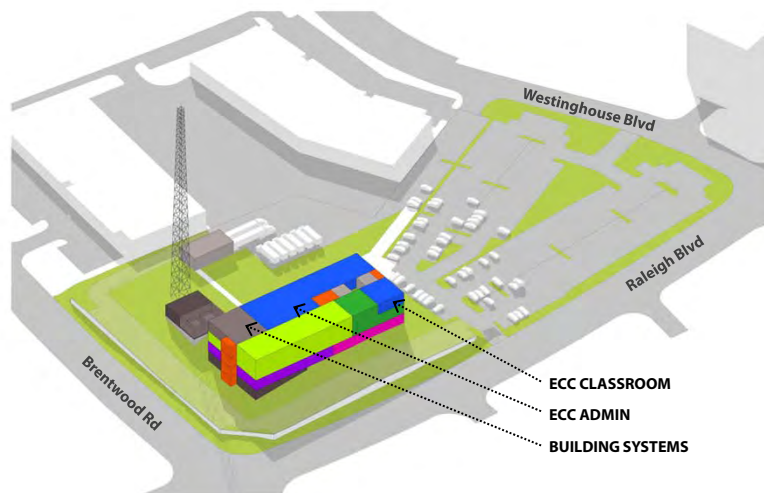
### Option E – Level 1



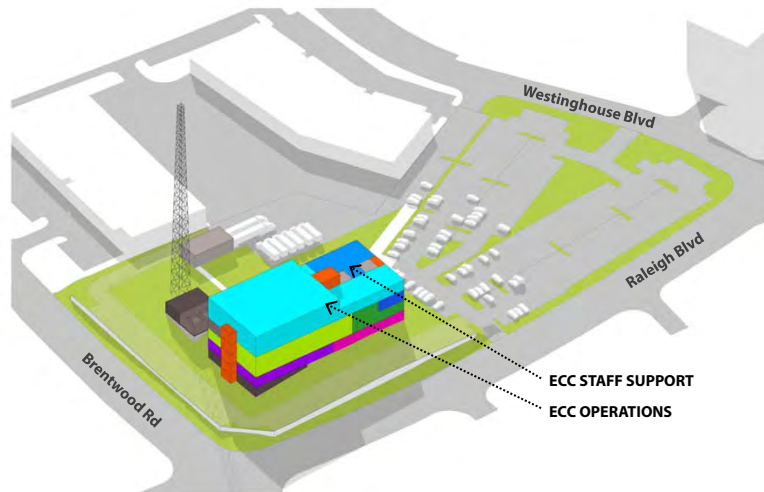
### Option E – Level 2



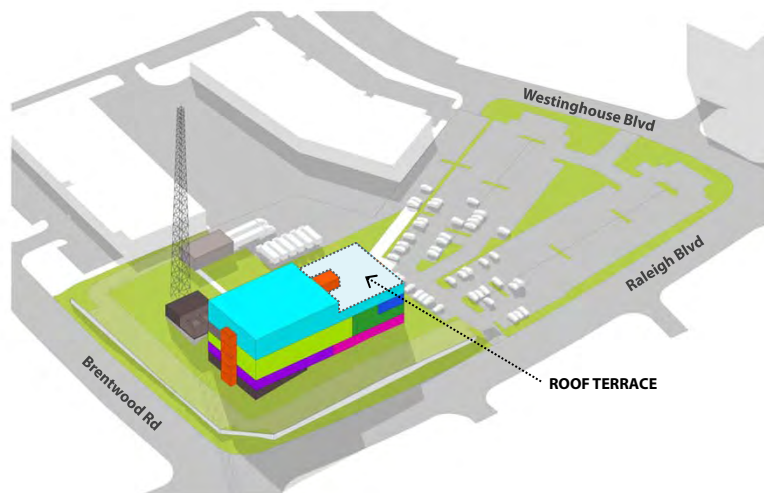
### Option E – Level 3



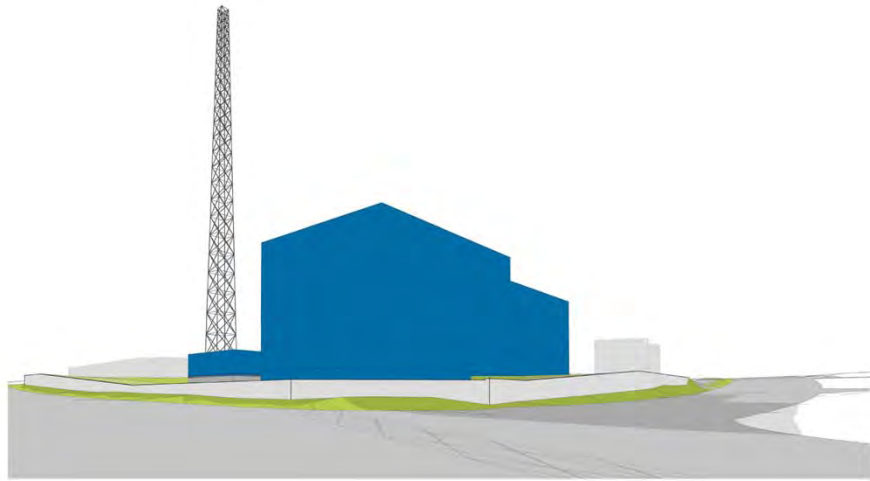
### Option E – Level 4



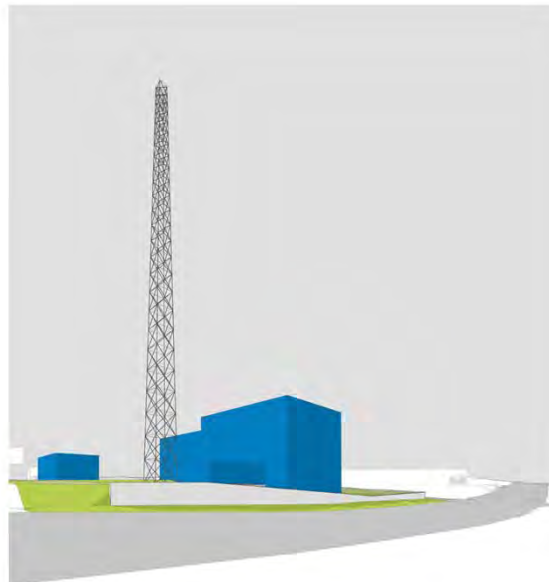
### Option E – Roof



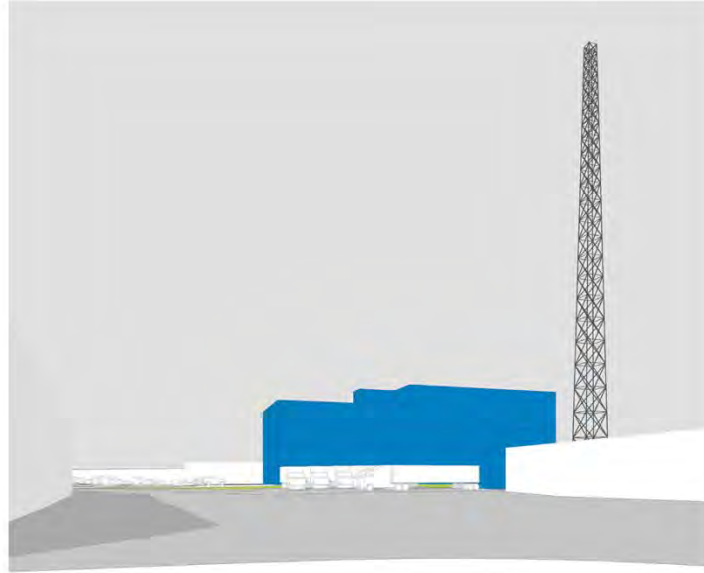
### Option E – North East Corner



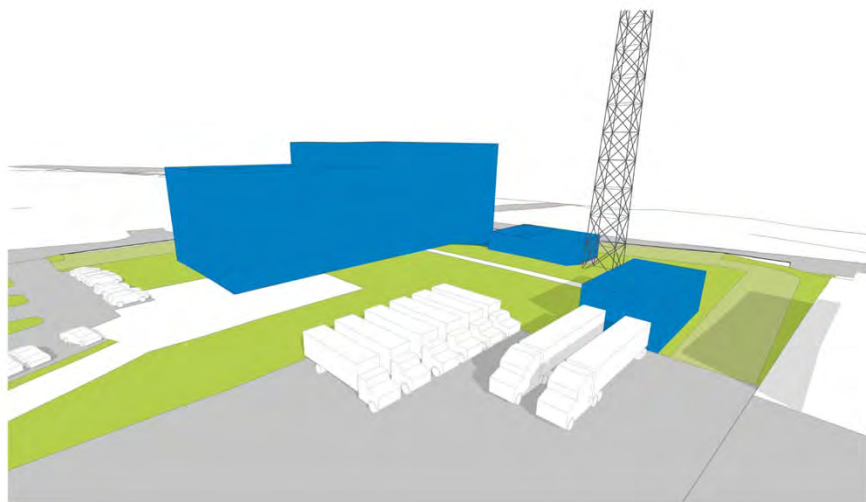
### Option E – South East Corner



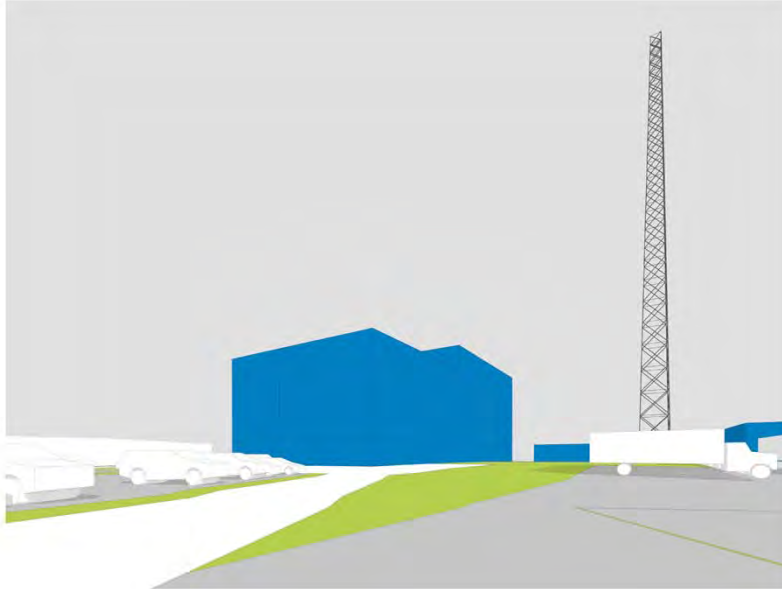
**Option E – South**



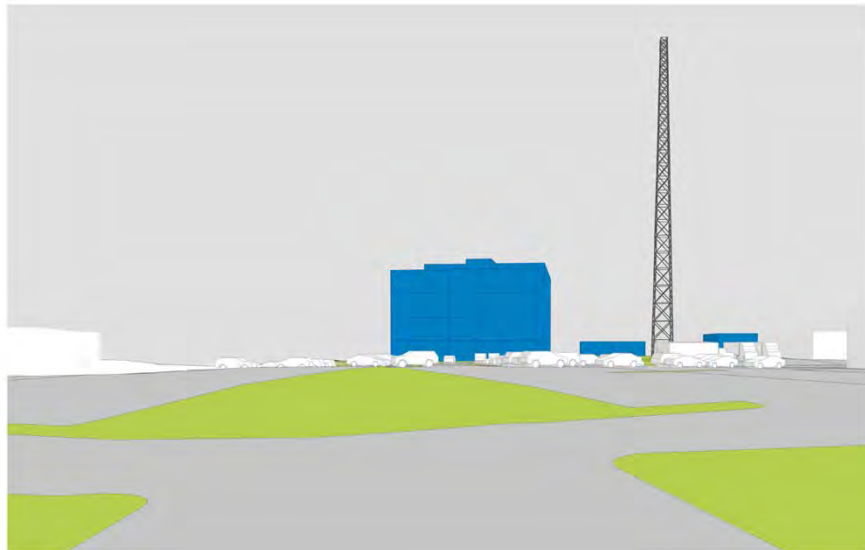
**Option E – Loading Dock**



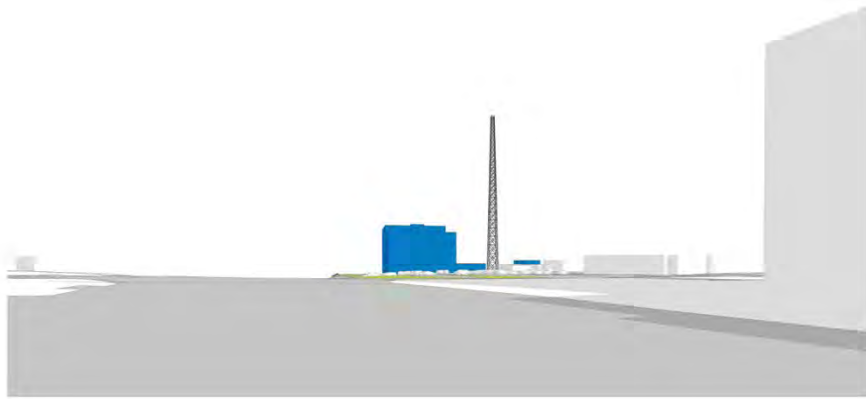
### Option E – Visitor Parking



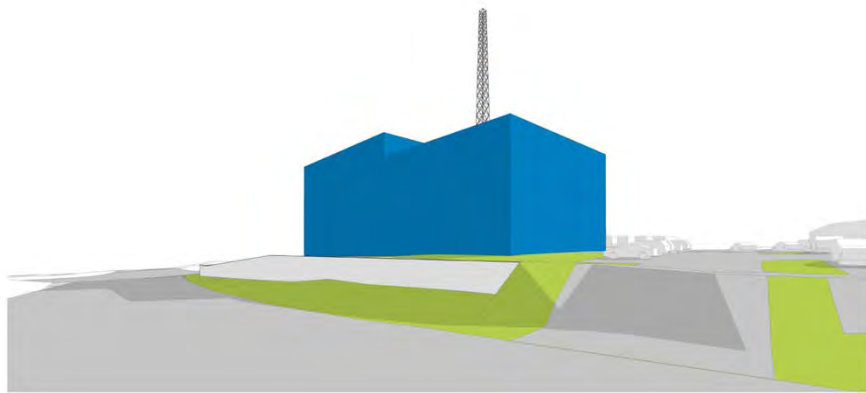
### Option E – West Gate



### Option E – North West Corner



### Option E – North Gate



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1633-MN

City of Raleigh

PBC+L/AECOM

Critical Public Safety Facilities Project

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DATE: November 06, 2012

A meeting was held on November 06, 2012 at the Convention Center.

Attendees included the following:

Name:	Company	Email Address	Phone
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Cassandra Hicks	CoR / IT	cassandra.hicks@raleighnc.gov	919-996-5513
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Craig Schulz	RWECC	craig.schulz@raleighnc.gov	919-996-5013
Walt Fuller	RWECC	Walt.Fuller@raleighnc.gov	919-996-5012
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R.J. Hope	BMCD	rjhope@burnsmcd.com	913-638-9349

The following items were discussed:

## November 6, 2012, Workshop

### Raleigh CPSF Programming, Blocking Concepts and Site Concepts

1. The design team reviewed updated site plan security separation/fence:
2. Security fence locations near the media trucks parking were updated. Bollards would prevent vehicles from incurring on the setback area.
3. Visitor parking is outside the security fence. It was discussed that visitors could approach the facility on foot but vehicles would be prohibited from the 25M setback zone.
4. The design team updated the adjacency and stacking diagrams, reviewed new schematic concepts G and H based on comments from yesterday's workshop.
5. Option G - This option is 12 feet shorter in total building height than previous options.  
Building systems and Facilities are on lower level.
  - a. Lobby, Combined EOC and ECC Classroom are on first level with higher structural bays

### PBC+L Architecture

333 Fayetteville St. Suite 1000 PO Box 951 Raleigh, North Carolina 27602 tel: 919.836.9751 fax: 919.836.1751



- b. Data Center, Traffic Control Center (TCC) and IT are on second level
  - c. ECC Operations and ECC Staff Support are on third level
  - d. ECC Administration is on fourth level
- 6. Option H
  - a. Building systems and Facilities are on lower level.
  - b. Data Center, ECC classroom and IT are on first level.
  - c. Combined EOC, TCC and shared Staff Support on second level
  - d. ECC Operations and ECC Support are on third level
  - e. ECC Administration is on fourth level.
- 7. The design team prefers option G.
  - a. Discussed the adjacency of Traffic Control adjacency to the EOC. It was noted that there are different needs for the TCC viewing traffic displays than the EOC. It was suggested that the EOC needs their own displays.
  - b. There is a strong relationship between the citizen call center and the press room at the same level with lobby.
  - c. Existing grades will allow for day lighting and equipment access on lower level.
  - d. Elevators will be sized to handle heaviest piece of equipment in Data Center.

### Mission Critical Hardening Strategies

*A draft report on the Security and Threat Analysis was distributed by Burns and McDonnell to the City of Raleigh Stakeholders for their review and comment.*

R.J. Hope reviewed general recommendations:

1. Analyze threat risk.
2. Hardening solutions are already integrated in the design.
3. Restrict public access and unscreened parking.
4. Restrict access to critical assets by access control.
5. While terrorism is a concern, it is highly unlikely that the city of Raleigh would be a target of a terrorism act. Larger cities like Washington DC are more likely targets.
6. Workplace violence and domestic violence are more likely concerns.
7. A segregated receiving facility (Remote Delivery Facility) reduces threats from mail and other deliveries.

Steve Loomis (AECOM) reviewed Threat and Vulnerability Assessment as it relates to the facility and discussed potential mitigation strategies:

#### Natural Threats

1. Tropical storm winds - design for Category 1 hurricane.
2. Tornadoes do not appear to be a major threat, so facilities will not be generally designed for tornado force winds or impacts. (Other mitigation strategies will be discussed later)
