

Room Name: Wet Lab 2

ELECTRICAL

Electrical Comments: 120V Duplex outlets every 4' @ countertop.
 No more than 3 duplex outlets per circuit.
 (3) 50A 208V 3 phase receptacles - 1 on each side wall and one mounted in center of lab in ceiling.
 120V duplex outlets every 6' wall space where cabinets not installed.
 2 conduit in ceiling with pull wire for future 480V, 3 phase, 30 amp service.
 120V power for each hood.

LIGHTING

Lighting Level: fc 50 avg., 70 task Light Type: Fluorescent
 Lighting Comments: Lighting will provide general illumination. Supplemental lighting will provide additional illumination in task areas, and task lighting will have separate controls. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights and task lighting.

COMMUNICATION

Data/Phone Outlets: 1 data drop, with 3 RJ45 jacks with cat. 6 cable each, on 3 walls, 3 drops total. No phone.
 Communication Comments: 1 wireless access point.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Work Sink (resin)	1	
	Emer. Sh/Eye Wash	1	
Floor Drain	Only at the emergency shower/eyewash		
Misc:	Cold water connection along side of the piped gas connections in hoods only.		

GASES

Gases Comments: 3 Piped Gases - Compressed Air (125 psi), Nitrogen, Argon. Piped to all hoods, center island, and two wall locations.

OTHER

Fire Protection Comments: No special requirements
 Acoustical Comments:
 Structural Comments:
 Security Comments :

Room Name: Wet Lab 3

GENERAL

Room Name:	Wet Lab 3	Number of Occupants:	4
Function:	Traditional Wet Chemistry	Hours per Day:	11 (in and out)
		Days per Week:	5 (in and out)
Quantity of this Room:	1	Primary Adjacencies:	lab support
Minimum Floor Area:	nusf	Secondary Adjacencies:	Wet Labs 1 & 2
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 11' min. clear
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	Epoxy paint on concrete	Door Material:	wd./half glass, h.m. frame
Wall Base:	Vinyl	Doors:	pair 3' x 7'
Windows:	Observation	Window Treatments:	Blinds

Finish Comments:

Construction Comments: Lab walls extend to structure above.

FURNITURE

Quantity	Description	Supplied by
2	chairs	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
10 LF	base cabinet with one 36" wide sink	DBF
10 LF	wall cabinet	DBF
10 LF	mobile (wheeled) base cabinet	DBF
2	10' x 4' walk-in hood	DBF
1	acid storage cabinet, lockable	DBF
1	flammable material storage cabinet, lockable	DBF
2	mobile work benches, 30" x 60" (center island)	DBF
1	vented flammable gas cylinder cabinet (3 cylinders)	DBF

Equipment Comments:

HVAC

Relative Humidity:	30% to 65% Humidity	HVAC Reliability:	no 100% outage
Directional Airflow:	Bldg. Standard	Heat Generating Equipment:	Equipment List

HVAC Comments: Merv 8 filtration Ventilation alarm system & HVAC to maintain 72F-78F
3 stub outs for exhaust snorkels in ceiling, one at each end and center.
once-through air circulation
N+1 exhaust capacity

HAZARD

Hazard Comments: Chemical inventory being developed.

Room Name: Wet Lab 3

ELECTRICAL

Electrical Comments: 120V Duplex outlets every 4' @ countertop.
 No more than 3 duplex outlets per circuit.
 (3) 50A 208V 3 phase receptacles - 1 on each wall and one mounted in center of lab in ceiling.
 120V duplex outlets every 6' wall space where cabinets not installed.
 2 conduit in ceiling with pull wire for future 480V, 3 phase, 30 amp service.
 2 overhead drops at center island.
 120V power at each hood.

LIGHTING

Lighting Level: fc 50 avg., 70 task Light Type: Fluorescent
 Lighting Comments: Lighting will provide general illumination. Supplemental lighting will provide additional illumination in task areas, and task lighting will have separate controls. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights and task lighting.

COMMUNICATION

Data/Phone Outlets: 1 data drop, with 3 RJ45 jacks with cat. 6 cable each, on 3 walls, 3 drops total. No phone.
 Communication Comments: 1 wireless access point.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Work Sink (resin)	1	
	Emer. Sh/Eye Wash	1	
Floor Drain	Only at the emergency shower/eyewash		
Misc:	Cold water connection along side of the piped gas connections in hoods only.		

GASES

Gases Comments: 3 Piped Gases - Compressed Air (125 psi), Nitrogen, Argon. Piped to all hoods, center island, and two wall locations.

OTHER

Fire Protection Comments: No special requirements. Sprinkler system
 Acoustical Comments:
 Structural Comments:
 Security Comments :

Room Name: Robotics Lab
(Low-High Bay)

GENERAL

Room Name:	Robotics Lab (Low-High Bay)	Number of Occupants:	10
Function:	High Bay Lab	Hours per Day:	
		Days per Week:	
Quantity of this Room:	1	Primary Adjacencies:	Metal Add. Manuf. Lab
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 25 ft. clear
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	Sealed concrete	Door Material:	solid core wood
Wall Base:	none	Doors:	pr. 3' x 7' 12'W x 16'H overhead door
Windows:	observation windows	Window Treatments:	None
Finish Comments:			
Construction Comments:	<ul style="list-style-type: none"> • Provide work platform over the Metal Additive Manufacturing Lab. "Robotics Control Station", with concrete floor and removable railing. • Provide bollard protection both sides of overhead door. • Designed as control area. Requires 1-hour construction separating it from the rest of the building. 		

FURNITURE

Quantity	Description	Supplied by
12	chair	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
20 LF	base cabinet with 36" sink	DBF
20 LF	wall cabinet	DBF
6	desk	DBF
6	work bench	DBF

Equipment Comments:

HVAC

Relative Humidity:	40%-60%	HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	
HVAC Comments:	Temp. between 72F-78F. 2 stubouts for exhaust snorkels		

HAZARDS

Hazard Comments:	Oil and grease, solder, flux, cleaners, degreasing compounds
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Room Name: Robotics Lab
(Low-High Bay)

ELECTRICAL

Electrical Comments: 120V duplex outlet every 8' of wall.
120V duplex outlet every 4' of countertop.
(4) outlets 208V, 3 phase, 60 amps,
(4) 480V, 3 phase, 60 amps.
Max. 6 duplex outlets per 20 amp circuit.

LIGHTING

Lighting Level: fc 50 avg., 70 task Light Type: Fluorescent
Lighting Comments: Lighting will provide general illumination. Supplemental lighting will provide additional illumination in task areas, and task lighting will have separate controls. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights and task lighting.

COMMUNICATION

Data/Phone Outlets: 1 data drop, with 3 RJ45 jacks with cat. 6 cable each, on 3 walls, 3 drops total. Phone outlet at one location.
Communication Comments: 2 wireless access points
(1) dedicated LAN line.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Work Sink (resin)	1	
	Emer. Sh/Eye Wash	as required by code	ANSI/ISEA Z358.1
Floor Drain	Only at the emergency shower/eyewash		
Misc:	Cold water connection along side of the piped gas connections.		

GASES

Gases Comments: 3 Piped Gases - Compressed Air (125 psi), Nitrogen, Argon. 1 manifold each on 3 walls plus additional compressed air outlet at 20' o.c. on 3 walls.

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Metal Additive Manuf. Lab
(Low-High Bay)

GENERAL

Room Name:	Metal Additive Manuf. Lab (Low-High Bay)	Number of Occupants:	4
Function:	Metal Printing	Hours per Day:	various
		Days per Week:	various
Quantity of this Room:	1	Primary Adjacencies:	Robotics Lab
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 11' min. clear
Wall Finishes:	Paint	Ceiling Material:	ACT in lab, open to structure over work platform
Floor Finishes:	Antistatic epoxy coating on concrete	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	pr. 3' x 8', removable/no center post 3' x 7' egress door
Windows:	Interior observation windows. Exterior windows not required	Window Treatments:	None
Finish Comments:	Interior finishing should be easy to clean to insure no metal powder can accumulate separated from robotics area by partition.		
Construction Comments:	<ul style="list-style-type: none"> •Robotics Control Station platform above. •Lab proportions should be rectangular, not square. 		

FURNITURE

Quantity	Description	Supplied by
2	chairs	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
2	Arcam A2x Metal Printer	GFE
2	Arcam PRS	GFE
3	Russel Finex Sifter	GFE
1	flammable storage cabinets, lockable, for liquid solvents, 4' H	DBF
2	flammable storage cabinets, for metals, 6' H	DBF
6	standard storage cabinets, 6'H x 3'W	DBF
5	counter height storage cabinets	DBF
1	desk	DBF

Equipment Comments: Provide 4' clear around Aram A2X metal printer.

Room Name: Metal Additive Manuf. Lab
(Low-High Bay)

HVAC

Relative Humidity: 50%-60% HVAC Reliability:
 Directional Airflow: Building Standard Heat Generating Equipment: Arcam Printers
 HVAC Comments: Appropriate HVAC system to maintain lab between 68F-78F @ relative humidity between 50%-60%.
 Possible need for oxygen monitor due to the use of helium gas (2 gas bottles), notification inside lab (GFE).

HAZARDS

Hazard Comments: Metal "powders" are used in the printing process. At small enough sizes, they can be pyrophoric and possibly explosive. Materials are classed according to the IBC as Pyrophoric material. With appropriate storage, allowed 8 cubic feet of solid material. Limit activities to the maximum allowed in a control area.

ELECTRICAL

Electrical Comments: 120V duplex outlet every 6' of wall at 48" above finished floor.
 (2) 440V outlets (for printers)
 (4) 208V outlets

Transformers must be at least 30 feet from the printers.
 Transformers must be at least 30 feet from interior room walls.

All equipment in the room must be well grounded. Grounding lugs must be available to tie equipment to grounding lugs, perimeter ground bus around room. Provide 24" copper ground bar at 48" above finished floor - 1 each short wall + 2 each long wall = 6 total

LIGHTING

Lighting Level: fc 50 avg., 70 task Light Type: Fluorescent
 Lighting Comments: Lighting will provide general illumination. Additional lighting will provide further illumination in task areas, and task lighting will have separate controls. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights and task lighting.

COMMUNICATION

Data/Phone Outlets: 1-2 data drops, with 3 RJ45 jacks with cat. 6 cable each, on each side wall, 3 drops total. No phone.

Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	work sink (future)	1	stub out plumbing for future sink
	Emer. Sh/Eye Wash	1	outside room by door
Floor Drain	Only at the emergency shower/eyewash		
Misc:			

Room Name: Metal Additive Manuf. Lab
(Low-High Bay)

GASES

Gases Comments: Piped Gases, Nitrogen, Argon, valved, stubbed and capped.
Compressed Air (125 psi), 2 drops in ceiling and 2 drops on one short wall.
200 gallon buffer tank for compressed air. Needs 42 CFM compressed air for 5-10
minutes at a time.
1x1 helium manifold with automatic changeover.

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Lab Support

GENERAL

Room Name:	Lab Support	Number of Occupants:	0
Function:	Support	Hours per Day:	0
		Days per Week:	0
Quantity of this Room:	2	Primary Adjacencies:	wet and dry labs
Minimum Floor Area:	nusf	Secondary Adjacencies:	one each floor
Function Comment:	May function as required control area for chemical storage. 240 SF lab support per 1200 SF lab, excludes low-high bay labs.		

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft.
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	Vinyl Tile	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	pair 3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:			
Construction Comments:	Walls extend to structure above.		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
15 LF	mobile open shelf unit, wire shelving, 5 high	DBF
3	mobile storage cabinet, (3' x 6')	DBF

Equipment Comments:

Room Name: Lab Support

HVAC

Relative Humidity: HVAC Reliability:
 Directional Airflow: Heat Generating Equipment:
 HVAC Comments: Building Standard

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V duplex outlet every 12'-0" of wall

LIGHTING

Lighting Level: fc 10-30fc Light Type: Fluorescent
 Lighting Comments: Single Switch Control lighting will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: 1 data drop, with 3 RJ45 jacks with cat. 6 cable each, on each short wall, 2 drops total. 1 phone outlet.

Communication Comments: (1) dedicated LAN line.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	None		

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
 Acoustical Comments:
 Structural Comments:
 Security Comments :

Room Name: VTC Room

GENERAL

Room Name:	VTC Room	Number of Occupants:	20
Function:	Video Teleconference Meeting and Training	Hours per Day:	9
Quantity of this Room:	1	Days per Week:	5
Minimum Floor Area:	nusf	Primary Adjacencies:	first floor
Function Comment:	shared space	Secondary Adjacencies:	
		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 10
Wall Finishes:	Paint + tackable surface	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Sealed concrete & raised floor system with carpet tile	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	Per Building Design	Window Treatments:	Vertical Blinds. Blackout shades

Finish Comments: Provide tackable surface at monitor wall.
 Construction Comments: Provide acoustical sound transmission treatment around perimeter of room - STC 45
 Provide 3" high raised computer floor system.
 Provide additional wall blocking - TV's.
 Provide 8 LF millwork, vented A/V equipment cabinet with countertop & 30" wide knee space.

FURNITURE

Quantity	Description	Supplied by
1	Conference table, "V" shaped, adjustable	DBF
20	Conference chairs	DBF
1	task chair	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	70" monitor on wall opposite door	DBF
1	video camera mounted under monitor	DBF
6	ceiling mounted microphones	DBF
1	computer to drive A/V equipment	DBF
1	white board	DBF
1	space for portable video conference equipment cart	GFE

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:

HVAC Comments:

HAZARDS

Hazard Comments:

Room Name: VTC Room

ELECTRICAL

Electrical Comments: Provisions for conduit from wall/TV to conference table.
(2) 120V duplex outlets built into to A/V cabinet
(1) 120V duplex outlet at 10' o.c. along walls.
(1) power drop in ceiling at center of room for future use.
Provide power to conference table via raised floor system.
Provide 120V duplex outlet high mounted for wall mounted monitor.

LIGHTING

Lighting Level: fc 35 avg., 50 task Light Type: Dimmable
Lighting Comments: Dimmable lighting will provide general illumination. Separate lighting for three level task. Dimmable light located over the table, no lights over smart board without a separate dimmer switch. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space.

COMMUNICATION

Data/Phone Outlets: 1 Phone connection
Communication Comments: Provide data conduit to conference table via raised floor system.
Provide data to monitor, and A/V equipment cabinet.
(1) data drop in ceiling at center of room for future use.
(1) dedicated LAN line.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	None		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :
Audiovisual Comments: Provide microphones in ceiling.

Room Name: Offices

PIPING/PLUMBING

Fixtures:	<i>type</i>	<i>quantity</i>	<i>notes</i>
	None		
Floor Drain	None		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:	None
Acoustical Comments:	None
Structural Comments:	None
Security Comments :	None

Room Name: Private Office

GENERAL

Room Name:	Private Office	Number of Occupants:	1
Function:	Director / Private Office	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	12	Primary Adjacencies:	office area, 1/2 each floor
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	Per Building Design Acoustical	Window Treatments:	Blinds at exterior windows
Finish Comments:	Insulation in walls between offices & above ceilings.		
Construction Comments:	Provisions for additional wall blocking for wall hung furniture.		

FURNITURE

Quantity	Description	Supplied by
1	L shaped desk	DBF
1	"Executive" chair	DBF
2	Guest chair	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments: Door stops. Coat hooks

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	
HVAC Comments:	Thermostat control @ each office		

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: (1) 120V duplex outlet on each wall.

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
Lighting Comments:	Overhead lighting with local switch will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

Room Name: Private Office

COMMUNICATION

Data/Phone Outlets: (1) telcomm. outlet with (3) RJ45 jacks, cat. 6, at desk.

Communication Comments: wireless access in ceiling

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	None		

Floor Drain None

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments: None

Acoustical Comments: None

Structural Comments: None

Security Comments : None

Room Name: Conference Room

GENERAL

Room Name:	Conference Room	Number of Occupants:	16
Function:	meeting space	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	1	Primary Adjacencies:	2nd floor office area
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	Types:		

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint + tackable surface	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	Blinds

Finish Comments:

Construction Comments: Provide blocking in wall for future wall-mounted TV monitor.
Provide tackable surface at north wall.

FURNITURE

Quantity	Description	Supplied by
16	conference room chair	DBF
1	table, oblong/oval	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	white board	DBF

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: provide convenience outlet on each wall

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
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Lighting Comments: Dimmable lighting for general illumination. Task lighting with local controls. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets:	(1) phone outlet.
Communication Comments:	covered by wireless network (1) dedicated LAN line.

Room Name: Conference Room

PIPING/PLUMBING

Fixtures:	<i>type</i>	<i>quantity</i>	<i>notes</i>
	None		
Floor Drain	None		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:	None
Acoustical Comments:	None
Structural Comments:	None
Security Comments :	None

Room Name: Small Meeting Room

GENERAL

Room Name:	Small Meeting Room	Number of Occupants:	4
Function:	meeting space	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	4	Primary Adjacencies:	offices and workstations
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint + tackable surface	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	Blinds

Finish Comments: Provide tackable surface at one (back) wall.

Construction Comments:

FURNITURE

Quantity	Description	Supplied by
4	chair	DBF
1	table, round	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	white board	DBF

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: outlets as required by code

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
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Lighting Comments: Lighting for general illumination. Task lighting with local controls. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets:	1 phone outlet.
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Communication Comments: covered by wireless network

Room Name: Small Meeting Room

PIPING/PLUMBING

Fixtures:	<i>type</i>	<i>quantity</i>	<i>notes</i>
	None		
Floor Drain	None		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:	None
Acoustical Comments:	None
Structural Comments:	None
Security Comments :	None

Room Name: Quiet Room

GENERAL

Room Name:	Quiet Room	Number of Occupants:	4
Function:	meeting space	Hours per Day:	8
Quantity of this Room:	4	Days per Week:	5
Minimum Floor Area:	nusf	Primary Adjacencies:	open office area,
Function Comment:		Secondary Adjacencies:	
		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	glass
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	none
Finish Comments:			
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
1	sofa	DBF
1	ottoman	DBF
1	lounge chair (only occurs in one Quiet Room)	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: convenience outlet on each wall

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
Lighting Comments:	Lighting for general illumination. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

COMMUNICATION

Data/Phone Outlets:
Communication Comments: covered by wireless network

Room Name: Quiet Room

PIPING/PLUMBING

Fixtures:	<i>type</i>	<i>quantity</i>	<i>notes</i>
	None		
Floor Drain	None		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:	None
Acoustical Comments:	None
Structural Comments:	None
Security Comments :	None

Room Name: Collaborative Meeting

GENERAL

Room Name: Collaborative Meeting Number of Occupants:
 Function: Meeting and Training Hours per Day:

 Days per Week: 5
 Quantity of this Room: 1 Primary Adjacencies: Interdisc. Lab Mtg. Space
 Minimum Floor Area: nusf Secondary Adjacencies:
 Function Comment: open to corridor Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud Minimum Ceiling Height: ft. 10
 Wall Finishes: Paint + tackable surface Ceiling Material: Acoustical Ceiling Tile
 Floor Finishes: Carpet Door Material: solid core wood
 Wall Base: Vinyl Doors: 3' x 7'
 Windows: Per Building Design Window Treatments: Blinds.
 Finish Comments: Provide tackable surface at south wall.
 Construction Comments:

FURNITURE

Quantity	Description	Supplied by
6-8	table	DBF
12-16	chairs	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	white board	DBF

Equipment Comments:

HVAC

Relative Humidity: HVAC Reliability:
 Directional Airflow: Heat Generating Equipment:
 HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V Duplex outlets every 12' along walls.

LIGHTING

Lighting Level: fc 35 avg., 50 task Light Type: Dimmable
 Lighting Comments: Dimmable lighting will provide general illumination. Separate lighting for three level task. Dimmable lighting located over the table, no lights over smart board without a separate dimmer switch. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space.

Room Name: Collaborative Meeting

COMMUNICATION

Data/Phone Outlets:

Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
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Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Interdepartmental Meeting

GENERAL

Room Name:	Interdepartmental Meeting	Number of Occupants:	
Function:	Meeting and Training	Hours per Day:	
		Days per Week:	5
Quantity of this Room:	1	Primary Adjacencies:	Interdisc. Lab Mtg. Space
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	open to corridor	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 10
Wall Finishes:	Paint + tackable surface	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	Per Building Design	Window Treatments:	Blinds.
Finish Comments:	Provide tackable surface at south wall.		
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
6-8	table	DBF
12-16	chairs	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	white board	DBF

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V Duplex outlets every 12' along walls.

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Dimmable
Lighting Comments:	Dimmable lighting will provide general illumination. Separate lighting for three level task. Dimmable lighting located over the table, no lights over smart board without a separate dimmer switch. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space.		

Room Name: Interdepartmental Meeting

COMMUNICATION

Data/Phone Outlets:

Communication Comments:

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

User Approval

Print Name

Date

Room Name: Interdepartmental Meeting

Room Name: Print Area

GENERAL

Room Name:	Print Area	Number of Occupants:	0
Function:	printing/plotting	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	2	Primary Adjacencies:	office area, 1 each floor
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	open to office area	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Carpet	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	none
Windows:		Window Treatments:	Blinds
Finish Comments:			
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
----------	-------------	-------------

Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	
HVAC Comments:			

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: outlets as required for owner furnished equipment

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
Lighting Comments:	Overhead lighting with local switch will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Daylight controls turn off lights when ambient light is sufficient.		

Room Name: Print Area

COMMUNICATION

Data/Phone Outlets: Generic Room. (1) Phone connection. (1) data connection.
Ceiling mounted wireless access point

Communication Comments: Data Type is determined by Room Type

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: EDP Office

GENERAL

Room Name:	EDP Office	Number of Occupants:	
Function:	Office and Support Incubation Space	Hours per Day:	
Quantity of this Room:	1	Days per Week:	
Minimum Floor Area:	nusf	Primary Adjacencies:	
Function Comment:	none	Secondary Adjacencies:	
		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 10
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Resilient Flooring - Vinyl Sealed Concrete	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:			
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

qty	equipment	GFE	qty	equipment	GFE
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Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V Outlets Every 12' of Wall Space.

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
Lighting Comments:	Lighting will provide general illumination. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space.		

COMMUNICATION

Data/Phone Outlets:	(1) Phone Connection (1) Data Connection
Communication Comments:	

Room Name: EDP Office

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments:

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: SRNS Office

GENERAL

Room Name: SRNS Office	Number of Occupants:	
Function:	Hours per Day:	8
	Days per Week:	5
Quantity of this Room: 1	Primary Adjacencies:	
Minimum Floor Area: nusf	Secondary Adjacencies:	
Function Comment:	Types:	

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud	Minimum Ceiling Height:	ft. 10
Wall Finishes: Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes: Carpet	Door Material:	solid core wood
Wall Base: Vinyl	Doors:	3' x 7'
Windows:	Window Treatments:	Blinds
Finish Comments:		
Construction Comments:		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow: Building Standard	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: outlets as required by code

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type: Fluorescent
Lighting Comments:	Overhead lighting with local switch will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Daylight controls turn off lights when ambient light is sufficient.	

Room Name: SRNS Office

COMMUNICATION

Data/Phone Outlets: No phone.

Communication Comments: wireless access point

PIPING/PLUMBING

Fixtures:	type	quantity	notes
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Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: USCA Engineering Lab

GENERAL

Room Name:	USCA Engineering Lab	Number of Occupants:	13
Function:	instructional classroom/lab	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	1	Primary Adjacencies:	1st floor
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 10
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Epoxy paint on concrete	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	Blinds
Finish Comments:			
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
TBD	TBD	USCA

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
TBD	TBD	USCA

Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	
HVAC Comments:			

HAZARDS

Hazard Comments: None.

ELECTRICAL

Electrical Comments: 120V duplex power at 10' o.c. along each wall.
 Power drop in ceiling at two locations for future ceiling mounted projector.
 Power at one location in each wall for future monitor/screen/smart board.
 (8) floor boxes with power and data. See communication note below.

Room Name: USCA Engineering Lab

LIGHTING

Lighting Level: fc 35 avg., 50 task Light Type: Fluorescent
 Lighting Comments: Overhead lighting with local switch will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Daylight controls turn off lights when ambient light is sufficient.

COMMUNICATION

Data/Phone Outlets: No phone.
 Data outlet adjacent to power outlet at 10' o.c along each wall. 3 RJ45 jacks, cat. 6a, per outlet.
 Data outlet adjacent to power outlet at locations for future monitor/screen/smart board.
 Data drop at each power drop in ceiling.
 (8) floor boxes with power and data. See electrical note above.
 Communication Comments: Connection to USCA network.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Sink (future)	1	stub out for future sink
Floor Drain	None.		
Misc:			

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
 Acoustical Comments:
 Structural Comments:
 Security Comments :

Room Name: Break Area

GENERAL

Room Name:	Break Area	Number of Occupants:	24
Function:	Break / Lunch / Recycle	Hours per Day:	24
Quantity of this Room:	1	Days per Week:	7
Minimum Floor Area:	nusf	Primary Adjacencies:	first floor offices, Intedisc. Lab Meeting Space
Function Comment:	none	Secondary Adjacencies:	
		Types:	

Room Name:

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	paint with full height backsplash at cabinets	Ceiling Material:	acoustical ceiling tile + GWB accents
Floor Finishes:	polished concrete	Door Material:	
Wall Base:	painted wood	Doors:	
Windows:		Window Treatments:	
Finish Comments:			
Construction Comments:	Double Sinks (1 ADA) Provisions for wall blocking for GFE & cabinets both upper and lower		

FURNITURE

Quantity	Description	Supplied by
6	lounge chair	DBF
6	banquette	DBF
3	sofa	DBF
3	side table, 30" D	DBF
6	side table, 18" x 18"	DBF
4	stools	DBF
1	trash/recycling unit	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
2	coffee makers	DBF
2	refrigerator	DBF
1	ice maker	DBF
1	dishwasher	DBF
4	microwave ovens	DBF
1	paper recycling bin	DBF
2	vending machines (types to be determined)	vendor

Equipment Comments: All equipment to have stainless steel front faces.