3. Lightning protection - proper grounding of systems needs to be incorporated into the design.
4. Ice and Snow - check for ice build-up on antennas, protect cables.
5. Flood zone - locate ground mounted equipment above anticipated flood level. Site is not in a flood zone area.

#### Seismic/Geological

6. Earthquake - comply with current building code requirements (essential services)

#### Service interruption (Natural occurrences)

7. Interruption of primary power, provide 100% backup, two separate commercial power sub stations are preferable; however it is generally more economical and reliable to provide multiple on site generators.
8. Interruption of secondary power - backup generators that are redundant.
9. Interruption of water - provide backup plan. Gray water for flushing toilets and clean water for drinking (typically bottled).
10. Interruption of food - 72 hours or even 5 days of food on hand (after seeing the effects of big storms like Sandy)
11. Interruption of fuel as well as fuel supply on priority from suppliers

Provide backup fuel storage to run generators for minimum of 72 hours.

Terry Dodge suggested that natural gas be considered for the generators. Use bi-fuel to extend on-site diesel.

*A question was raised about using Photovoltaics as a back-up. It was noted that these can be considered for normal weather, but not in storm situations, as they can't be relied on in an emergency, where there might not be available sunlight.*

12. Interruption of radio - boost cell phone reception and handheld radios within the building should be considered

13. Equipment failures- provide redundancy in HVAC systems and electrical systems.

#### **Civil threats**

14. Chemical, biological and explosives, are considered medium risk. Provide intake air vents as high as practical on the building

15. Firearms-workplace violence, domestic violence may be considered high risk.

16. Aircraft threat is considered low risk

17. Interruption of power, water and food is considered same as above

#### **Vandalism**

18. Property damage is considered medium risk. Provide fencing around the site and proper lighting. Use CPTED principles.

19. Theft is considered medium risk.

20. Unauthorized entry, physical. Control vehicle access at Raleigh Blvd (right in, right out only and secondary)

21. Consider expanding visitor parking, instead of using secure parking for non cleared city employees coming to the building for training.

22. Consider traffic issues with right-in right out, queuing on Raleigh Blvd.

#### **Accident hazards**

23. Chemical release inside building, provide negative pressure in custodial areas and restrooms and non hazardous cleaning solutions.

24. Hazardous materials from transportation are considered low risk.

25. Radioactive release is considered low risk.

26. Aircraft – site is not near airport, low risk.

27. Consider personal safety indoors and outdoors

#### **Building Technology**

Kristian Zebrosky reviewed the following technology issues that will affect the design decisions:

##### **Facilities:**

1. Redundant and diverse pathways and cabling
2. Dual entrances
3. Maximize return on investment (ROI) and minimize operating costs
4. Leading edge design to maximize efficiency and collaboration
5. Smart cable management systems

##### **ECC**

6. High availability systems
7. Active zone boxes with redundant paths. Active zone boxes include network switches that are installed in the zone box, not just passive cabling.
8. Direct cabling for radio system-vendor supported application. In some applications may not be able to be run through the aforementioned switches and fiber in the zone box, so direct cabling to the telecom room copper cabling will also be provided from zone boxes.
9. Kristian will run calculations to establish the needs for fiber and copper during design. During design, we will design "x" number of cables and types to meet the requirements of the switches and direct cables needed above.

##### **Data Center and NOC**

10. Modular design
11. Redundant and diverse infrastructure

12. Controlled access to systems (user defined)
13. Overhead cabling
14. NOC connected and collaborative
15. Facilities/Building management Ops Center similar in size/equipment scope to NOC

**EOC**

16. Flexibility and high availability of technology design
17. Zoned approach-passive cabling
18. Robust A/V Switching with multiple inputs
19. Maximize situational awareness

**TCC**

20. Video wall and Operations board
21. Proximity to data center server
22. Controlled access to equipment
23. Digital signage throughout the building, monitors

**HVAC Plumbing Fire Protection**

Elizabeth Long reviewed the issues that will affect the design.