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:	standard for breakroom	Heat Generating Equipment:	
HVAC Comments:	exhaust		

Room Name: Break Area

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: GFCI outlets at counters at sink
120V duplex outlets every 12' of wall
(2) 120V duplex outlet, 20 amp dedicated circuit each, for vending machines
USB outlets at eating areas

LIGHTING

Lighting Level: fc 10-35fc Light Type: Fluorescent
Lighting Comments: Overhead lighting with local switch control will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: Generic Room / Data Point in ceiling for Wi-Fi / Phone Connection
Communication Comments: Data Type is determined by Room Type

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Counter Sink	2	

Floor Drain Yes. At ice maker.
Misc: Plumbing connection for equipment/appliances.

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Coffee Bar

ELECTRICAL

Electrical Comments: GFCI outlets at counters at sink
120V duplex outlets every 12' of wall
USB outlets at eating areas

LIGHTING

Lighting Level: fc 10-35fc Light Type: Fluorescent
Lighting Comments: Overhead lighting with local switch control will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: Generic Room / Data Point in ceiling for Wi-Fi / Phone Connection
Communication Comments: Data Type is determined by Room Type

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	Counter Sink	2	

Floor Drain Yes. At ice maker.
Misc: Plumbing connection for equipment/appliances.

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Interdisciplinary Lab Meeting Space

GENERAL

Room Name: Interdisciplinary Lab Meeting Space Number of Occupants:
 Function: Break Out Areas Hours per Day:
 Days per Week:
 Quantity of this Room: 2 Primary Adjacencies: 1 each floor
 Minimum Floor Area: nuf Secondary Adjacencies:
 Function Comment: circulation, gathering Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud Minimum Ceiling Height: ft.
 Wall Finishes: paint Ceiling Material: GWB/ACT
 Floor Finishes: polished concrete and carpet Door Material: solid core wood
 Wall Base: painted wood Doors: 3' x 7'
 Windows: Per building Design Window Treatments: Blinds
 Finish Comments: Writable walls. Provisions for additional wall blocking for TV's.
 Construction Comments: Provisions for built-in millwork.

FURNITURE

Quantity*	Description	Supplied by
1	trellis	DBF
19	bench	DBF
4	bench table	DBF
16	stool	DBF
10	lounge chair	DBF
13	ottoman	DBF
2	shared table	DBF
7	recycling/trash bin	DBF

Furniture Comments: *Furniture listed is total for both levels.

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments:

HVAC

Relative Humidity: HVAC Reliability:
 Directional Airflow: Building Standard Heat Generating Equipment:
 HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: USB outlets / Provisions for power for GFE / TVs
 120V duplex outlets every 12' along walls.
 Floor box with power and data at 5 locations on first floor.
 Cable TV connection.

Room Name: Interdisciplinary Lab
Meeting Space

LIGHTING

Lighting Level: fc 15 avg., 35 task Light Type: Fluorescent
Lighting Comments: Overhead lighting with local switches will be provided for multi-zone lighting controls. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Daylight controls turn off lights when ambient light is sufficient.

COMMUNICATION

Data/Phone Outlets: Ceiling mounted data connection for WI-FI / (2) Data Connections for A/V
Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
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Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Lobby/Exhibit

GENERAL

Room Name: Lobby/Exhibit	Number of Occupants:
Function: main entrance	Hours per Day:
Quantity of this Room: 1	Days per Week:
Minimum Floor Area: nusf	Primary Adjacencies:
Function Comment: none	Secondary Adjacencies:
	Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud	Minimum Ceiling Height: ft 9
Wall Finishes: paint	Ceiling Material: GWB/ACT
Floor Finishes: polished concrete and carpet	Door Material:
Wall Base: painted wood	Doors: Glass/Double Full-Height
Windows:	Window Treatments:
Finish Comments: Provisions for Blocking in Wall for TV's	
Construction Comments: Provisions for Built-in Reception Desk.	

FURNITURE

Quantity	Description	Supplied by
1	reception desk (millwork)	DBF
1	chair at reception desk	DBF
4	lounge seat	DBF
3	side table	DBF
2	ottoman, large	DBF
1	bench, small	DBF
1	bench, large	DBF
1	sofa	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
4	zSpace monitor, wall hung, height adjustable	DBF
1	computer at reception desk to control zSpace monitors	DBF

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow: Building Standard	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

Room Name: Lobby/Exhibit

ELECTRICAL

Electrical Comments: Provisions for floor core @ reception desk.
120V Duplex outlets every 12' of wall
USB outlets @ seating group.
Cable TV connection
Power for TV's
120V power for each zSpace monitor
Floor box with power and data at 2 locations.

LIGHTING

Lighting Level: fc 30 avg., 50 task Light Type: Fluorescent
Lighting Comments: Lighting will provide general illumination. Additional lighting will provide further illumination in reception task area, and task lighting will have separate controls.
Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements. Local switches will be provided to control overhead lights and task lighting. Daylight controls will turn off lights when ambient light is sufficient.

COMMUNICATION

Data/Phone Outlets: Generic Room
Communication Comments: Data Type is determined by Room Type.
Ceiling connection point for Wi-Fi.
Data connection @ desk.
Data connection for TV's.
Provide data, USB, HDMI connection for each zSpace monitor - routed to a computer at reception desk.

PIPING/PLUMBING

Fixtures:	type	quantity	notes
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Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Supply Room

GENERAL

Room Name:	Supply Room	Number of Occupants:	
Function:	Storage	Hours per Day:	
		Days per Week:	
Quantity of this Room:	1	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Vinyl Tile	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:	tackable surface at built-in cabinets		
Construction Comments:	Provisions for additional blocking in walls for wall mounted GFE Provisions for built-in cabinets		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
8-10 LF	base cabinet	DBF
8-10 LF	wall cabinet	DBF

Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:		Heat Generating Equipment:	
HVAC Comments:	Building Standard		

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V duplex outlet every 12'-0" of wall
120V duplex outlet every 4'-0" at millwork counter

LIGHTING

Lighting Level:	fc 10-30	Light Type:	Fluorescent
Lighting Comments:	Single Switch Control lighting will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

COMMUNICATION

Data/Phone Outlets:
Communication Comments:

Room Name: Supply Room

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: File Room

GENERAL

Room Name:	File Room	Number of Occupants:	
Function:	Office and Support Incubation Space	Hours per Day:	
Quantity of this Room:	1	Days per Week:	
Minimum Floor Area:	nusf	Primary Adjacencies:	
Function Comment:	none	Secondary Adjacencies:	
		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Resilient Flooring - Vinyl on Sealed Concrete	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None

Finish Comments:
Construction Comments: Floor to support Fire King file cabinets.

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
TBD	Fire King file cabinets	DBF

Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:		Heat Generating Equipment:	

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V Outlets Every 12' of Wall Space.
Provisions for GFE Eqpt.

LIGHTING

Lighting Level:	fc 35 avg., 50 task	Light Type:	Fluorescent
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Lighting Comments: Single Switch Control lighting will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: (1) Phone Connection (1) Data Connection
Communication Comments:

Room Name: File Room

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments : Access controlled.

Room Name: Server Room

GENERAL

Room Name:	Server Room	Number of Occupants:	0
Function:	Server Room	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	1	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	Sealed concrete & raised floor system with high pressure laminate static dissipative floor tile	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	None
Finish Comments:			
Construction Comments:	provide raised computer floor system 3" high		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
	base and wall cabinet with laminate countertop	DBF
2	MDF	
2	Plotter	GFE
1	printer	GFE
3	computer	GFE

Equipment Comments: 4 - 8 Racks

HVAC

Relative Humidity:	40% - 60%	HVAC Reliability:	
Directional Airflow:	Bldg. Standard	Heat Generating Equipment:	
HVAC Comments:	Separate Thermostat Control sufficient for 8 racks of servers		

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: dedicated outlet/circuit for Printer (2) & Plotter (2)
 *120V duplex outlets every 4' along counter
 *120V duplex outlets every 8' of wall
 sufficient power for 8 racks of servers

Room Name: Server Room

LIGHTING

Lighting Level: fc 35-50 Light Type: Fluorescent
Lighting Comments: Overhead lighting with local switch control will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: Data connection for printer & plotter
Wall phone connection

Communication Comments:

PIPING/PLUMBING

Fixtures: type quantity notes

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments: Fire Suppression System for Data/Server Rooms

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: MDF Room

GENERAL

Room Name:	MDF Room	Number of Occupants:	0
Function:	Data service entrance	Hours per Day:	8
		Days per Week:	5
Quantity of this Room:	1	Primary Adjacencies:	1st floor near exterior
Minimum Floor Area:	nusf	Secondary Adjacencies:	server room
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint	Ceiling Material:	Acoustical Ceiling Tile
Floor Finishes:	anti- static epoxy paint on concrete	Door Material:	solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:		Window Treatments:	None
Finish Comments:	Provided fire retardant backboards on all walls for wall mounted equipment.		
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
	communications racks	DBF

Equipment Comments:

HVAC

Relative Humidity:	40% - 60%	HVAC Reliability:	
Directional Airflow:	Bldg. Standard	Heat Generating Equipment:	
HVAC Comments:	Separate Thermostat Control sufficient for 8 racks of servers		

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments:	120V , 20 amp duplex outlets at 4' o. c. along walls. BICSI compliant communications grounding system.		
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LIGHTING

Lighting Level:	fc 35-50	Light Type:	Fluorescent
Lighting Comments:	Overhead lighting with local switch control will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

COMMUNICATION

Data/Phone Outlets:	no phone.		
Communication Comments:	DAS (distributed antenna system) equipment and infrastructure.		

Room Name: MDF Room

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: IDF Room

GENERAL

Room Name:	IDF Room	Number of Occupants:	0
Function:	data room	Hours per Day:	
		Days per Week:	
Quantity of this Room:	2	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft.
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	anti- static epoxy paint on concrete	Door Material:	Solid core wood
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:	Provided fire retardant backboards on all walls for wall mounted equipment.		
Construction Comments:	Provision for conduit for cabling / additional blocking in wall for wall mounted equipment		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
	communications racks	DBF

Equipment Comments: Provision for anchoring of free standing racks

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:		Heat Generating Equipment:	
HVAC Comments:	Building Standards		

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 120V duplex outlet at 4' o.c. along walls
Provision for required power at each rack
BICSI compliant communications grounding system.

LIGHTING

Lighting Level:	fc 35	Light Type:	Fluorescent
Lighting Comments:	Overhead lighting with local switch control will be provided. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

COMMUNICATION

Data/Phone Outlets:	no phone.
Communication Comments:	Provision for required data connections at rack(s). DAS (distributed antenna system) equipment and infrastructure.

Room Name: IDF Room

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Janitor Closet

GENERAL

Room Name: Janitor Closet	Number of Occupants:
Function:	Hours per Day:
	Days per Week:
Quantity of this Room: 3	Primary Adjacencies: 1-2 per floor near toilets
Minimum Floor Area: nusf	Secondary Adjacencies:
Function Comment:	Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud	Minimum Ceiling Height: ft. 9
Wall Finishes: Paint	Ceiling Material: Acoustical Ceiling Tile
Floor Finishes: Sealed Concrete	Door Material: solid core wood
Wall Base: Vinyl Base	Doors: 3' x 7'
Windows: None	Window Treatments: None
Finish Comments:	
Construction Comments: Mop Sink / Additional wall blocking for wall mounted equipment	

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
	wall mount shelf/hooks	DBF

Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments: Building Standard	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: Convenience 120V duplex outlet outside janitor closet

LIGHTING

Lighting Level: fc 10-30	Light Type: Fluorescent
Lighting Comments:	Overhead lighting with local switch control will be provided. Occupancy sensors will be installed that will turn lighting off within 30 minutes of an occupant leaving a space. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets:
Communication Comments:

Room Name: Janitor Closet

PIPING/PLUMBING

Fixtures:	<i>type</i>	<i>quantity</i>	<i>notes</i>
	Mop Sink	1	
	water heater	1	in one janitor closet only
Floor Drain	Yes		

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Men's Locker Room

GENERAL

Room Name: Men's Locker Room	Number of Occupants:
Function: Toilet, Shower, Lockers	Hours per Day:
	Days per Week:
Quantity of this Room: 1	Primary Adjacencies:
Minimum Floor Area: nusf	Secondary Adjacencies:
Function Comment: none	Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud	Minimum Ceiling Height: ft. 9	
Wall Finishes: Paint / Porcelain Tile	Ceiling Material: GWB	
Floor Finishes: polished concrete, porcelain tile in shower	Door Material: solid core wood	
Wall Base: Porecelain Tile	Doors: 3' x 7'	
Windows: None	Window Treatments: None	

Finish Comments:

Construction Comments: Built-in lockers and benches (some to be ADA)

FURNITURE

Quantity	Description	Supplied by
1	waste receptacle	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	shower curtain, rod, & hooks	DBF
1	robe hook	DBF
1	shower matt	DBF
1	towel hook	DBF
1	full sized mirror	DBF
1	1 bench (ADA)	DBF
	Grab bars (ADA)	DBF
1	mirror over sinks	DBF
2	towel dispenser	DBF
1 each stall	toilet paper dispenser	DBF

Equipment Comments:

HVAC

Relative Humidity:	System to keep humidity at 40% - 60%	HVAC Reliability:
Directional Airflow:	Building Standard	Heat Generating Equipment:

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: GFCI outlets at mirror/shower area

Room Name: Men's Locker Room

LIGHTING

Lighting Level: fc 5-15 Light Type: Fluorescent
Lighting Comments: UL wet labeled lighting with local switch will be provided.

COMMUNICATION

Data/Phone Outlets:
Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	lavatory	2	
	water closet	1	
	urinal	2	
	shower	1	

Floor Drain Yes

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Women's Locker Room

GENERAL

Room Name:	Women's Locker Room	Number of Occupants:	
Function:	Toilet, Shower, Lockers	Hours per Day:	
		Days per Week:	
Quantity of this Room:	1	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint / Porcelain Tile	Ceiling Material:	GWB
Floor Finishes:	polished concrete, porcelain tile in shower	Door Material:	solid core wood
Wall Base:	Porcelain Tile	Doors:	3' x 7'
Windows:	None	Window Treatments:	None

Finish Comments:

Construction Comments: Built-in lockers and benches (some to be ADA)

FURNITURE

Quantity	Description	Supplied by
1	waste receptacle	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	shower curtain, rod, & hooks	DBF
1	robe hook	DBF
1	shower matt	DBF
1	towel hook	DBF
1	full sized mirror	DBF
1	1 bench (ADA)	DBF
	Grab bars (ADA)	DBF
1	mirror over sinks	DBF
2	towel dispenser	DBF
1 each stall	toilet paper dispenser	DBF

Equipment Comments:

HVAC

Relative Humidity:	System to keep humidity at 40% - 60%	HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: GFCI outlets at mirror/shower area

Room Name: Women's Locker Room

LIGHTING

Lighting Level: fc 5-15 Light Type: Fluorescent
Lighting Comments: UL wet labeled lighting with local switch will be provided.

COMMUNICATION

Data/Phone Outlets:
Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	lavatory	2	
	water closet	1	
	shower	1	

Floor Drain Yes

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:
Acoustical Comments:
Structural Comments:
Security Comments :

Room Name: Men's Toilet

GENERAL

Room Name:	Men's Toilet	Number of Occupants:	
Function:	Toilet	Hours per Day:	
		Days per Week:	
Quantity of this Room:	3	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint / Porcelain Tile	Ceiling Material:	GWB
Floor Finishes:	polished concrete	Door Material:	solid core wood
Wall Base:	Porcelain Tile	Doors:	3' x 7'
Windows:	None	Window Treatments:	None

Finish Comments:

Construction Comments: Built-in lockers and benches (some to be ADA)

FURNITURE

Quantity	Description	Supplied by
1	free standing waste receptacle	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	mirror over sinks	DBF
	grab bars	DBF
2	towel dispenser	DBF
1 each stall	toilet paper dispenser	DBF

Equipment Comments:

HVAC

Relative Humidity:	System to keep humidity at 40% - 60%	HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: GFCI outlets at mirror/shower area

LIGHTING

Lighting Level:	fc 5-15	Light Type:	Fluorescent
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Lighting Comments: UL wet labeled lighting with local switch will be provided.

Room Name: Men's Toilet

COMMUNICATION

Data/Phone Outlets:

Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	lavatory	2	
	water closet	1	
	urinal	2	

Floor Drain Yes

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Women's Toilet

GENERAL

Room Name:	Women's Toilet	Number of Occupants:	
Function:	Toilet	Hours per Day:	
		Days per Week:	
Quantity of this Room:	3	Primary Adjacencies:	
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint / Porcelain Tile	Ceiling Material:	GWB
Floor Finishes:	polished concrete	Door Material:	Solid
Wall Base:	Porcelain Tile	Doors:	3' x 7'
Windows:	None	Window Treatments:	None

Finish Comments:

Construction Comments: Built-in lockers and benches (some to be ADA)

FURNITURE

Quantity	Description	Supplied by
1	free standing waste receptacle	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	mirror over sinks	DBF
	grab bars	DBF
2	towel dispenser	DBF
1 each stall	toilet paper dispenser	DBF
1 each stall	sanitary napkin disposal	DBF

Equipment Comments:

HVAC

Relative Humidity:	System to keep humidity at 40% - 60%	HVAC Reliability:	
Directional Airflow:	Building Standard	Heat Generating Equipment:	

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: GFCI outlets at mirror/shower area

LIGHTING

Lighting Level:	fc 5-15	Light Type:	Fluorescent
Lighting Comments:	UL wet labeled lighting with local switch will be provided.		

Room Name: Women's Toilet

COMMUNICATION

Data/Phone Outlets:

Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	lavatory	2	
	water closet	1	
	urinal	2	

Floor Drain Yes

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Unisex Toilet

GENERAL

Room Name:	Unisex Toilet	Number of Occupants:	
Function:	Toilet	Hours per Day:	building open hours
		Days per Week:	
Quantity of this Room:	1	Primary Adjacencies:	main entrance
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:	none	Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	ft. 9
Wall Finishes:	Paint and porcelain tile	Ceiling Material:	GWB
Floor Finishes:	Polished concrete	Door Material:	Solid
Wall Base:	Porcelain tile	Doors:	3' x 7'
Windows:	None	Window Treatments:	None

Finish Comments:
Construction Comments:

FURNITURE

Quantity	Description	Supplied by
1	waste receptacle	DBF

Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
1	mirror over sink	DBF
	grab bars	DBF
1	towel dispenser	DBF
1	toilet paper dispenser	DBF

Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:		Heat Generating Equipment:	

HVAC Comments:

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments:

LIGHTING

Lighting Level:	fc 5-15	Light Type:	Fluorescent
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Lighting Comments: Overhead lighting with local switch control will be provided. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

Room Name: Unisex Toilet

COMMUNICATION

Data/Phone Outlets: none

Communication Comments:

PIPING/PLUMBING

Fixtures:	type	quantity	notes
	lavatory	2	
	water closet	1	
	urinal	2	

Floor Drains:

Miscellaneous:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Central Energy Plant

GENERAL

Room Name: Central Energy Plant	Number of Occupants:
Function: Central Energy Plant	Hours per Day:
	Days per Week:
Quantity of this Room: 1	Primary Adjacencies:
Minimum Floor Area: nusf	Secondary Adjacencies:
Function Comment:	Types:

CONSTRUCTION AND FINISHES

Wall Material: GWB + metal stud	Minimum Ceiling Height:
Wall Finishes: Paint	Ceiling Material: exposed structure
Floor Finishes: sealed concrete	Door Material: solid core wood, interior hollow metal, exterior, pair
Wall Base: vinyl	Doors: 3' x 7'
Windows: none	Window Treatments: none
Finish Comments:	
Construction Comments:	Door seals at mechanical room / Provision for isolation pads at floor Provisions for additional wall blocking at ceiling tile at electrical - open to structure about for Mechanical room

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: Provision for required power at mechanical room /for equipment
120V duplex outlet every 12' of wall

LIGHTING

Lighting Level: fc 15-30	Light Type: Fluorescent
Lighting Comments:	Overhead lighting with local switch control will be provided. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

COMMUNICATION

Data/Phone Outlets: (1) Data Connection / (1) Phone Connection
Communication Comments:

Room Name: Central Energy Plant

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain Yes, at equipment requiring drainage

Misc:

GASES

Gases Comments: Provisions for gas line / connection to equipment as needed.

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Electrical Room

GENERAL

Room Name:	Electrical Room	Number of Occupants:	0
Function:	electrical service	Hours per Day:	
		Days per Week:	
Quantity of this Room:	4	Primary Adjacencies:	2 each floor
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	sealed concrete	Door Material:	Solid
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:			
Construction Comments:			

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments:

HVAC

Relative Humidity:		HVAC Reliability:	
Directional Airflow:		Heat Generating Equipment:	
HVAC Comments:			

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 2 total convenience outlets
houses electrical equipment

LIGHTING

Lighting Level: fc 15-30 Light Type: Fluorescent
Lighting Comments: Overhead lighting with local switch control will be provided. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.

Room Name: Electrical Room

COMMUNICATION

Data/Phone Outlets: none

Communication Comments:

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments:

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Main Electrical Room

GENERAL

Room Name:	Main Electrical Room	Number of Occupants:	0
Function:	electrical service	Hours per Day:	
		Days per Week:	
Quantity of this Room:	1	Primary Adjacencies:	Central Energy Plant
Minimum Floor Area:	nusf	Secondary Adjacencies:	
Function Comment:		Types:	

CONSTRUCTION AND FINISHES

Wall Material:	GWB + metal stud	Minimum Ceiling Height:	
Wall Finishes:	Paint	Ceiling Material:	exposed structure
Floor Finishes:	sealed concrete	Door Material:	solid core wood, interior hollow metal, exterior, pair
Wall Base:	Vinyl	Doors:	3' x 7'
Windows:	None	Window Treatments:	None
Finish Comments:			
Construction Comments:	requires a separate 4' deep 2-hour rated enclosure for emergency gear within room		

FURNITURE

Quantity	Description	Supplied by
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Furniture Comments:

EQUIPMENT

Quantity	Description	Supplied by
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Equipment Comments:

HVAC

Relative Humidity:	HVAC Reliability:
Directional Airflow:	Heat Generating Equipment:
HVAC Comments:	

HAZARDS

Hazard Comments:

ELECTRICAL

Electrical Comments: 2 total convenience outlets
houses transformers, panelboards, switchboards, etc.

LIGHTING

Lighting Level:	fc 15-30	Light Type:	Fluorescent
Lighting Comments:	Overhead lighting with local switch control will be provided. Lighting circuits will be controlled by a schedule base programmable building-wide lighting control system to achieve automatic shutoff in compliance with IECC-2009 lighting controls mandatory requirements.		

Room Name: Main Electrical Room

COMMUNICATION

Data/Phone Outlets: none

Communication Comments:

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain

Misc:

GASES

Gases Comments:

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

Room Name: Lab Materials Receiving /
Storage

COMMUNICATION

Data/Phone Outlets: (1) Fax Connection / (2) Phone Connection / (2) Data Connection

Communication Comments:

PIPING/PLUMBING

Fixtures: *type* *quantity* *notes*

Floor Drain:

Misc:

GASES

Gases Comments: None

OTHER

Fire Protection Comments:

Acoustical Comments:

Structural Comments:

Security Comments :

PART 3

DESIGN NARRATIVES

The following design narratives provide information from each design discipline. This information helps to define the scope and quality of finishes, materials, equipment and systems to be provided.

CIVIL

Description

The new building combines offices and research laboratories in a two story building with approximately 10 visitor stalls and 120 employee parking stalls, and associated infrastructure on approximately 6.5 acre parcel. This project is located in Aiken County. The tract is bounded to the north by Trolley Line Road, to the south by USC - Aiken's softball field, to the west by College Station Drive and to the east by a wooded portion of USC - Aiken's Campus. The topography of the site rises from College Station Drive approximately 17 feet to a crest on the eastern end of the site.

Accessibility Design

The parking lots will be constructed of asphalt paving bordered by concrete curb and gutter. Site access will be provided from Trolley Line Road and College Station Drive. The grading of the site will involve surface drainage and underground piping to convey stormwater runoff to a proposed detention pond near College Station Drive.

Stormwater

An overall hydrological study will be completed to determine the stormwater management facilities required for the site including the future parking south of the site. The stormwater management plan will involve the use of best management practices (BMP's) to provide water quality and channel protection. The water quality volume is established from the rainfall depth of 1" to reduce the overall Total Suspended Solids (TSS) that would be discharging from the site by 80%. Channel protection is provided to reduce the erosion on downstream channels. On-site detention will provide storage of runoff from a 25-year rainfall event. The discharge from this detention facility is at the 10-year undeveloped runoff rate.

A two phase erosion control plan will be developed to provide erosion and sediment control from the site during construction. This will include, but will not be limited to, the use of access stabilization, site stabilization with mulch, temporary and permanent grassing, matting on critical slopes, dust control, preventative filters, flow diversions and sediment control basins.