**Central plant**

1. Chilled water system; efficiency and redundancy  
Variable Primary pumping system
2. Heating hot water; high efficiency condensing boiler  
Primary/Secondary pumping system  
Consider Dual fuel for the boilers as well (like generators)
3. Asked the client if we should consider dual source systems for heating and cooling. Billy had shared earlier that there facility currently has both chilled water and DX and there was a discussion earlier in the morning about dual fuel like generators. Pros and cons were discussed, but ultimately Billy shared that as long as there was back-up equipment in the design, he was satisfied.

**Airside systems**

4. Air handling system; 3 AHUs 1 backup AHU
  - a. ECC and support (n+1)
  - b. EOC and support areas (1)
  - c. TCC and IT facilities (1)
5. VAV terminal units with hot water coils

**Data Center**

6. Computer Room air conditioning units (n+2)
7. Row based high density containment systems  
Supply at floor level (no raised floor)  
Physical separation of hot return air and cold air supply air
8. Systems without containment: drawbacks
  - a. Recirculated air
  - b. Difficult to control air temperature at IT equipment
  - c. Oversized CRAC units
  - d. Bypass air
9. Containment systems: Benefits
  - a. Maximize efficiency, flexibility
  - b. Built-in redundancy
  - c. Allows raising air supply/return temperature
  - d. Lowest total cooling equipment cost per KW of IT load

- e. Scalable

This solution will fit the no-raised floor option

Add Occupancy sensor- air control

### Plumbing

- 10. Low flow fixtures
- 11. Tankless water heaters
- 12. Consider Solar hot water heater option

### Fire protection

- 13. Data Center - Clean agent system
- 14. ECC Preaction
- 15. EOC center and remaining building - Wet pipe sprinkler system

### Electrical

Terry Dodge reviewed the issues that will affect the design

- 16. Redundant, scalable and available systems
  - a. Class F3 power distribution ANSI/BICS?
  - b. Dual power paths to critical equipment
  - c. N+1 generators, parallels controls
  - d. 2N UPS system, bypass
  - e. Bus duct to data racks
- 17. Reviewed Two Utility Input diagrams, Class F3

### UPS design options

#### Option 1: Two large UPS groups

- a. Internally modular, n+1
- b. Scalable by adding modules and by adding structures
- c. Add UPS in 100Kw to 160 KW blocks
- d. Infrastructure and MBP for anticipated future loads size is limited by initial assumptions
- e. Can do distributed or centralized static switch
- f. Locked into a specific manufacturer – model can become obsolete by mfr.

#### Option 2: Distributed End-of-Row UPS

- a. Add UPSs as you add racks, lower front end cost, lower upgrade costs
  - b. Add infrastructure as you add UPSs
  - c. Don't have to worry about obsolescence
  - d. More flexible for future, not locked in one manufacturer
  - e. More UPS to maintain, possible increased maintenance costs
18. Following discussion about Storm Sandy, stakeholders need to consider battery size and life, available space, generator reliability, minimum 15 min, preferred 30 min.

### Lighting

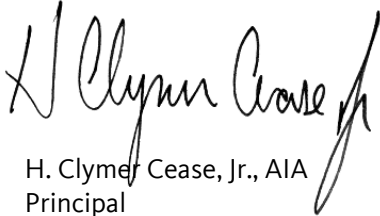
- 19. Energy Efficient - LED vs. Fluorescent (LED recommended)
- 20. Controls – Time, daylight, occupancy.

### Fire Alarm

- 21. Digital addressable
- 22. Monitored in dispatch
- 23. Is central monitoring desired by the City? City responded 'No – will monitor in dispatch.
- 24. City preferred system/manufacture? City responded – 'Will send list of preferred fire alarm as well as DDC/BAS system mfrs'

*The above represents the author's understanding of the content of discussion held during the meeting. Any corrections or additions are to be forwarded to PBC+L within seven (7) days of receipt. If no written objections are received within this period the above will become the official record of decisions made in this meeting.*

Submitted by:  
PBC+L/AECOM

A handwritten signature in black ink, appearing to read "H. Clymer Cease, Jr.", with a stylized flourish at the end.

H. Clymer Cease, Jr., AIA  
Principal

cc: File

# CITY OF RALEIGH CRITICAL PUBLIC SAFETY FACILITY

06 November 2012



City of Raleigh

Pearce Brinkley Cease + Lee | AECOM

## Options G&H

Option G&H – CPSF combined city/county EOC



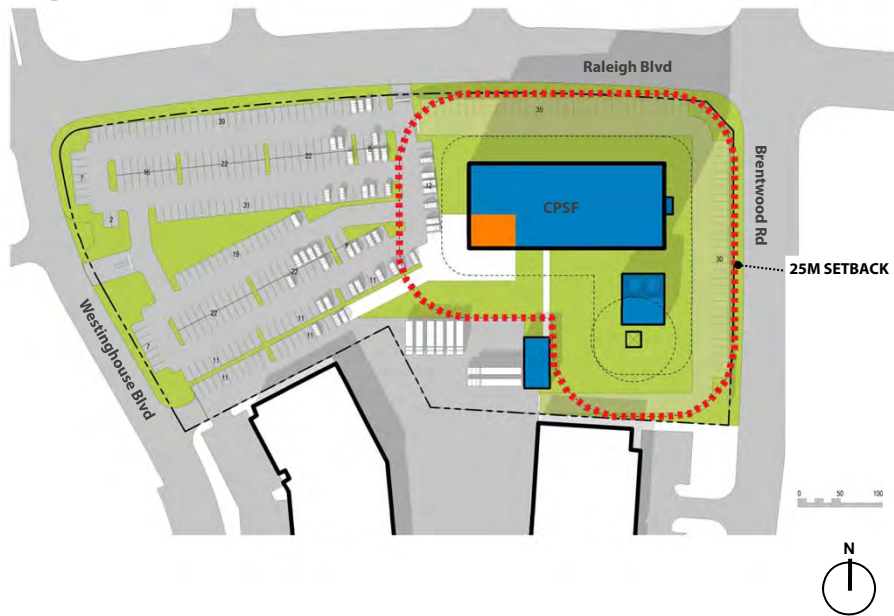
Option G&H – CPSF combined city/county EOC