Utilities

Fire service will be provided from an existing main along the north side of the proposed building. The domestic water service will be provided from an existing main south of the site in the "Quad" portion of the original USC-Aiken campus. Sewer service will be provided by extending an 8" sewer main to a proposed lift station. This lift station will require connection to an existing 4" force main to discharge into an existing manhole in the "Quad" portion of the original USC-Aiken campus.

Codes

The following are some of the major codes which govern the civil design:

- Aiken County Land Management Regulations – Planning, Zoning & Engineering
- Aiken County (MS4) and SCDHEC - Stormwater
- SCDOT – Driveway access to Trolley Line Road

Assumptions

- Stormwater design is based upon Aiken County and SCDOT requirements.
- Installation of offsite water and sewer utilities will be required. This includes a sewer lift station and force main.
- Fire main is adequately sized to serve the facility.
- The existing infrastructure and abandoned utilities within the disturbed site area will require removal as part of this project.

ARCHITECTURAL

Description

The new building combines offices and research laboratories in a two story building. The office functions include open offices, private offices, and meeting spaces. The laboratory functions will include a large “high bay” space, “wet” chemistry laboratories, and “dry” laboratories for such varied functions such as virtual reality, additive materials manufacturing, computation, and electronics.

Construction

In general, the structure of the building does not require a fire rating or fire protection. The IBC will allow a sprinklered Business Occupancy up to four stories, 75 feet tall, and with up to 69,000 SF per floor to be Type IIB construction. This is because the IBC rewards sprinklered construction with substantial increases to the allowed building height and area per floor. Type IIB construction requires no fire rating for building elements such as structural frame, bearing walls, nonbearing walls, floor construction, or roof construction.

Control areas used for managing chemical quantities require fire rated construction. Walls around a control area must be one-hour rated construction. Floor and floor support construction for control areas in Type II B construction must be two-hour rated.

If an open space at least 30 feet wide is maintained around the entire perimeter of the building, the area per story can be further increased. A Type IIB, sprinklered, Business occupancy can have as much as 86,250 SF per story. This allows ample room for expansion using Type IIB construction.

Exterior Materials

The proposed exterior materials have been chosen to provide an attractive, high quality, low maintenance exterior, and to project the image of a modern research facility. Due to the building’s association with the University of South Carolina – Aiken campus, “Aiken Brick” will be used on portions the building to visually tie it to the campus.

Roofing

A flat, white, thermoplastic olefin (TPO) roof system will be provided. Walk pads will be provided on the roof to provide protection for the roof surface as needed to provide access to rooftop equipment. See the LEED narrative for maximum U value of roof insulation.

The roof will have two slopes. The visually flat roof will slope at $\frac{1}{4}$ ” per foot. The visually sloped roof will slope at $\frac{3}{4}$ ” per foot. Roof slopes will generally be achieved by sloping the roof structure. Supplementary, localized sloping such as crickets will be provided by sloped rigid roof insulation. The roofs will slope to external roof drains. A gutter and down spout system will be provided on the south. The north will have external drains with overflow boxes and downspouts. Internal roof drains will only be used at limited location where external roof drains prove impractical.

Rooftop Equipment

The design includes roof mounted air handling units. These units will be screened from view by a perforated metal screen wall

SRNS will also place equipment such as antennas on the roof. This project will provide a 10 foot by 10 foot platform with steel grating floor raised 3 feet above the roof surface. Painted steel guardrails, 1 $\frac{1}{2}$ ” diameter, 42” high, will encircle the platform.

Entrance Canopies

Canopies at the lobby entrance and at the South/USCA entrance will be cantilevered and suspended laminated glass.

Brick

A portion of the exterior will be a nominal 4 inch brick veneer supported by metal studs. The elevation drawings indicate where the brick is to be used. The basis of design for the main body brick veneer is Aiken Brick.

The typical brick wall assembly will be brick with brick tie reinforcing at 24" on center horizontal and 16" on center vertical, an air space, with liquid emulsion vapor permeable air barrier applied on 5/8" glass matt gypsum sheathing, on metal studs with rigid and batt insulation, finished with painted 5/8" gypsum wall board on the interior face. The air space will contain continuous flashing with counter flashing and termination bar, mortar net, and weeps at each floor slab level and at window and door heads. Metal stud size, gauge, and spacing are to be determined. Metal studs will be designed for L/600 maximum deflection.

Metal Panels

A portion of the exterior will be metal panels. At the lobby entrance and office parapet a bonded aluminum composite material panel (ACM) such as Alucobond is proposed in one color. Panel thickness will be a minimum 2.5 inches, but not less than required to provide the required insulation value. See the LEED narrative for required wall insulation values. Panel length, width, texture, pattern, and color will be determined during design.

Exterior Window Systems

Fixed, tinted, double-glazed windows will be provided. See the LEED narrative for required glazing insulation values. Tempered glazing will be provided where required by code.

Where two story tall windows are shown, such as along the office façade, and the main entrance, the windows will be set in an outside glazed, thermally broken, aluminum curtainwall or storefront system. Painted metal spandrel panels will be included where needed, in the window system. The window system will be dark bronze in color.

Along the clerestory and at the high bay structure, windows will be set in 4 ½" deep, nominally 2" wide, thermally broken, aluminum storefront system frames. The storefront system will be dark bronze in color. YKK YES 600, and Kawneer Trifab VG 451T, are examples of the proposed quality of storefront systems.

Roof Access

The roof will be accessible by two exterior stairs leading from the second floor to the roof. These stairs will be painted steel.

Interior Materials

Interior Windows

Interior windows, such as observation windows at laboratories, will be in painted hollow metal frames. Interior glazing will be clear, single-glazed. Tempered glass will be provided at locations required by code, such as within 24" of a door, or less than 18" above the floor.

Doors, Locks, and Security

See the Interior Narrative for a description of proposed doors. All lockable interior and exterior doors will have a digital keyless lock. The basis of design for these locks is Trilogy Industrial Electronics, keyless lock system, series DL3000, for interior applications and DK 3000 for exterior applications.

The main entrance door will have a buzzer wired to ring in an office workstation on the first floor.

The loading dock and low high bay will have electrically operated overhead insulated steel coiling doors with chain-hoist manual override capability. Overhead doors will not be operable from the exterior of the building. The basis of design for the overhead doors will be Type FMWU by The Cookson Company with horizontal mounted gearhead motor, FinalCote Finish and Featheredge. Painted steel channels will be provided around overhead door openings to protect the opening.

Insulation

The building envelope will be insulated including, walls, windows, doors, and roof. Insulation will be provided to meet or exceed the International Energy Conservation Code, 2009 edition, with a goal of meeting LEED Certification. See the LEED narrative for required insulation values.

Steel Pipe Rails and Decorative Rails

The two exit stairs, the exterior roof stairs, and the Robotics Lab elevated platform, and stair will have 1 1/2" diameter painted steel pipe rails. Two segments of the railing will be removable at the elevated platform.

Decorative railing will be designed for the Interdisciplinary Lab Meeting Space overlooks and stairs. See the Interior narrative for a description.

Toilet Accessories

Toilet rooms will be provided with typical toilet accessories, stainless steel, including toilet paper dispensers, recessed paper towel dispensers/waste receptacle, sanitary napkin disposal units, soap dispensers, and grab bars as required by the accessibility code. Towel hooks, a shower curtain rod and curtain, and a changing bench will be provided in each locker room. A mop and broom holder will be provided in each janitor's closet. The basis of design will be Bobrick accessories.

Elevators

There will be a freight elevator provided in the project. The basis of design for the elevator is the ThyssenKrupp, Endura MRL product line.

The elevator will be machine room-less twin post telescoping hydraulic design. It will have 5,000 pounds capacity and a rated speed of 125 feet per minute. The car will have clear inside dimensions of 5'-8" by 8'-5" clear inside, and a two speed side opening.

The elevator car will have a digital key pad lock. The basis of design is Trilogy Industrial Electronics, keyless lock system, series DL3000.

Elevator shaft walls will be one-hour fire rated construction. Acoustical sound insulation will be provided in the elevator shaft walls. Construction will also include for each shaft a 4'-0" deep pit, a safety beam at the top shaft, lighting in the pit and shaft, rail bracket supports, pit sump, and pit ladder.

Fire Extinguishers

Portable fire extinguishers will be provided with the appropriate type and quantity required by code. Fire extinguishers will typically be 10 pounds, class A B C, unless a different type is required at a particular lab location. A recessed or semi-recessed cabinet will be provided at each fire extinguisher location. Fully recessed cabinets will be used at Interdisciplinary Lab Meeting Space and other locations to be determined. Cabinets will be metal with baked enamel finish.

Fire Shutters

Automatic fire shutters, 45 minute rated, will be provided at locations where observation windows occur in one-hour rated fire walls. Observation windows into the low high bay space are examples. Fire shutters will be wired as required by code to be triggered by the fire alarm and automatic fire sprinkler system. McKeon Auto-Set FSFD-1S vertical coiling door is an example of the proposed type of fire shutter.

Codes

The following is a summary of code requirements from the International Building Code (IBC).

1. Summary

Key uses: offices and research laboratories
Number of stories: 2
Area per story: 35,400 GSF 1st floor
29,000 GSF 2nd floor (including platform)
Total area: 64,400 GSF

2. Applicable codes.

These codes are enforced by all municipalities in South Carolina. The codes may change in July 2016:
International Building Code, 2012 ed. (IBC) with SC amendments
ANSI A117.1 (latest)

This review is based on the IBC, 2012 edition.

3. Occupancy Classification(s).

(IBC 303, 304, 306, 307. 509.1, 509.2, 509.3)

Offices – Business (B)

Educational (classrooms) over 12th grade – Business (B)

Laboratories for testing and research – Business (B)

Meeting rooms with fewer than 50 occupants, or less than 750 SF – Business (B)

Meeting rooms with 50 or more occupants – Assembly (A-3)

Labs with chemicals of types and quantities exceeding those allowed for a control area are High Hazard (H)

The building can have multiple control areas and still be Business or other Occupancy as long as the chemical quantities are not exceeded in a control area. Only after chemical quantities exceed the amount allowed in a control area is that area considered High Hazard occupancy.

Ancillary uses such as storage that take less than 10% of the building area of the story in which they are located will be classified as Business Occupancy..

4. Multiple / Mixed Occupancies.

(IBC Table 508.4, sec. 303.1.2)

At present the entire building is assumed to be Business Occupancy. If additional occupancies are determined, the chart below shows the rated fire separations that would be required between them.

<u>(sprinklered)</u>	<u>A</u>	<u>B</u>	<u>H-2</u>	<u>H-3</u>
Assembly up to 300	-	1	3	2
Business	1	-	2	1
Hazardous H-2	3	2	-	1
Hazardous H-3	2	1	1	-

Assembly rooms under 750 SF or 50 occupants are considered accessory to the primary occupancy. So are small storage rooms. See IBC 508.2 and for accessory occupancies.

IBC separated occupancies allow code provisions to be applied individually per occupancy. The sum of the ratios of the area of each occupancy divided by the allowable area for each occupancy must not exceed 1. See 508.4.2 for requirements. For required occupancy separations see IBC table 508.4,

5. Control Area Requirements.

(IBC sec. 307.1, 414.2 Table 414.2.2)

As long as the maximum allowed quantities of chemicals in of Tables 307.1(1) and 307.1(2) are not exceeded per control area, the building will not be a High Hazard occupancy with its associated height, area, and construction type limitations. Managing the quantities of chemicals to within control area limits will allow us to construct the entire building as a Business Occupancy.

The first floor may have up to four control areas, with up to 100% of the maximum allowable quantities of chemicals per control area. The second floor may have up to three control areas, with up to 75% of the maximum allowable quantities of chemicals per control area.

Control areas must be surrounded by 1-hour rated fire barrier walls and 2-hour rated floor and floor support construction. (Note that floor and floor support construction can be 1-hour if Type IIA construction is used.) Observation windows in the 1-hour rated fire barrier walls would either be specially tested, size-limited W-60 rated fire glass or protected by 45 minute rated fire shutters. See also part 10 below.

6. Automatic Sprinkler System.

(IBC Tables 503 and 601, sec. 903)

This is often determined by the program. Otherwise height, area, and construction type will dictate if sprinklers are needed. The building is currently planned to be fully automatic sprinklered. See the Fire Protection Narrative for more information.