### Option G&H – Future Expansion



### Option G&H – Security Setback 25 meter





### Option G&H – Security Setback 10 meter



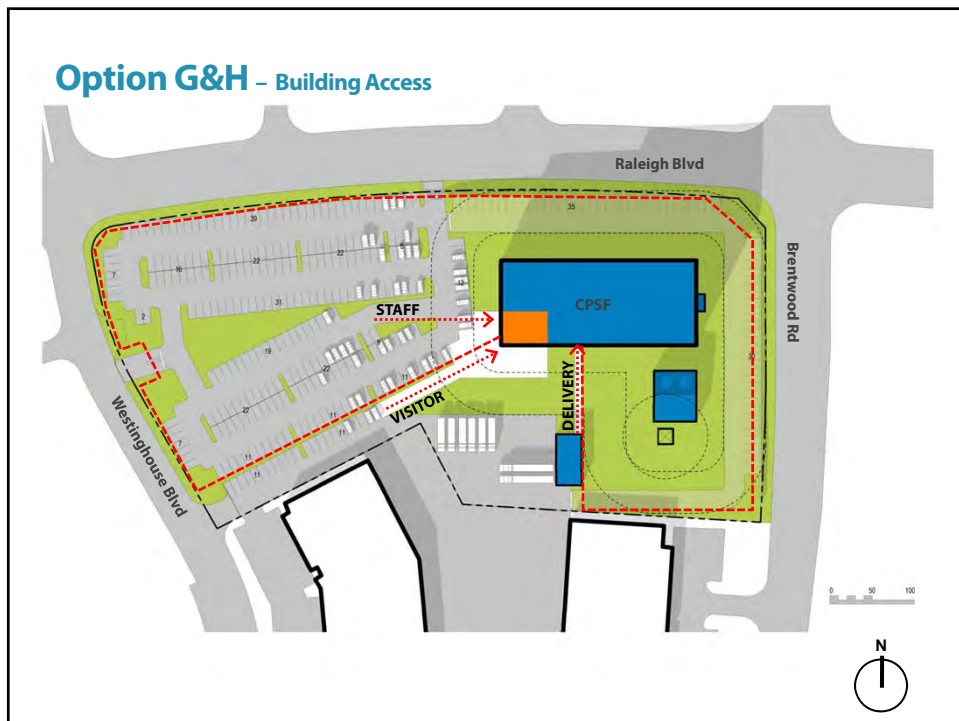
### Option G&H – Security Fence/Wall



### Option G&H – Vehicular Access



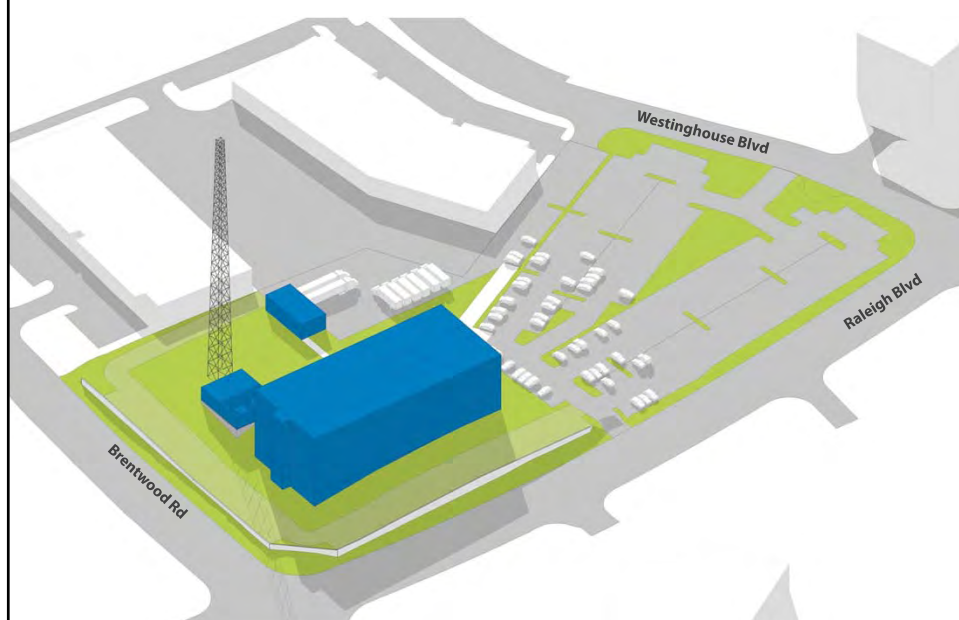
### Option G&H – Building Access



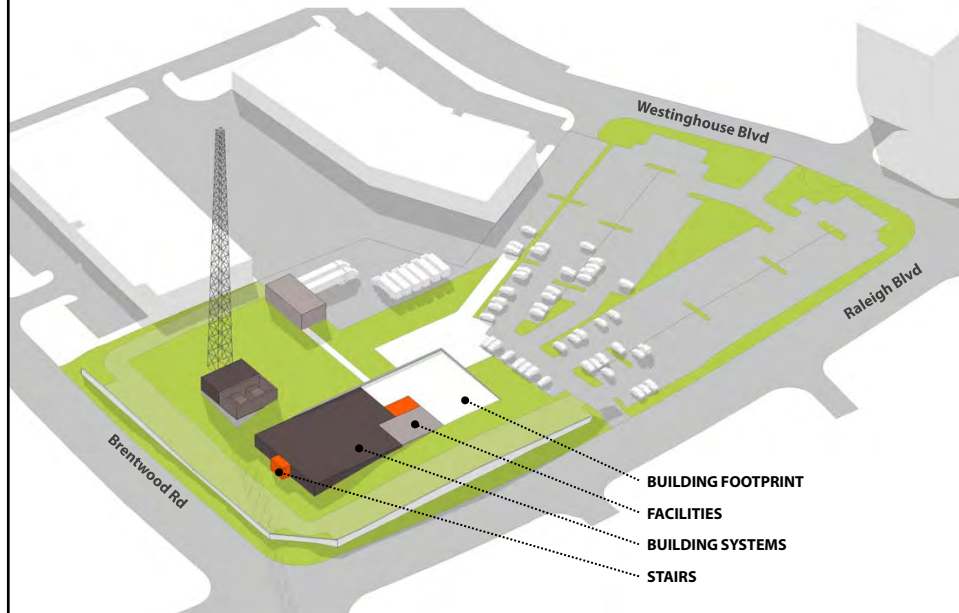
### Option G&H – Approx. Parking (346)



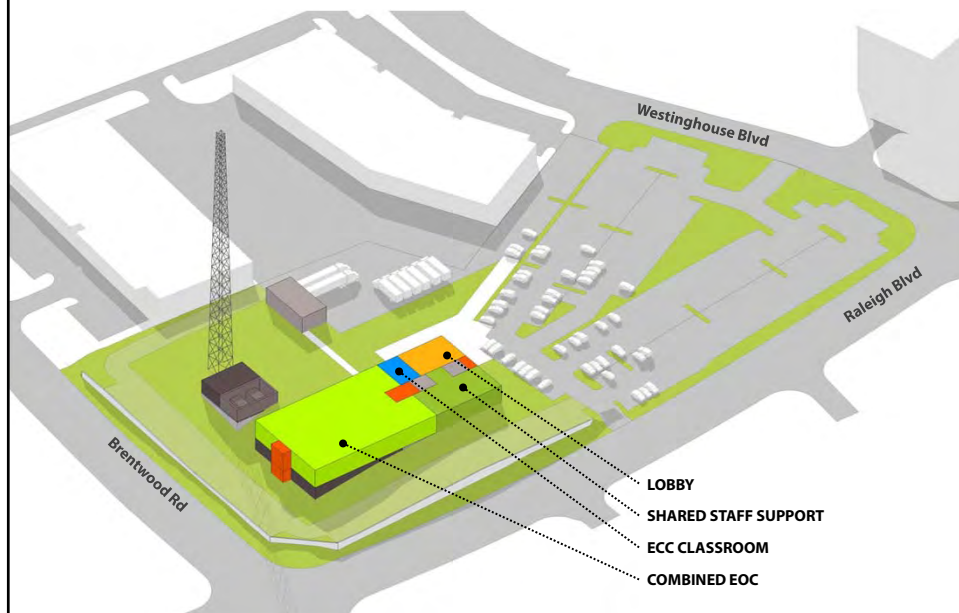
### Option G – Blocking Stacking 3D diagram



### Option G – Lower Level

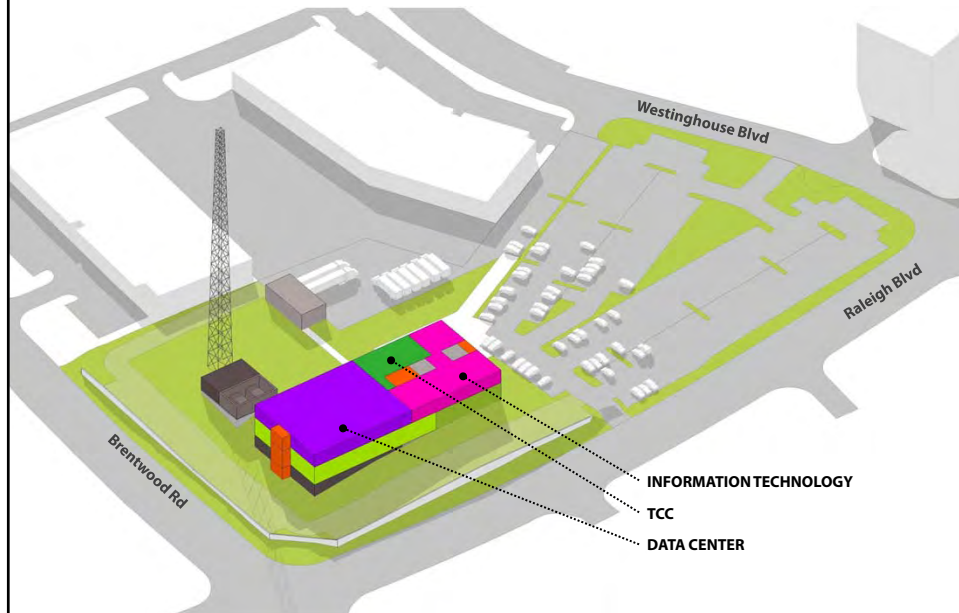


### Option G – Level 1

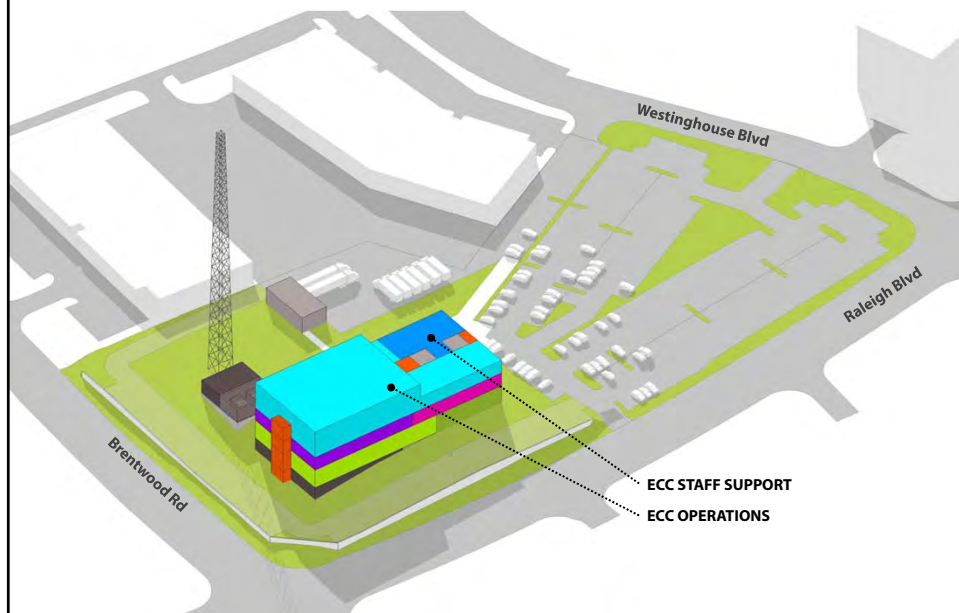




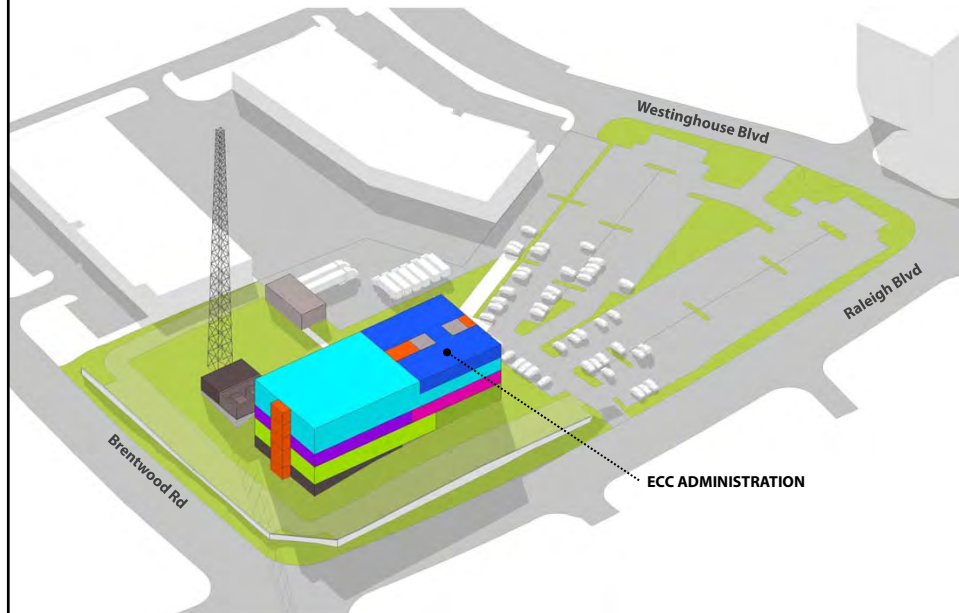
### Option G – Level 2



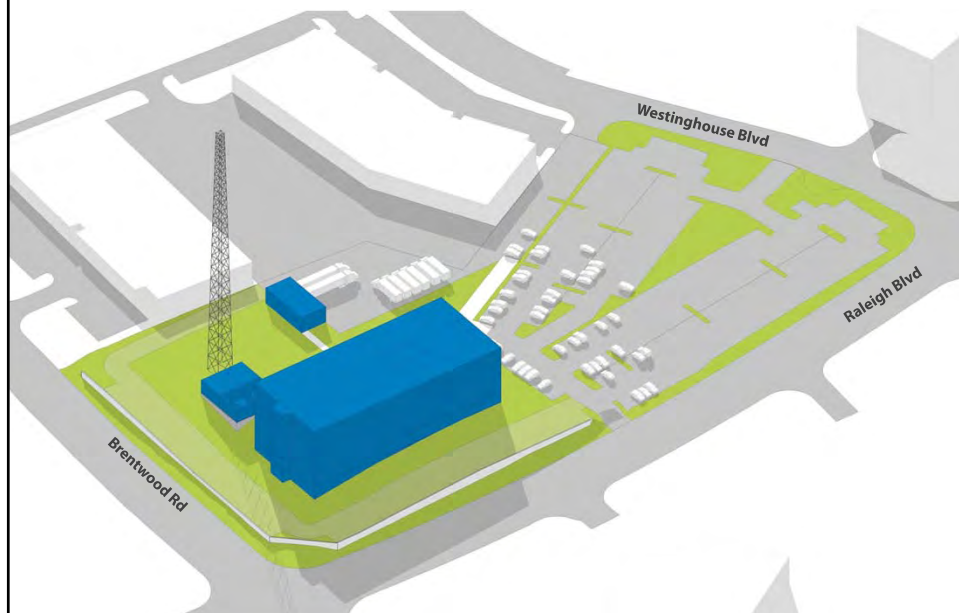
### Option G – Level 3



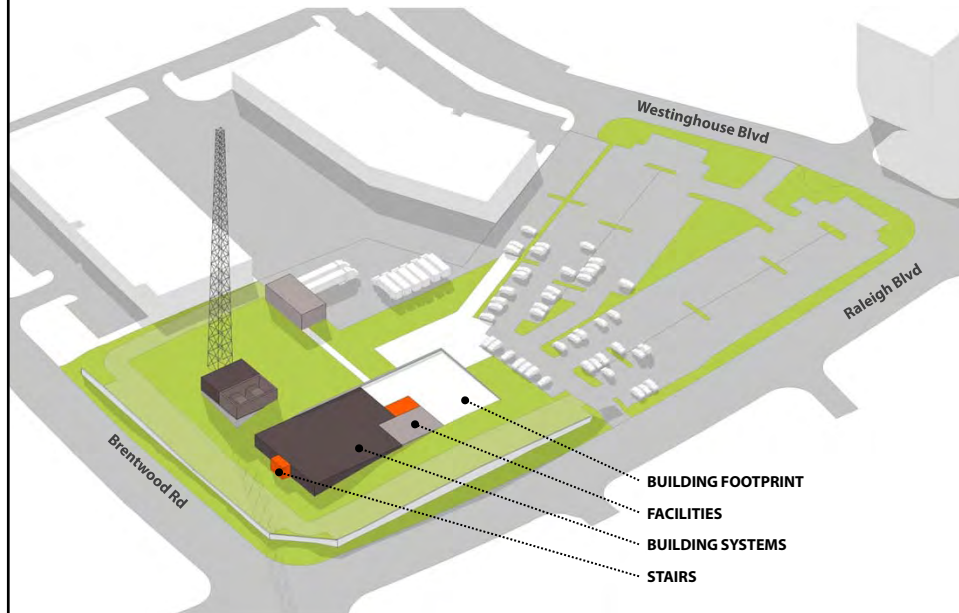
### Option G – Level 4



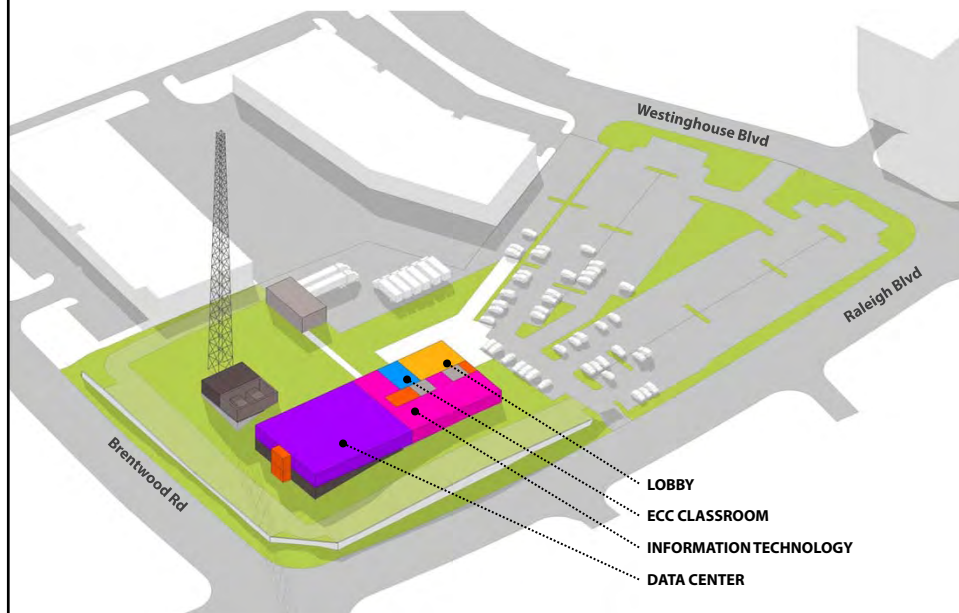
### Option H – Blocking Stacking 3D diagram