7. Construction Type, Allowable Height, and Allowable Area.

(IBC Tables 503, 601, 602, sec. 504.2, 506.1, 506.2, 506.3)

Applying height and area increases allowed for a sprinklered building, the least restrictive construction type allowed for a building up to 75 feet tall, up to four stories, and up to 69,000 GSF per story is Type IIB. Additional area increases are available for having open space around the building perimeter. Types IA, IB, and IIA are more restrictive in construction requirements but would allow greater height and floor area. If the building has at least 30 feet open space around the entire perimeter, the allowed area per story for Type IIB, sprinklered, Business occupancy will increase to 86,250 SF. We propose type IIB construction. A chart comparing possible construction types follows:

<i>Building Element</i>	<i>Construction Type</i>			
	<i>IA</i>	<i>IB</i>	<i>IIA</i>	<i>IIB</i>
primary structural frame	3	2	1	0
primary structural frame supporting roof only	2	1	1	0
exterior bearing walls	3	2	1	0
interior bearing walls	3	2	1	0
interior bearing walls supporting roof only	2	1	1	0
exterior nonbearing walls and partitions	0	0	0	0
interior nonbearing walls and partitions	0	0	0	0
floor construction and assoc. secondary members	2	2	1	0
roof construction and assoc. secondary members	1.5*	1*	1*	0

* Where every part of roof construction is more than 20 feet above the floor below, (high bays) the roof structure does not have to be rated.

8. Vertical Opening Requirements.

(IBC 404, 712.1.8, 713.4)

A floor opening is allowed in Business Occupancies provided it:

1. Connects no more than two stories
2. Does not contain a required egress stair
3. Does not penetrate a horizontal assembly (floor slab) that separates fire areas or smoke compartments
4. Is not concealed
5. Is not open to an Institutional or Residential occupancy
6. Is not open to a corridor on a non-sprinklered floor
7. Is separated from other floor openings and air transfer openings by shaft enclosures

Shaft enclosures in a two story building must be at least one-hour rated, but not less than the rating of the floor assembly penetrated. If Type IA or IB construction is chosen, shaft enclosures will have to be two-hour rated. This applies to stairs, elevators and other shafts.

9. Other Required Separations.

(IBC tables 509, and 1018.1, sections 509.4, 3006.4)

Incidental Uses (sprinklered):

Furnace room with equipment over 400,000 BTU/hr input	smoke partition
Room with boiler over 15 psi and 10 hp	smoke partition
Room with refrigerant machinery (chillers)	smoke partition
Waste collection room over 100 SF	smoke partition
Corridors (sprinklered):	
Elevator Machine Rooms	not rated if not abutting and no openings into elevator shaft enclosure, otherwise equal to elevator shaft enclosure

10. Opening Protection.

(IBC Tables 716.5, 716.6)

<i>Assembly</i>	<i>Protection (door or fire shutter)</i>
2-hour shaft	1.5 hour
1-hour shaft, stair, exit passageway	1.0 hour
1-hour fire barrier (for a control area)	45 minutes
1-hour partition, occupancy separation, etc.	45 minutes
1-hour partition, corridor wall	20 minutes

Windows in 1-hour fire barriers, such as those that might be in a control area (lab) wall, will be limited to W-60, fire rated assemblies tested per UL 263 or ASTM E 119.

11. Maximum Egress Distances.

Common Path of Travel (sprinklered)

(See IBC section 1014.3.)

Assembly:	75'	
Business:	100'	(The entire building is currently designed as Business Occupancy)
Hazard (H-2):	25'	
Hazard (H-3):	25'	

Travel Distance (sprinklered)

(See IBC table 1016.2)

Assembly:	250'	
Business:	300'	(The entire building is currently designed as Business Occupancy)
Hazard (H-2):	100'	
Hazard (H-3):	150'	

Dead End (sprinklered)

(See IBC section 1018.4.)

Assembly:	20'	
Business:	50'	(The entire building is currently designed as Business Occupancy)
Hazard (H-2):	20'	
Hazard (H-3):	20'	

No limit if the length of the corridor is less than 2.5 times the least width of the corridor.

12. Occupant Load.

(IBC Table 1004.1.2)

Occupant load for each space is based on USE, not classification. (i.e... a conference room is calculated as assembly use, but might not be classified as assembly if its occupant load is below 50.)

Assembly (unconcentrated, tables and chairs)	1/15 NSF
Business	1/100 GSF
Classroom	1/20 NSF

13. Required Number of Exits.

(IBC Table 1015.1, sec. 1015.1, 1015.2.1)

Any space with more than 49 occupants is required to have at least two exits. In sprinklered buildings, the two exits must be located apart by a distance equal to at least 1/3 of the length of the longest diagonal dimension of the space served.

Two exits are required in boiler or furnace rooms larger than 500 SF and with fuel fired equipment over 400,000 Btus. Two exits are required in refrigeration machinery (chillers) rooms larger than 1,000 SF.

14. Required Exit Width.

(IBC sec. 1005.3.1, 1005.3.2, 1008.1.1, 1008.1.6)

The capacity of an exit component is determined by its width. In this two story building, stair width will be determined by the occupant load of the second floor. Exit stair width must be at least 0.3" per occupant served; but it may be reduced to 0.2" per occupant if an emergency voice/alarm communication system is provided. (See also part 16 below. Level components such as doors and ramps must provide 0.2" per occupant served.

Stair width factor:	0.3"/ occupant without voice/alarm communication system 0.2"/occupant with voice/alarm communication system
Door width factor:	0.2"/occupant , 32" min.
Ramp width factor:	0.2"/occupant
Corridor width factor:	0.2"/occupant

15. Door Swing

(IBC sec. 1005.7.1, 1008.1.2, 1009.8, 1018.3)

Doors in means of egress must swing in the direction of exit travel where serving an occupant load of 50 or more. A door's swing may obstruct less than one half the required width of an aisle, corridor, or landing. It may not project more than 7" into the required width of an aisle, corridor, or landing when fully open.

16. Exit Stairs and Rails

(IBC 1009.2, 1009.4, 1009.5, 1009.7.2, 1009.7.4, 1009.7.5.1, 1009.8, 1009.10, 1009.15, 1012.2, 1012.6, 1012.8, 1012.9, 1021.3, 1027.1) (ADA 505.10)

Exit stairs must lead to the exterior exit discharge either directly, or via an enclosed 1-hour rated exit passageway. Exits must be continuous from the point of entry to the exit discharge. However, up to one

half of the exit capacity can exit through and area on the first floors such as a lobby, provided the exit path is readily visible and unobstructed.

Stair shaft enclosures in a two story building must be at least one-hour rated, but not less than the rating of the floor assembly penetrated. If Type IA or IB construction is chosen, shaft enclosures will have to be two-hour rated. See parts 7 and 8 above.

Exit stairs must be at least 36" wide when serving fewer than 50 occupants. Exit stairs must be at least 44" wide when serving 50 or more occupants. Railings may infringe on the clear width of the stair up to 4-1/2" on each side. The minimum headroom required is 80".

The maximum allowed rise of stair between landings is 12 feet. Landings in exit stairs must be at least as deep in the direction of travel as the width of the stair run. If the stair run is straight, the landing need not be more than 48" deep.

Risers must be between 4 and 7" high. Treads must be at least 11" deep. No more than 3/8" variance is allowed between the smallest and largest tread or the smallest and largest riser. Nosings may not project more than 1-1/4".

Handrails must be provided on both sides of a stair. Handrails must be within 30" of all portions of required egress width. The top of handrail must be between 34" and 38" above stair nosing / edge of tread. Hand rails must extend at least 12" beyond the riser nosing at the top and at least the depth of one tread, continuing the slope, beyond the bottom riser nosing at the bottom. See also part 19 for guard requirements.

17. Ramps and Rails

(IBC sec. 1010.3, 1010.5, 1010.6.1, 1010.7.2, 1010.7.3, 1010.9, 1010.10, 1012.2, 1012.6, Table 1018.2,) (ADA sec. 405.5, 405.7.2, 405.7.3, 405.8, 505.2, 505.4, 505.10)

The maximum slope for a ramp in a means of egress is 1:12, and the maximum rise for a ramp is 30". The minimum width is 36" serving less than 50 occupants, and 44" serving 50 or more occupants. Ramps used for handicapped access only may be 36" minimum wide. Provide landings at the top and bottom at least as wide as the ramp and at least 60" deep.

Hand rails are required for ramps that rise more than 6". Handrails must be provided on both sides of a ramp. Handrails must be within 30" of all portions of required egress width. The top of handrail must be between 34" and 38" above the ramp surface. Rails must extend horizontally at least 12" at the top and bottom landings of each ramp run. Edge protection at least 4" high is required where hand rails are required. See also part 19 for guard requirements.

18. Handrail Clearance and Diameter

(IBC sec.1012.3, 1012.7) (ADA 505.4)

IBC and ADA require 1 1/2" minimum clearance between handrail and wall. The diameter of circular cross-section handrails must be between 1 1/4" and 2". Non circular cross-section handrails shall have a maximum cross-section dimension of 2 1/4", a minimum cross-section dimension of 1", and a perimeter dimension no less than 4" and no greater than 6 1/4".

19. Guards

(IBC sec.1013.2, 1013.3, 1013.4)

Guards at least 42" high are required at open sides of walking surfaces including stairs, ramps, mezzanines, platforms and landings more than 30" above the floor or grade below. This guard must resist passage of a 4 3/8" sphere. At the triangular opening between the bottom rail and a stair, the guard must resist passage of a 6" sphere.

20. Area of Refuge Requirements.

(IBC sec. 1007.3 exc. 2, 1007.4. exc. 2.)

Typically, if a building is sprinklered, the entire floor is considered an area of refuge. Special areas of refuge are not required for the stairs or elevators.

21. Elevator Requirements.

(IBC sec, 3002.1, 3006.2, 3006.4, 713.4, 713.14.1)

Elevator shaft enclosures in a two story building must be at least one-hour rated, but not less than the rating of the floor assembly penetrated. If Type IA or IB construction is chosen, shaft enclosures will have to be two-hour rated. See part 8 above.

Elevator machine rooms must be enclosed with fire rated construction not less than the rating of the elevator shaft. Elevator machine rooms containing solid state equipment must have an independent ventilation or air conditioning system to keep temperatures in the established range for the equipment.

Enclosed elevator lobbies are not required in two story buildings.

22. Fire Alarms, Fire and Smoke Detection.

(IBC sec. 907.2.2, 907.3.1)

A fire alarm system is required. The occupant load for the second floor is over 100.

27,800 GSF/100 GSF per occupant = 278 occupants.

Manual fire alarm boxes are not required if the building is sprinklered and occupant notification is activated by water flow.

Automatic fire detectors are required. A smoke detector is required at each fire alarm control unit.

23. Standpipe Requirements.

(IBC sec. 905.3)

A standpipe system is not required.

24. Fire Extinguishers

(IBC sec. 906, Table, 906.3(1), NFPA 10, sec. 5.2.1, 5.2.2, 6.5, Table 6.2.1)

Portable fire extinguishers are required in Business occupancies.

Basic fire extinguisher requirements for Class A hazards (typical for office uses):

FE type for ordinary hazard occupancy: 2-A
Max. travel distance to an FE: 75 feet
Max. floor area per FE per unit of A: 1,500 SF

Basic fire extinguisher requirements for Class B hazards (for flammable or combustible liquids)

FE type for ordinary hazard occupancy: 10-B or 20-B
Max. travel distance to an FE: 30 feet 50 feet

Basic fire extinguisher requirements for Class D hazards (for combustible metal powders)

FE type for ordinary hazard occupancy: based on the type of metal
Max. travel distance to an FE: 75 feet from the Class D hazard

25. Minimum Plumbing Fixtures Requirements.

(IBC 2902.1.1 and Table 2902.1, IPC 419.2)

First determine the occupant load, then see IBC table 2902.1 and section 2902.3.

Assume one half occupants are male and one half are female

Always round up to nearest whole number.

See item 12 for occupant load calculation

For Business Occupancy:

Toilets/urinals - 2 for the first 50, then 1/50 thereafter: 9 for male, 9 for female

Note that up to $\frac{1}{2}$ (4) male toilets may be urinals

Lavatories - 2 for the first 80, then 1/80 thereafter: 6 for male, 6 for female

Drinking fountains - 8

Service sink - 1

INTERIOR

Finishes

Floors

The main entrances into the interior space of the building will receive a 10 foot long walk-off mat installed flush with the finished floor. Floor at all corridors around labs will be polished concrete.

Typical laboratory floors will be concrete with an epoxy paint finish. Certain labs will receive an anti-static epoxy coating on the concrete. These locations are identified in the Room Data Sheets.

Ceilings

Ceilings will typically be acoustical ceiling tile (ACT) in a two foot by two foot suspended grid. All ACT grids will receive aluminum extruded shadow mold at all perimeters where the grid intersects gypsum walls. Gypsum wall board (GWB) ceilings and soffits will be provided at 15% of the ceiling area to add architectural interest in the Entry/Reception/Waiting Area, Level 1 Breakroom and Level 2 Coffee Bar, Toilets, Showers and Locker Rooms will receive water-resistant GWB ceilings. The Entry/Reception area will also use ACT clouds with perimeter extruded aluminum trim for acoustics. ACT clouds to cover 85% of exposed ceiling area.