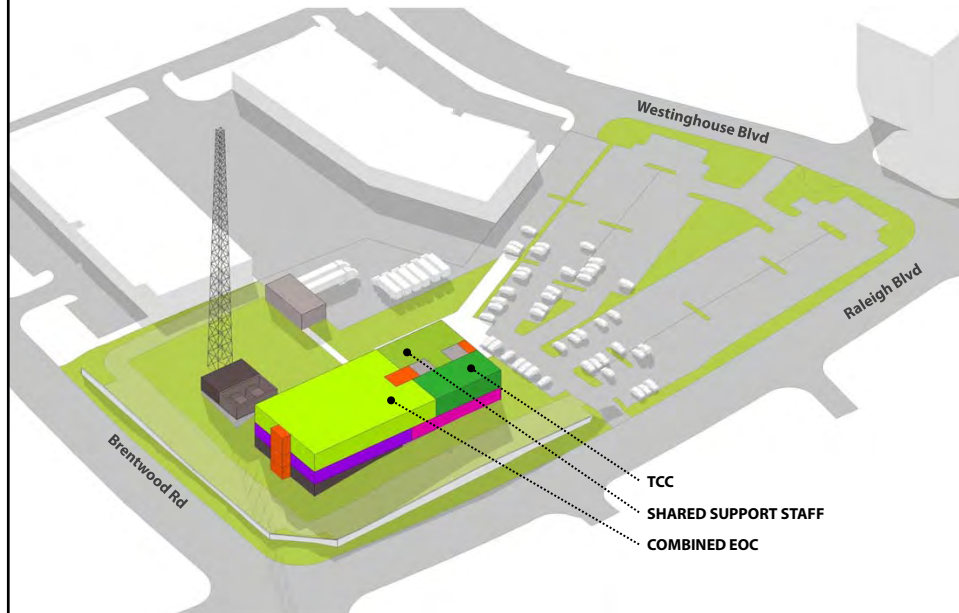
### Option H – Lower Level



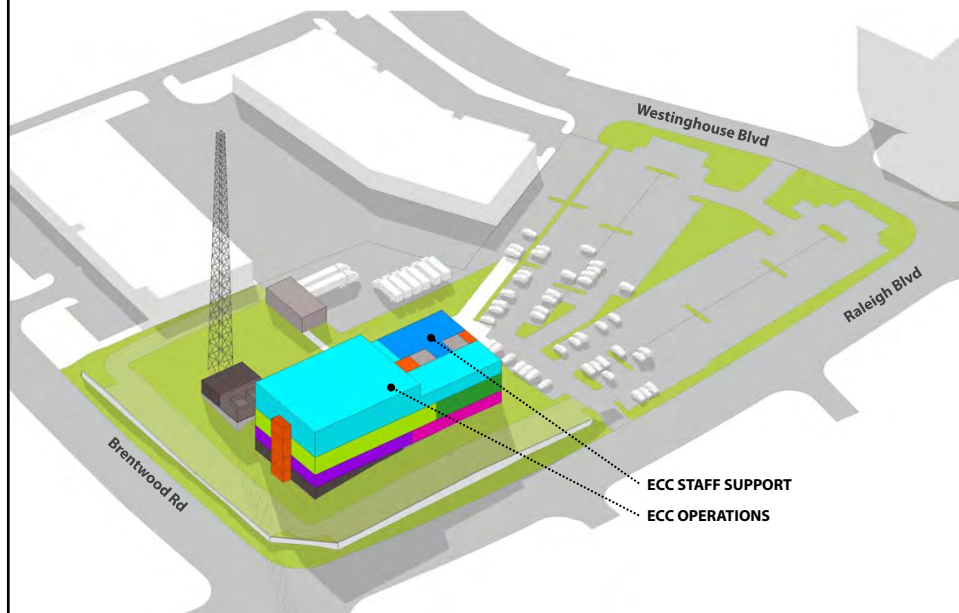
### Option H – Level 1



### Option H – Level 2

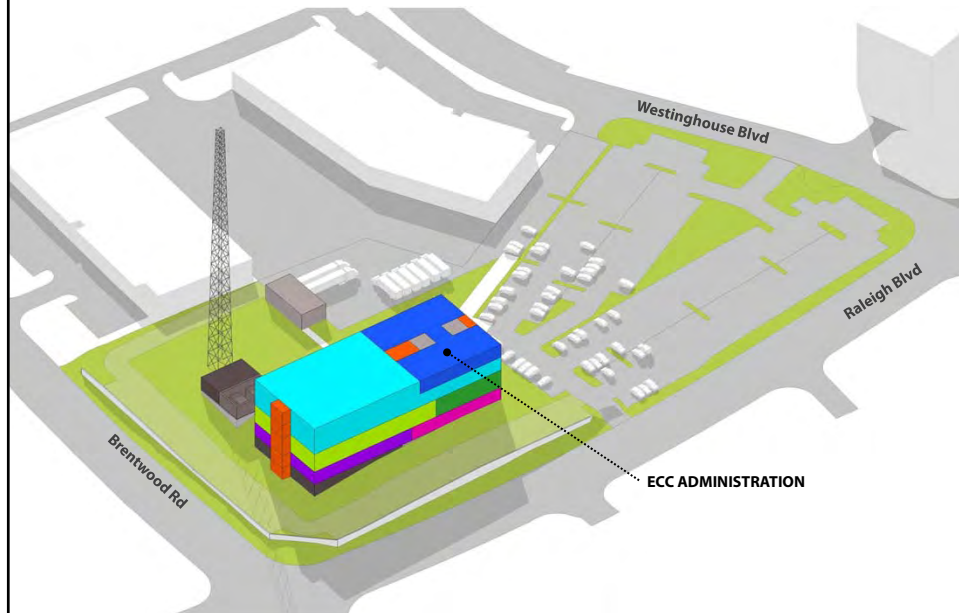


### Option H – Level 3

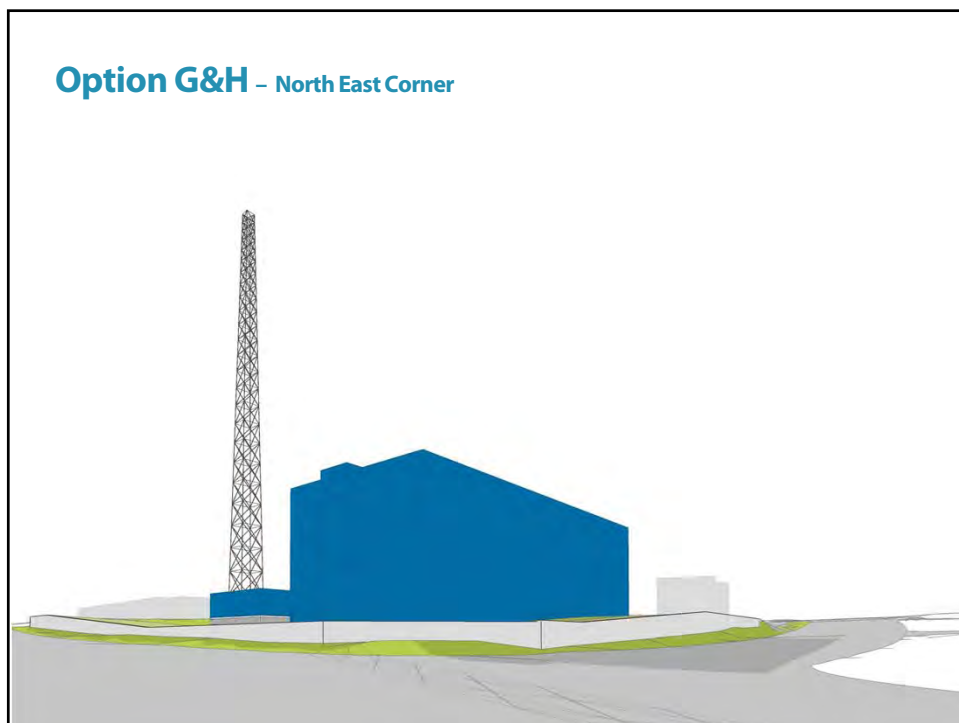




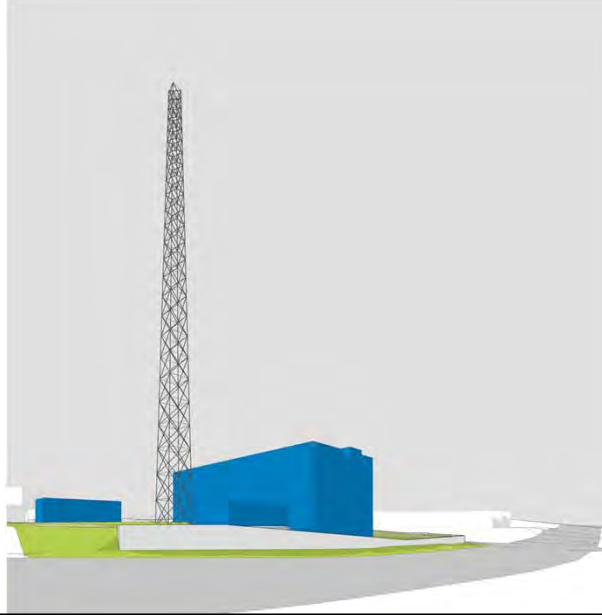
### Option H – Level 4



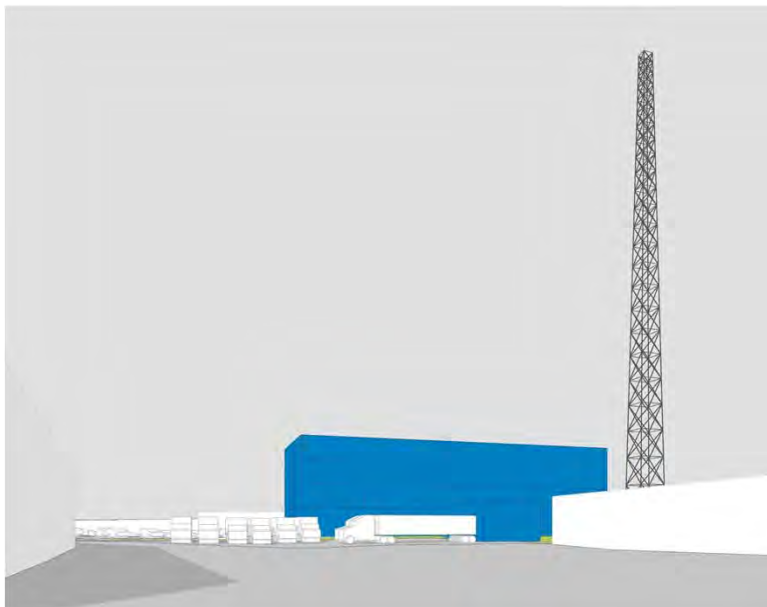
### Option G&H – North East Corner



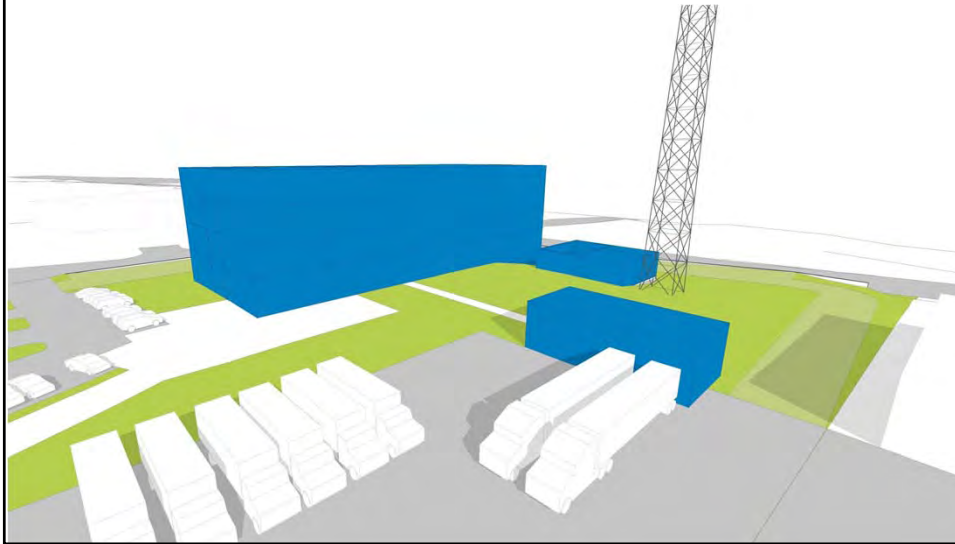
**Option G&H – South East Corner**



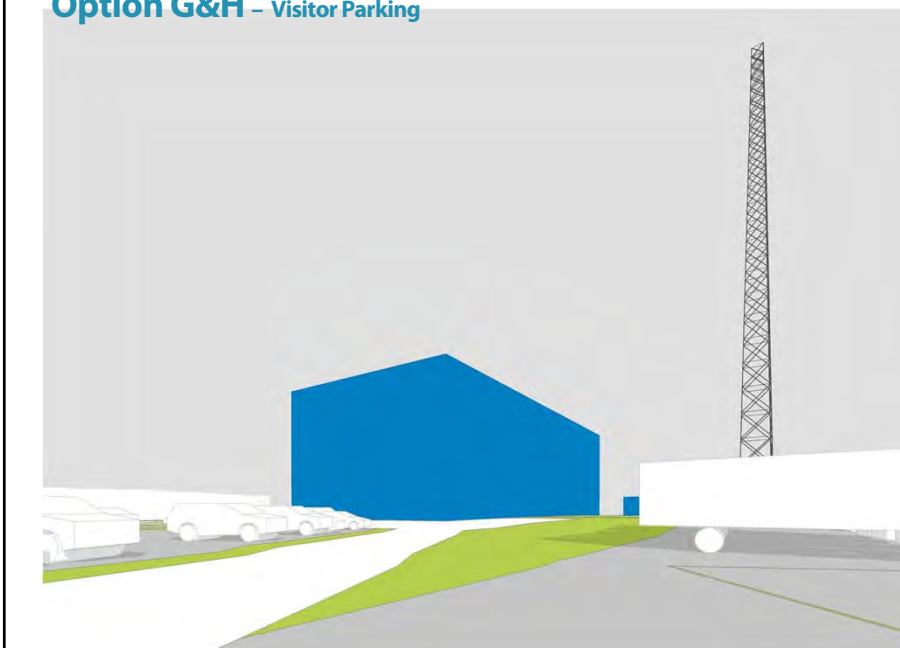
**Option G&H – South**



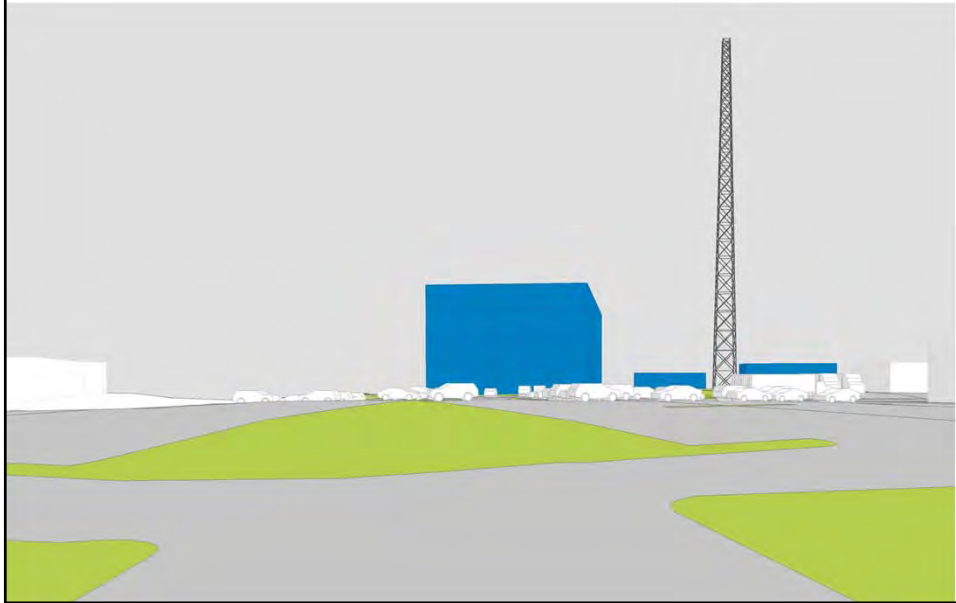
### Option G&H – Loading Dock



### Option G&H – Visitor Parking



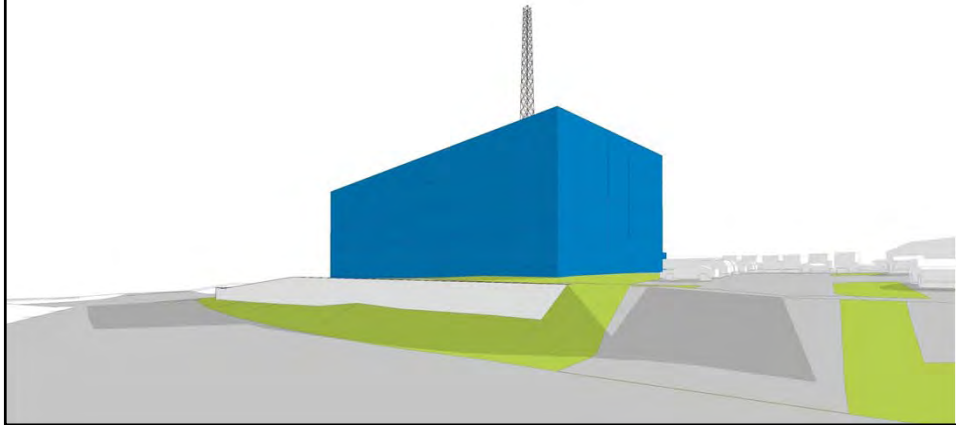
**Option G&H – West Gate**



**Option G&H – North West Corner**



## Option G&H – North Gate



## Next Steps

Threat and Vulnerability Assessment Completion Date: 11/6/12		ASSESSMENT Rank (high, medium, low)		DESIGN PRECAUTIONS ARE NOTED FOR THE FOLLOWING BUILDING SYSTEMS						
		Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
<b>NATURAL THREATS</b>										
<i>Weather</i>										
	Tropical Storm Winds			Design for Category 1 Hurricane.	Anchor all site mounted equipment.	Protect windows from projectiles.	Protect exterior equipment.	Protect outside equipment and switch stations. Provide underground utilities.	Provide fixed outdoor furniture including at staff break area.	Antenna Supported to withstand wind speeds.
	Tornado/ Microburst			Design for wind speeds up to EF-3 for the Operations Component per FEMA 361. Microbursts are typically EF-1.	Same as above	Same as above. Harden skin of building. Provide safe room for staff.	Same as above	Same as above	Same as above	Same as above. Most storms travel from west to east.
	Lightning			Protect equipment from lightning and electrical surge. Provide communications equipment grounding in accordance with Motorola R56.	Perform soil resistivity test and provide a proper grounding plan.			Provide proper surge protection for both internal and external transients.		Cadweld all below grade grounding cable connections. Provide master labeled lightning protection system
	Ice and Snow			Protect critical equipment. Provide for basic facilities for staff who may have to stay on site and work multiple shifts.	County to prioritize site snow removal	Provide spaces for staff including bunking, showers and cooking.		Check for ice build-up on Antennas	County contract in place to remove snow from roofs prior to exceeding design loads	
	Flood - Inundation Rain			Protect critical equipment. Provide non flooding route for staff to get to work.	Site access blocked by local flooding. Provided second site access point. Parking lot also floods. Re grade parking lot.	Same as above	Locate ground mounted mechanical equipment above anticipated flood levels.	Conduit located outside of flooding area. Provide above ground fuel tanks and generators.		
<i>Seismic/Geological</i>										
	Earthquake			Comply with Building Code, for an essential facility. Design for continuity of operations after an event.		Comply with Building Code for an essential facility. Design for continuity of operations after an event.	Comply with Building Code for an essential facility. Design for continuity of operations after an event.	Comply Building Code for an essential facility. Design for continuity of operations after an event.		

**City of Raleigh**  
**Critical Public Safety Facilities**

**Threat and Vulnerability Assessment**  
*PBC+L/AECOM*

	Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
<b>Service Interruption (Natural Occurrences)</b>									
Interruption of Primary Power Supply (natural)			Provide redundancy	Underground building utilities. Any above ground services should be outside of tree drip zones.		Provide 100% backup by generators for critical areas.	Provide 100% backup by generators for critical areas.		Ideally provide 2 generators each capable of powering 100% of the emergency load. Design per NEC 708
Interruption of Secondary Power Supply (natural)			For critical areas provide multiple paths.				Multiple Paths for uninterruptible power supply (UPS). Provide quick connection for mobile generator and / or secondary back up generator.		Trailer mounted generator
Interruption of Water (natural)			Provide backup should water service go down.					Possibly create a Fire Watch position in the ECC.	Provide Bottled water and portable toilets.
Interruption of Food (natural)			Provide backup plan should staff not be able to leave or enter site.					Bring food in	
Interruption of telecomm (natural)			Provide protection for telecommunication cable as well as redundancy.				Provide underground utilities in a concrete encased duct bank. Provide a secondary feed for Telecomm fiber .		
Interruption of transport (natural)			Provide basic facilities to house staff should roadways become blocked or unusable.	Remove trees which can impact mission critical operations by providing roads, drives, and buildings outside of tree fall zones.	Provide bunk areas and showers for staff.				Provide second entrance for accessibility and egress from the site.
Interruption of fuel			Provide fuel storage to run generators for min. 72 hours.					Provide back up fuel delivery from County fuel farm.	
Interruption of Radio			Provide backup for the primary radio system.				Provide a Bi-Directional Amplifier (BDA) to boost cell phone reception within the building .	Provide backup for console systems i.e.: desktop radios and amateur radios.	Interoperability contracts with other jurisdictions including Fairfax and prince Williams Counties
Equipment Failure			Provide redundancy for mission critical equipment and systems that serve mission critical areas.			Provide redundant HVAC	Provide redundant generator or quick connection for mobile generator		Redundant telecomm grid feed from each side of the building
<b>CIVIL THREATS</b>									
<b>Terrorism</b>									

	Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
Chemical							Position intake air up high for HVAC per the National Institute for Occupational Safety and Health (NIOSH) standard. Provide remote shut down of fresh air with warning sensors.		Restrict site access.	
Biological						Provide a Mail Room with separate exhaust system. Provide emergency exhaust in lobby.	Negative pressure HVAC system in mail room and lobby. Provide remote shut down of fresh air with warning sensors.		Provide off site mail screening.	
Incendiary explosives)					Avoid direct vehicle approaches to the buildings. Use reinforced concrete walls, planters and bollards to keep vehicle distance from the building.	Hardened Facility with stand off distances to public vehicles, 82 feet per Unified Facilities Criteria (UFC) 4-010-01.	Secure fuel tank in concrete vault.	Secure transformer vault.		
Firearms				Provide space and power to serve a metal detector and x ray machine at controlled public entrance near security desk and at staff vestibule. Provide security zones.		Ballistic glazing, UL Level 4, and exterior walls around critical functions per National Fire Protection Agency (NFPA) 1221. Ballistic glazing at security desk is recommended. Provide electronic security, card access zones.				
Vehicle				Indirect vehicle access	Provide reinforced concrete planters, low walls and bollards at entrances and other critical areas minimize threat.	Hardened Facility with stand off distances of 25 feet to public vehicles.				
Aircraft										Activate back-up communication center
Interruption of Power (malicious)					Provide bollards around generator and fuel tank.		Secure access and monitor to mechanical rooms.	Secure switch gear space with card access and secure distribution panels.		
Interruption of Fuels (malicious)				Protect fuel tanks.	Secure access at fuelling point.					
Interruption of Water (malicious)				Similar to natural interruption						
Interruption of Food (malicious)				Similar to natural interruption						
Interruption of Telecomm/ Wireless (malicious)								Provide diverse routings from various ends of the facility.	Back-up radios	



	Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
Unauthorized entry - forced			Secure entry vestibule with CCTV surveillance. Create several levels of security zones with most secure zone being ECC operations floor.		Provide ballistic glazing and exterior ballistic rated walls around critical functions per NFPA 1221.		Provide electronic card access system with multiple security zones. Provide ability to monitor from multiple workstations with CCTV coverage of the building perimeter, building entry points and at entry to next secure level zone.		
<b>Vandalism</b>									
Property Damage			Provide visual access to exterior, CCTV around perimeter, generator, entrances, and mechanical and electrical rooms which can be monitored from various workstations throughout the facility.	Provide non-concealing hardscaping and landscaping which could interfere with surveillance.	Avoid concealment areas.		Design lighting levels, so motion can be picked up from cameras.		Design with Crime Prevention Through Environmental Design (CPTED) guidelines.
Theft			Provide secure parking areas.	Provide non-concealing hardscaping and landscaping which could interfere with surveillance.	Avoid concealment areas.		Secure hand holes on site.		Design with Crime Prevention Through Environmental Design (CPTED) guidelines.
Unauthorized Entry (physical)			Provide Levels of Security	Provide non-concealing hardscaping and landscaping which could interfere with surveillance.	Provide control through zoned security levels with electronic multiple levels of card access. Avoid concealment areas.			Have vendors check in and escort to their appropriate area.	
Unauthorized Entry (electronic)			Provide Levels of Security						Provide private networks with fire walls.

	Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
<b>Information Security</b>									
Acoustic Interception of Data			Provide Levels of Security to protect NCIC and medical records		Provide acoustic controls to areas where sensitive information will be discussed.				
Visual Interception of Data			Provide Levels of Security		Provide control through zoned security levels, visual barriers, locked files.				
Theft of Data (physical)					Provide control through zoned security levels.			Practice proper disposal of sensitive documents.	
Electronic Interception/ Theft of Data								Provide firewalls and encryptions for electronic data.	
<b>ACCIDENT HAZARDS</b>									
<b>Internal</b>									
Chemical Release			Provide negative pressure in restrooms and custodial spaces. Centralize custodial supplies and chemicals to area with negative pressure and design with proper exhaust.		Specify low volatile organic compounds (VOC) materials during design and construction.	Provide an independent HVAC for Ops areas. Flush out HVAC systems before occupancy. Provide emergency shut down for air intake.		Establish operating limitations on cleaning products allowed internal to building and store in proper locations. Isolate mechanically.	
Fire	High	High	Construct with low combustible materials per Building Code.		Design 2 hour separation around critical functions per NFPA 1221.	Provide preaction fire suppression system in operations area. Provide double interlock fire protection system including clean agent system for equipment rooms. Protect cable penetrations.	PA and strobe alarm in all areas, with a silencer in dispatch area. Possibly use LED light fixtures.	No personal coffee pots, space heaters, or personal electronic devices at workstations and offices.	
Water	Low	High				Provide floor drains near wet areas, and slope floor to drains. No water pipes above data center.	Provide a leak detection system and design cable runs to be located in trays above racks.		Provide a preaction double interlocked sprinkler system on the floor above.

	Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Site	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical / Telecomm Redundancy	Operational Solutions	Other
<b>External (vicinity of facility)</b>										
Chemical Release	Low	High					Provide high air intakes (NIOSH). Emergency shut down for air intake, button at supervisor console.			
Radioactive Releases	Low	High		Will not be designed to withstand radio active release						
Biological	Low	High					Provide high air intakes (NIOSH). Emergency shut down for air intake, button at supervisor console.		Health screening may be required in the event of an attack.	
Aircraft - (accidental)	High	High								Activate back-up communication center
<b>Personal Safety</b>										
Indoors	Low	Low		Provide levels of security. Provide CCTV coverage of public areas.				Provide CCTV for visual identification of non staff that before they are allowed to enter building after normal working hours or if lobby not staffed for deliveries, appointments, etc.	Designate staff assigned to monitor CCTV system.	
Outdoors on-site and near site	Low	Low		Secure staff parking and break area and provide adequate light levels. Provide CCTV around building perimeter.	Provide staff break area within fenced and gated parking enclosure. Provide non concealing hardscape and landscape.			Locate cameras to monitor employee parking, break and entry areas.	Designate staff assigned to monitor CCTV system.	Design with Crime Prevention Through Environmental Design (CPTED) guidelines.