Walls

Walls will typically be painted GWB with vinyl wall base at areas with carpeting and at areas with polished concrete flooring. Painted GWB will occur in nearly all locations. Toilet rooms and shower walls will be tile backer board and have porcelain tile at all wet walls, the remaining walls to be GWB. Transitions between tiles walls and painted walls shall have an aluminum transition strip by Schluter or equal manufacturer. Walls at millwork countertops in the Break Room and Coffee Bar will receive glass tile between the backsplash and upper cabinets.

Walls surrounding rooms identified to need sound control or privacy will extend full height to structure above and they will be constructed as acoustical partitions with batt insulation. Such rooms include Toilets/Showers, VTC Conference, Mechanical Room, elevator shaft, and walls separating the Low High Bay Lab from the main building.

Conference, Small Meeting, VTC, and Breakout Rooms will receive a 4'x8' back-painted glass panel as a writable surface and (1) full wall of tackable fabric-wrapped acoustical panel.

Where wall protection is needed, integrated corner trim will be used. In shipping/receiving and file room, 6 foot high stainless steel corner guards will be used.

Millwork

Excluding laboratory locations, all other countertops, upper cabinets, and base cabinets will be high pressure laminate on premium grade plywood/MDF substrate/frame. Countertops in wet locations, such as Break Rooms, will be quartz surfaces with a 4" quartz backsplash. Millwork islands in Break Rooms will receive quartz countertops and quartz supports wrapping the ends of the islands and have integrated power outlets below the counter surface. At Break Room and Coffee Bar the millwork base cabinets and island will be high pressure laminate on marine-grade plywood. Countertops in Restrooms and Supply Areas within the open office will be quartz surfaces with 4" quartz backsplash. Supply areas will receive a tackable bulletin board vertical surface between the backsplash and upper cabinets. All millwork cabinet doors will receive concealed European-style hinges and aluminum cabinet and drawer pulls. All upper cabinets will have integrated under-cabinet lighting to illuminate work surfaces below.

The VTC Room will have a millwork cabinet with a quartz countertop with 4" backsplash. Wood veneer on premium grade plywood/MDF substrate/frame will be used at all vertical surfaces, with a base of stainless steel wrapped on plywood substrate. The cabinet will house AV equipment and be mechanically ventilated.

The Reception Desk will have wood veneer on premium grade plywood/MDF substrate/frame at all vertical surfaces. The countertop and transaction top will be quartz surfaces, with quartz on the vertical surface of the transaction portion of the desk. The base of the desk will be stainless steel wrapped on premium marine-grade plywood that is installed flush to the vertical surface of the desk.

Lockers in restrooms will be double tier metal lockers with standard locks.

Millwork in the Shipping/Receiving Area will have high pressure laminate countertops and high pressure laminate on vertical surfaces of upper and lower cabinets. A tackable bulletin board vertical surface will be used between the countertop and upper cabinets.

Lab Casework

In laboratories, the casework lab benches and cabinets will be painted steel from a laboratory equipment supplier such as the Research Collection from Kewaunee Scientific Corporation, or equal. Cabinet doors will be solid metal. Cabinets will be provided in a variety of configurations with a mix of drawers and shelves. Some cabinets will be on casters for mobility. Some workbenches will receive anti-static epoxy countertops. All flammable and combustible storage cabinets, such as those under the fume hoods, to have locks. See the Room Data Sheets for quantities of fixed and mobile benches and cabinets.

Wet Chemical Labs will have Marine Edge countertops fabricated of epoxy resin with 4" backsplashes. Typical Lab spaces will have 1" thick, 1/8" beveled edged epoxy resin countertops with 4" high loose curb and 4" backsplash at sink locations. All countertops are to have a seamless look once installed.

Doors

Interior doors will typically be painted flush wood doors in painted hollow metal frames. Public entrance doors will be storefront and glass in anodized aluminum storefront frames. Back-of-house and service entrance doors will be painted insulated heavy duty seamless steel doors in painted hollow metal frames.

Ten (10) doors in accent walls will be finished to match the walls in which they reside.

Door protection will be provided on those doors in high traffic lab areas with frequent cart movement such as lab support, supply areas and shipping/receiving. At laboratory locations where doors are part of the observation window wall, doors will be wood with top half lights in painted hollow metal frames.

Interior Windows

Interior windows such as lab view windows will be glazed, painted hollow metal frames. Tempered glazing will be provided at locations required by code. A view window in a rated wall will be protected by an automatic fire shutter.

Interdisciplinary Lab Meeting Space

The Interdisciplinary Lab Meeting Space, starts at the entry/reception area and continues along the building's spine. The Interdisciplinary Lab Meeting Space flooring will be polished concrete with patterning created with ¼" wide control joints, as well as defined areas of carpet at 25% of the floor surface. The wall base will be painted solid marine-grade hardwood (30% of the lobby/exhibit flooring area) as well as the flooring beneath the reception desk and waiting area will be an upgraded carpet. The "spine" or accent wall of Interdisciplinary Lab Meeting Space will have a level 5 finish that will be painted a glossy sheen and have the appearance of a monolithic slab. The north and south walls dividing the Office section and Lab section from Interdisciplinary Lab Meeting Space will be GWB of a level 5 finish segmented by bands of recessed ½" reveals as drywall control joints that occur vertically at every column grid location. Ceilings on the first level of Interdisciplinary Lab Meeting Space will be GWB at the entry/reception area and exposed to structure along the top of the two-story volume. The main stair in this space will receive rubber treads and risers.

The main lighting for Interdisciplinary Lab Meeting Space will be a liner direct fixture, that will be spaced evenly along the two-story volume. On the 2nd level of Interdisciplinary Lab Meeting Space above the informal seating group will be a cluster of circular light ring pendants that overlap one another and vary in size. The two story entry of Interdisciplinary Lab Meeting Space will get tubular rod shaped light fixtures, installed at varying heights.

All exposed structural columns in Interdisciplinary Lab Meeting Space are to be field painted.

Elevator Finishes

There is one elevator provided in the project to be used as both passenger elevator and as a freight elevator.

It will have durable finishes, with full-height stainless steel panels at all four interior walls. Handrails will be used on the side and back walls to protect the panels from freight moving in and out of the elevator. It will have steel paneled ceilings to host recessed lighting fixtures and rubber flooring.

Feature Lighting

Open Office will have slim direct/indirect suspended light fixtures. The typical conference rooms will receive suspended liner light fixtures. Huddle rooms will have a simple pendant in scale with the size of the room. L1 Break Area and L2 Coffee Area islands will have clusters of "filament" bulbs hung with sockets from the structure above.

Signage

Signs will be included as required by code, such as those to identify exits, exit routes, and stairs. Signs will be included as required for LEED such as "No Smoking." Signs will be provided for wayfinding such as directional signs and room name and number signs for each room. Signs will be APCO, ADA Complaint Arcadia Curved Face or other equivalent.

Decorative Railings

Railings at the Interdisciplinary Lab Meeting Space feature stair and around all the upper level floor opening will be a stainless steel cable rail system with a brushed stainless steel cap.

Miscellaneous

Egress Stairs will receive rubber treads and risers by Johnsonite or equal manufacturer, with rubber flooring at all landings. Handrails to be painted white.

All exposed structural columns are to be field painted.

Manual blinds will be used at all windows except the clearstory.

STRUCTURAL

Design Criteria

Occupancy Category II

LIVE LOADS (reduced as allowed by the Building Code):	
ROOF	20 PSF (NON-REDUCIBLE)
1ST FLOOR CORRIDORS AND LOBBIES	100 PSF
SECOND FLOOR LABS	100 PSF
ASSEMBLY AREAS/BRIDGES	100 PSF
MECHANICAL ROOMS	150 PSF (INCL. NOM 4" HOUSEKEEPING PAD)
STAIRS	100 PSF
OFFICES	60 PSF
PARTITIONS	15 PSF

DEAD LOADS:	
3" COMPOSITE DECK WITH A 3-1/2" NORMAL WT. CONCRETE TOPPING	63 PSF
CONCRETE PONDING ALLOWANCE	6 PSF
MECH, ELEC, PLUMB	10 PSF
CEILING	2 PSF
ROOF DECK	2 PSF
ROOF SYSTEM	8 PSF
MECH, ELEC, PLUMB	11 PSF
MISC.	5 PSF

Snow Ground	10 psf (ASCE 7-10 Fig 7-1)
Exposure Factor C_e	1.0
Importance Factor I_s	1.0 (ASCE 7-10 T1.5-2)
Thermal Factor C_t	1.0

Basic Wind Speed:	115 mph (Fig 26.5-1B)
Risk Category	II (ASCE 7-10 T1.5-1)
Exposure	C

Earthquake Loads	
Seismic Hazard Exposure Group	II
Seismic Importance Factor	= 1.00
Seismic Site Classification	C
Spectral Response Acceleration at Short Periods, S_s	= 0.331g
Spectral Response Acceleration at one-second period, S_1	= 0.121g

Design Seismic Spectral Response Acceleration at Short Periods, $S_{ds} = 0.265g$

Design Seismic Spectral Response Acceleration at one-second period, $S_{d1} = 0.136g$

Seismic Design Category C

Building Frame System: Steel System not specifically detailed for Seismic Resistance (B.3 Steel Ordinary Concentrically Braced Frames)

$R = 3-1/4$

$C_d = 3-1/4$

Seismic Response Coefficient (C_s) = 0.128

Analysis Procedure: Equivalent Lateral Force Procedure (ELFP)

Structural Testing and Inspection

- A qualified Structural Testing/Inspection Agency shall perform inspections and testing in accordance with project specifications.

Material Properties

- Reinforcement:

Reinforcing Steel	ASTM A615, Grade 60
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- Normal-Weight Concrete:

Footings	3,000 psi
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Elevator Pits	4,000 psi
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Slab-on-Grade	4,000 psi
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Slab on Metal Deck	4,000 psi
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- Concrete Masonry Units:

Minimum Compressive Strength (f'm)	1,500 psi
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- Structural Steel:

Structural steel W-shapes shall conform to ASTM A992, Grade 50.

Square /rectangular hollow structural sections (HSS) shall conform to ASTM A500 Grade B.

Round hollow structural sections (HSS) shall conform to ASTM A501 or ASTM A53, Grade B, or ASTM A500, Grade B.

Other Steel shapes (channels, angles, and plates) may conform to ASTM A36

Geotechnical Report

- Site preparation and foundation design is based on the recommendations in the Geotechnical Report, dated June 14, 2016, prepared by ECS Carolina, LLP (Project No.: 49-9029).

Foundations / Slabs-On-Grade

The foundations will consist of spread footings bearing on virgin soil. Footings at steel bracing will be larger, as necessary, to resist the uplift forces generated by the bracing. Footings at bracing will be connected together in the braced bay with 24" square concrete grade beams (assume total of 500'-0") to share the lateral load between adjacent footings.

- Foundation will consist of strip footings and individual spread footings bearing on soil capable of supporting 2,500 psf.
- Assume column footing requirements as follows:

Column	Footing Size	Footing Reinforcing
Typical Interior	11' - 0" x 11' - 0" x 26"dp.	450 pounds
Typical Exterior	10' - 0" x 10' - 0" x 24"dp.	350 pounds

- Typically, slab-on-grade to be a soil-supported 5-inch thick concrete slab with WWF 6x6 - W2.1xW2.1 reinforcing.
- The central plant and Low High Bay Labs floors will be a soil-supported 6-inch thick concrete slab with WWF 6x6 - W2.9xW2.9.
- Slabs-on-grade shall be constructed on a 4-inch thick, free-draining granular subbase and 15mil vapor barrier (UNO) with maximum aggregate size of 1 1/2" and no more than 2% fines.

Lateral Load-Resisting Structure

- Lateral resistance will be provided with steel X-bracing, with K-braces and Chevron-bracing where corridors and doors occur. The braces will typically consist of HSS members ranging in size from HSS 4 x 4 x 3/8 to HSS12 x 6 x 3/8 to enable easier stud infill above and below the braces.
- Assume minimum 17 brace members at an average size of HSS6x6x3/8 with an average length of 32'-0".

Columns

- Building columns to be W 10 x 54 average steel wide flange columns. (UNO)
- HSS 11.25 x 0.5 pipe columns at canopy/overhangs.
- Low High Bay column to be W 18 x 86
- Lobby 2-Story column to be HSS 16 x 16 x 3/8

Framed Floor Structure

- 3-1/2"-inch thick, normal concrete slab on 3VLI, 18 GA composite steel deck (galvanized) with WWF 6x6 – W2.1xW2.1 reinforcing. Crack mitigation reinforcing (#4@12" oc x 8'-0" long) will be required over each composite girder and all spandrel beams (hooked at edge).
- A 5/16-inch continuous bent plate will be required around the building perimeter and at interior openings for a pour stop. The angle will be supported by 1/4-inch stiffener plates at 4 feet on center.