# Technology

6 November 2012

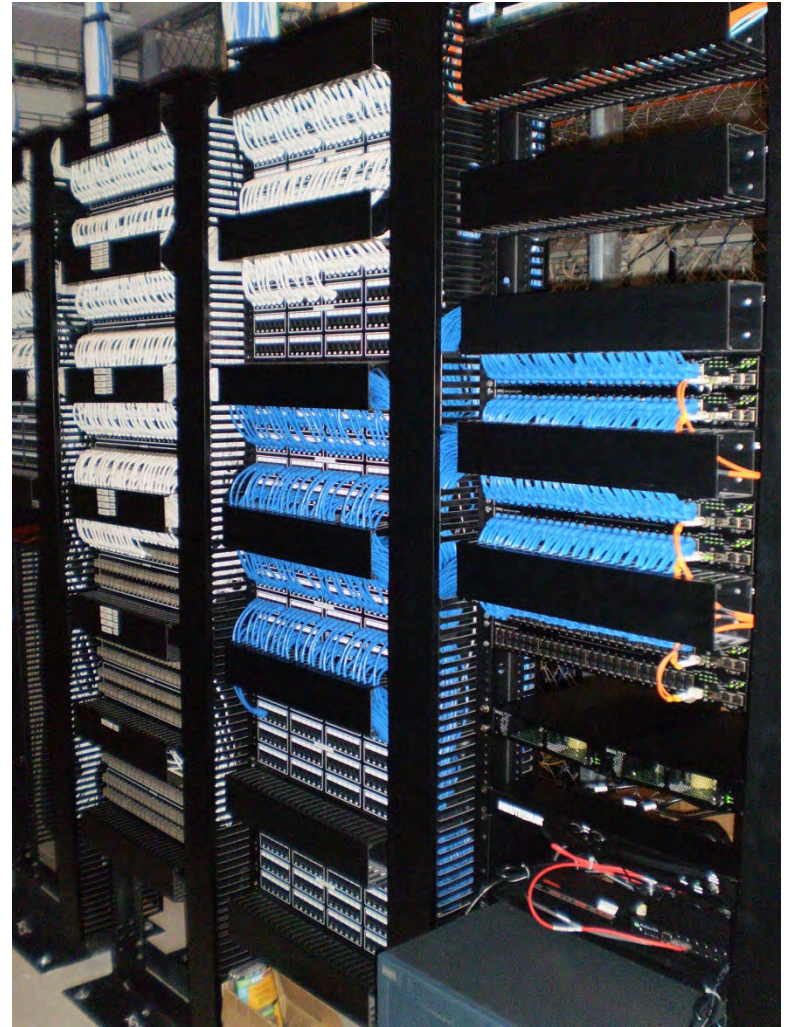


City of Raleigh

Pearce Brinkley Cease + Lee | AECOM

# Facilities

- Redundant and Diverse Pathways and Cabling
- Dedicated technology spaces-dual Entrances
- Leading edge design to maximize efficiency and collaboration
- Maximize ROI / minimize operating costs
- Cabling Management System(smart patch panels)





# ECC

- High availability systems
- Active Zone Boxes at WSOs with redundant paths
- 911 CPE – Enhanced, Phase II, Next Gen
- PBX/Admin
- Two-Way Radio
- Computer Aided Dispatch (CAD)
- National & State Systems & RMS
- Recorder (DVL)
- Auxiliary – Video feeds, Alarms, Security
- Geographic Databases



# Data Center and NOC

- Overhead Cabling Distribution
- TIA 942 Compliant
- Modular Design with growth and change-out space
- Redundant and Diverse planned infrastructure
- Controlled Access to Systems (user defined)
- N.O.C. –Connected and Collaborative



# EOC

- Dispatch consoles
  - Interface to Radio base station equipment
- Command level users
  - User equipment with additional features
  - Interface to Smart phones
- Interoperable tactical solution
  - Pre programmed groups or channels
  - Allows direct communications between field officers
- Flexibility and High Availability of technology design
  - Maximize Situational Awareness
- A/V Switching with multiple inputs





# TCC

- Operations Center with Video Wall and Operations Board
- Proximity to own Server section of Data Center
- Controlled Access to Equipment





## Central Plant Systems

- **Chilled Water**
  - High Efficiency Variable Speed Chillers (n+1)
  - Variable-Primary Pumping System (n+1)
  - Water-Side Economizer (n)
- **Heating Hot Water**
  - High Efficiency Condensing Boilers (n+1)
  - Primary / Secondary Pumping System (n+1)

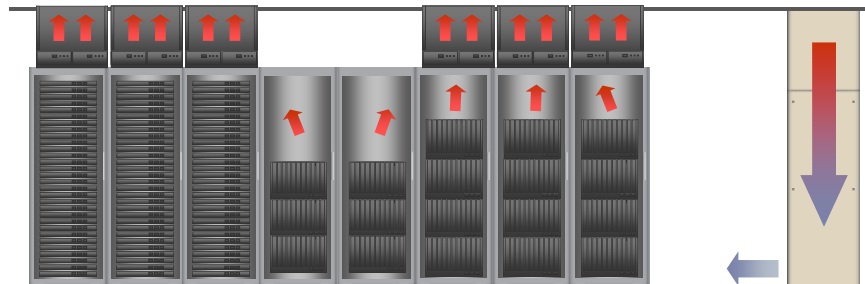


## Airside Systems

- **Air Handling Units**
  - Variable Air Volume (VAV)
  - 3 AHU's + 1 Back-up AHU
    - ECC & Support Areas (n+1)
    - EOC & Support Areas (1)
    - TCC, IT & Facilities (1)
  - VAV Terminal Units with Hot Water Coils
- **Data Center**
  - Computer Room Air Conditioning Units (n+2)

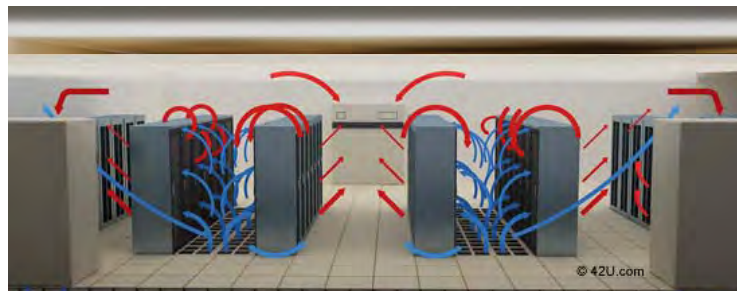
## Data Center

- **Row Based High-Density Containment Systems**
  - Physical separation of hot return air and cold supply air
  - Removes heat directly from the source



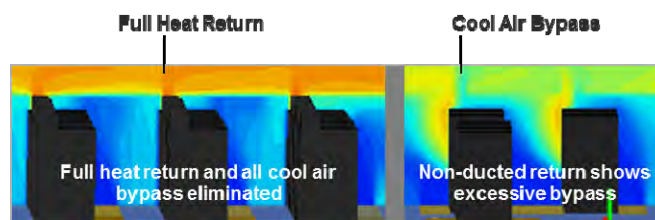
## Systems Without Containment

- **Drawbacks**
  - Recirculation of air
  - Difficult to control air temperature at IT equipment
  - Oversized CRAC units
  - Bypass air



## Containment Systems

- **Benefits**
  - Maximize efficiency
  - Maximize flexibility
  - Built in redundancy
  - Allows raising air supply/return temperature
  - Lowest total cooling equipment cost per KW of IT load
  - Scalable



## Mechanical Systems

- **Plumbing**
  - Low Flow Fixtures
  - Tankless Water Heaters
- **Fire Protection**
  - Data Center
  - Clean Agent System
  - ECC / EOC Center
  - Wet Pipe Sprinkler System



## Electrical

6 November 2012



City of Raleigh

Pearce Brinkley Cease + Lee | AECOM

## Electrical - Power

- **Redundancy, Scalability, Availability**

- ANSI/BICSI Class F3 Power Distribution
- Dual power paths to Critical Equipment
- N+1 Generators, Parallel Controls
- 2N UPS Systems, Bypass
- Bus Duct to Data Racks



## Electrical – Power Class F3

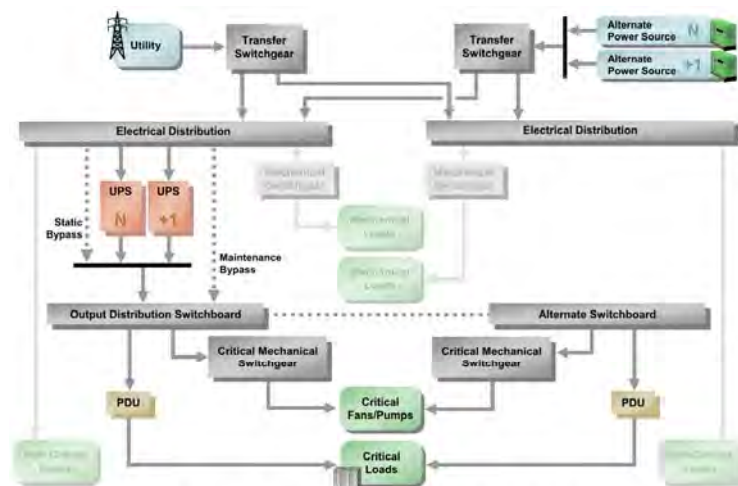


Figure 17b: Class F3 Single Source Two Utility Inputs



## Electrical - UPS Design Options



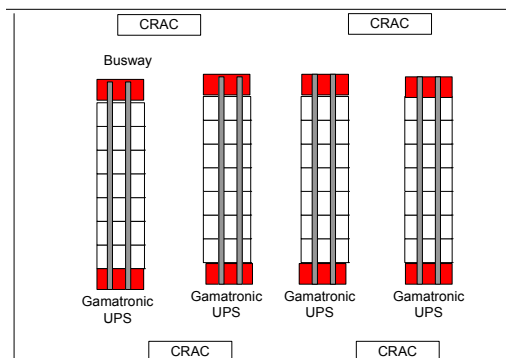
### 1. Two Large UPS Groups

- Internally modular, N+1
- Scalable by adding modules
- Add UPS/Battery cabinets later
  - » Add UPS in 100kW to 160kW blocks
- Infrastructure and MBP for full anticipated future load, therefore size is limited by initial assumptions
- Can do distributed or centralized Static Switch
- Locked into a specific manufacturer
  - » Manufacturer obsolete model could be an issue later

## Electrical - UPS Design Options

### 2. Distributed End-of-Row UPS

- Add UPSs as you add racks, lower front end cost
- Add infrastructure as you add UPSs
- Don't have to worry about obsolescence
- More flexible for future
- More UPSs to maintain, increase maintenance time and cost



## Lighting

- Energy Efficient
  - LED vs. Fluorescent
- Controls
  - Time, Daylight, Occupancy



## Fire Alarm

- **Digital Addressable**
  - **Monitored in Dispatch**
    - Is Central Monitoring also desired?
  - City Preferred or Undesirable Systems/Mfrs?
  - Mass Notification desired?