Roof Structure

- 1-1/2-inch metal deck (galvanized or painted, 18 gage).
- Steel joists and steel wide flanged girders.
- Steel wide flange beams supporting the roof top units, antenna platform and the screen wall and braces.
- Screen wall to consist of HSS 6x6 vertical and diagonal supported wide flange roof beams
- A 1/4-inch bent plate will be required around the building perimeter and at interior openings. Overhangs greater than 8 inches will require a 1/4-inch stiffener plates at 4 feet on center.
- Galvanized structural steel platform of wide flange beams with grating to support satellite dishes.

Miscellaneous Steel

- Allowance to be provided for miscellaneous steel not shown on structural or architectural drawings commensurate with this building type
- Include 7 psf structural steel framing for satellite platform on lab roof and canopy roofs
- Include 5 tons misc steel for roof framing at corners, mechanical units, etc.

Architectural, Mechanical, and Electrical Components

- The architectural, mechanical, and electrical components shall be properly anchored or braced to resist seismic forces as required by the Building Code. See architectural, mechanical, and electrical documents for bracing requirements.
- Brace suspended ducts, pipes, and conduits in accordance with the SMACNA Seismic Restraint Manual, 1991 Edition, for Seismic Design Category C.
- Non-loadbearing masonry partitions will be reinforced with #5 @ 48" vertically with horizontal joint reinforcement.
- Provide L 6 x 4 x 3/8 brick support angle around the perimeter at second level. At Low High Bay Lab area include L 6 x 4 x 3/8 welded to an HSS 10 x 10 x 3/8 spanning between columns.

ELECTRICAL

Description

All material, labor, transportation, tools, equipment and supervision will be provided to completely install and leave ready for operation, complete electrical systems as defined below and on the Room Data Sheets.

Generally the work will include, but not necessarily be limited to, the following general items:

- Main switchboard, panelboards, transformers, feeders and other equipment for the complete power distribution system to the electrical closets on each floor.
- Wiring devices, branch circuit conduit and wiring systems.
- Complete interior lighting and control systems.
- Exterior lighting including parking lot and building entry and loading dock areas.
- Power wiring for all mechanical equipment furnished under other sections.
- Emergency power supply system.
- Fire alarm system.
- Structured Cabling system
- Audio/Visual System.
- Lightning protection system (UL Master Label)

Codes

All work will comply with the following:

- International Building Code, 2012 Edition with South Carolina Amendments
- International Fire Code, 2012 Edition with South Carolina Amendments
- National Electrical Code, NFPA 70, 2011 Edition
- International Energy Conservation Code, 2009 Edition
- National Fire Alarm and Signaling Code (NFPA 72), 2010 Edition

Seismic Design

Electrical components shall be properly anchored and/or braced as required by code for Seismic Hazard Group II, Design Category C, Importance Factor 1.0.

Site Electrical Distribution

The site electrical system consists of underground power and communications service to the building.

An overhead 12,470 volt, 3 phase, SCANA line exists along Trolley Line Road. At a point established by SCANA, the overhead service will transition underground to a pad mount transformer located at the east side of the building. From the point of transition to the transformer, the contractor will provide the trench and 5" schedule 40 PVC conduit. The contractor will also provide the transformer pad in accordance with SCANA design standards. All other work will be provided by the Utility Company. (2) underground 4" conduits (schedule 40 PVC)

will be provided from the telecom service provider point of connection. Final connection point to be coordinated with the provider.

Electrical Design Loads

Design loads used in the sizing of the electrical system are based on information obtained from interviews conducted with the end user, information contained on the Room Data Sheets, and information from the mechanical and plumbing systems.

Equipment Short Circuit Rating

Short circuit values were derived from available fault current data obtained from SCANA (2 MVA transformers, 44,000A at 480V, 3 Phase)

Power Distribution

Service Entrance Equipment:

The normal power system will consist of the 480/277V, 3 phase, 4 wire system. The system will consist of a 4000A main switchboard (UL 891, front access, group mounted, molded case circuit breakers) with surge suppression, power monitoring and feeder OCP devices as indicated. Main breaker shall be equipped with arc energy reduction settings. All breakers will be equipped with LSI (G) electronic trip units. Power monitoring system is microprocessor-based. Metered values (true RMS) includes multiphase amperes and volts, watts, VARS, volt-amps, watt-hours and VAR-hours, amperes and watts demand, frequency, power factor, and harmonic distortion. Main meters can be used as Ethernet gateway for interconnection to future sub-meters.

Distribution Panelboards

Distribution panels shall be sized and shall contain surge protection. Main and feeder OCP shall have electronic trip units. Panel shall be rated to withstand full short circuit current. Protective devices in distribution panels shall be bolt-on type circuit breakers. Buswork shall be copper. Panel will have a minimum 10% spare circuit breakers plus 20% spaces for future circuit breakers.

House Lighting and Receptacle Panelboards

Main and feeder OCP shall have thermal mag trip units. Protective devices shall be bolt-on type circuit breakers. Panel shall be rated to withstand full short circuit current. Buswork shall be copper. Panel will have a minimum 10% spare circuit breakers plus 20% spaces for future circuit breakers.

Laboratory Panelboards

Panels shall contain surge protection. Main and feeder OCP shall have thermal mag trip units. Protective devices shall be bolt-on type circuit breakers. Panels shall be rated to withstand full short circuit current. Buswork shall be copper. Panels will have a minimum 10% spare circuit breakers plus 20% spaces for future circuit breakers.

Dry Type Transformers

Transformers shall be compliant with the efficiencies required with DOE's 2016 Transformation Efficiency Standards.

Electrical Distribution (General)

All feeders shall be cable installed in conduit. Exposed conduit shall be EMT. In areas where conduit can be subject to damage, conduit shall be IMC. Underground conduit shall be Schedule 40 PVC.

Wiring shall be insulated conductors, type THWN/THHN or XHHW insulation. Conductors for power wiring are a minimum of #12 AWG and a maximum of 600 kcmil. For the 1st and 2nd floor office areas, branch circuits serving receptacles located west of column No. 8 shall be #10 AWG.

Conductors #2 and smaller shall be copper. Conductors larger than #2 can be aluminum. MC Cable utilizing an individual insulated ground conductor can be used for office area branch circuiting. Laboratory branch circuiting shall be conduit and wire.

Electrical Distribution (Wet and Dry Laboratories)

On all fixed casework, dual channel, aluminum wireway will be provided. (Wiremold AL5200 Series or equal) Receptacle and data outlet spacing shall be as indicated on the Room Data Sheets.

For movable center aisle casework, overhead retractable electrical, telecom and data utilities will be provided.

Dedicated special outlets will be provided for laboratory equipment loads such as freezers, refrigerators, incubators, centrifuges, etc. Refer to the Room Data Sheets for device quantity and requirements.

Electrical Distribution (Low High Bay – Robotics and Metal Additive Manufacturing Lab)

Same as wet and dry laboratories. In addition, provide 120 Volt, 1- Phase; 208 Volt, 3-Phase and 480 Volt, 3-Phase outlets per the Room Data Sheets.

System Furniture (Power and Data)

The furniture system power configuration shall be 4-circuit (20A), 8-wire (4-hot, 2-neutral, 2-ground). Minimum wire size shall be #12AWG. Refer to Room Data Sheets for Power and Telecom outlet quantities.

Electrical Distribution (Non-Laboratory Areas)

Receptacles shall be installed as indicated in the respective Room Data Sheets. For the elevator, provide code required pit receptacles and lighting. See architectural narrative for additional information.

Emergency Power Supply System

The emergency power system will consist of a 200Kw, .8 PF diesel generator with skid mounted tank, transfer switch, distribution panelboards, lighting panelboards, transformers and receptacle panels.

Two open transition transfer switches will be provided for the following load types:

- Life safety branch serving code required egress lighting and the fire alarm system.
- Legally required standby loads (equipment branch). This would serve all laboratory fume hoods, BAS system controls, and the sewage lift station.

The engine generator set will be installed in a metal weatherproof exterior enclosures, complete with louvers, dampers, lockable hinged service and maintenance access doors, interior lighting and maintenance receptacles.

LIGHTING

Interior Lighting

The electric lighting system for the Building will be designed to emphasize visual quality, to support occupant tasks, and to optimize energy use. The electric lighting design will include a layered strategy of ambient, accent, and task lighting systems. The base building electric lighting strategy will rely primarily on the use of high efficiency, high CRI, fluorescent lamps in luminaires equipped with high-frequency electronic ballasts. The Interdisciplinary Lab Meeting Space corridor and adjacent gathering area will be considered for specialty lighting features that may evoke the type of work performed. Refer to Interdisciplinary Lab Meeting Space finishes and future lighting sections for additional lighting requirements in this space. Additional task lighting will be installed at the Laboratories, Reception Area and other locations where reading or writing tasks occur. VTC and Conference Room lighting shall have dimming capabilities.

With the exception of the emergency lighting designated as 24/7 operation, all luminaires in the building will be connected to a lighting control system which will control the lighting based on occupancy, scheduling or other user determined conditions.

Task Lighting - supplemental task lighting, including permanently installed undershelf or under cabinet lighting and/or wall mounted task lighting shall be installed. These fixtures shall have a control device integral to the luminaires, or shall be controlled by a wall-mounted control device, provided that the control device is readily accessible and located so that the occupant can see the controlled lighting.

Lighting levels will be designed to comply with the recommendations of the Illuminating Engineering Society's (IES) 10th Edition Handbook. In addition, the installed lighting power density will comply with the Space-by-Space requirements of ASHRAE 90.1-2007. Lighting will generally be 277V.

Exterior Lighting

The exterior electric lighting system for the project will be designed to provide visibility for the building while respecting the urban context of the site and preserving the night sky for surrounding residents. Pole mounted high efficiency site lighting fixtures will be used for general illumination of the parking lots. Flag lighting will be provided at the building main entry. High efficiency exterior lighting will be used to highlight the building façades. Surface mounted weatherproof lighting will be provided at loading dock and other exterior canopies. The total exterior lighting power allowance for all exterior building applications is the sum of the base site allowance plus the individual allowances for areas that are to be illuminated and are permitted by ASHRAE 90.1-2007 for the applicable lighting zone. Lighting not designated for dusk to dawn operation (i.e. Loading Dock) shall be controlled by either a combination of a photosensor and a time switch, or an astronomical time switch. Lighting designated for dusk to dawn operation shall be controlled by an astronomical time switch or photosensor. All time switches shall be capable of retaining programming and time setting during loss of power for a period of at least 10-hours.

Emergency Lighting

Life safety/egress lighting within the building and on the building exterior will be supported by the emergency generator. Emergency circuits shall be connected to their respective switches. Emergency circuits shall be controlled simultaneously with other lighting circuits within that control zone when normal utility power is provided to the system. Upon loss of the normal power and subsequent presence of emergency power, emergency circuits shall immediately go to full-on condition. During this period, remote control stations shall be inoperable. Upon normal power restoration, lighting zones shall revert to their status prior to the emergency condition, and remote control stations shall, once again, be operable. The emergency full-on shall be accomplished by emergency electronics, switching both the intensity signal and the on/off signal of each emergency circuit dimmer between the local control stations and a full-on constant drive supply. Security and

Night lighting shall be provided by occupancy sensors in all locations allowed by code. Exit signs will be internally illuminated and not exceed 5-watts per face.

Lighting Control System

Lighting controls will be provided to meet the mandatory lighting control provisions of ANSI/ASHRAE/IESNA 90.1 – 2007. The lighting control concept consists of the implementation of microprocessor-based, programmable lighting control relay panels, room controllers, occupancy sensors, digital override switches, time-of-day scheduling, and programming.

The Lighting Control System shall consist of relay panels for zone power switching. The system shall be capable of utilizing application specific controllers to provide application specific control of digital switch override of automated system functions, remote access, and historical data logging. The lighting control system shall have a dedicated network. An Astronomic Time Switch will provide unique lighting schedules for weekdays, weeknights, weekend days, weekend nights, holidays, and special events. The astronomic function will allow scheduled events and control operations to adjust based on sunrise and sunset throughout the year. Local override devices will be provided to give users ultimate control of their space. The lighting control system shall be capable of programming settings of occupancy sensors (such as time delay, occupancy/vacancy modes, and zoning groups) based on time scheduling. Ceiling mounted occupancy sensors will be used in larger areas that require overlapping coverage. Smaller areas, such as Private Offices, will use either wall-box type or ceiling mounted occupancy sensors, depending on the size and furniture layout of the room and will be used in conjunction with room controllers.

Factory programming, training and service, and associated wiring to allow control of the facility shall be supplied. The lighting control system shall enable the onsite lighting administrator to navigate between luminaires, zones, and floors. In addition, each relay panel must be able to be locally accessed by a local interface.

The intelligent relay panels shall be mounted in electrical closets. Room controllers shall be remote mounted above ceilings. The numbered relays in the panels shall be wired to control the power to each circuit. Digital override switches and other low voltage devices shall be mounted and wired to either digital switches or individual controllers. All wiring shall be identified with the number of the breaker, switch or low voltage device.