UCR

University of California, Riverside
Riverside, California

DPP

Materials Science and Engineering

Appendix I - Room Data Sheets
Appendix II - Meeting Notes
Appendix III - Cost Plan

May 30, 2003

HGA / KMW

Appendix I

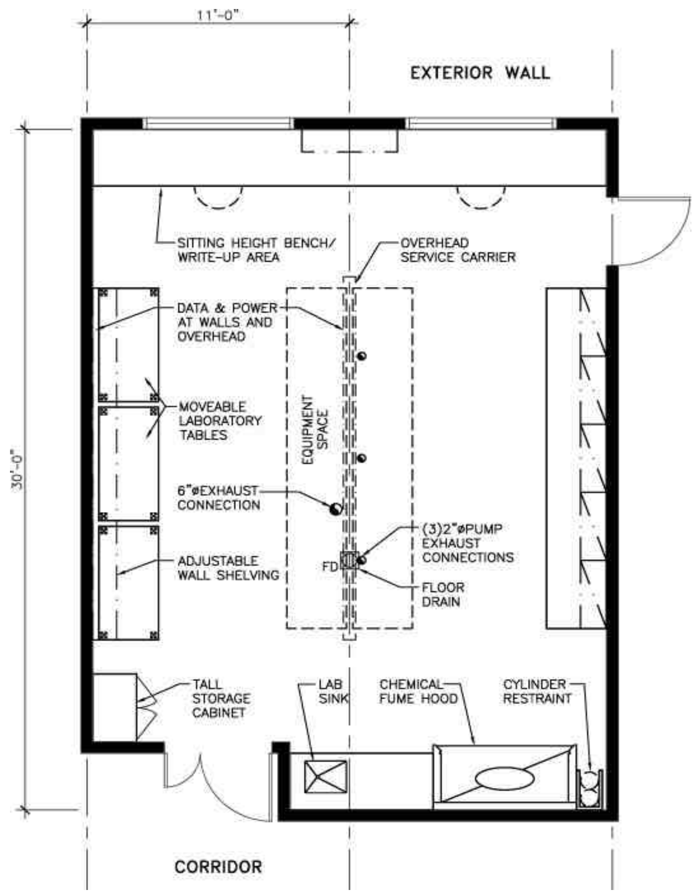
Room Data Sheets

A1.01 *Room Code*

MATERIALS AND NANOTECHNOLOGY *Department*

MAIN RESEARCH LAB *Space Name*

660 ASF *Assignable Area*



General Notes

Room Code	**A1.01**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**MAIN RESEARCH LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(1)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

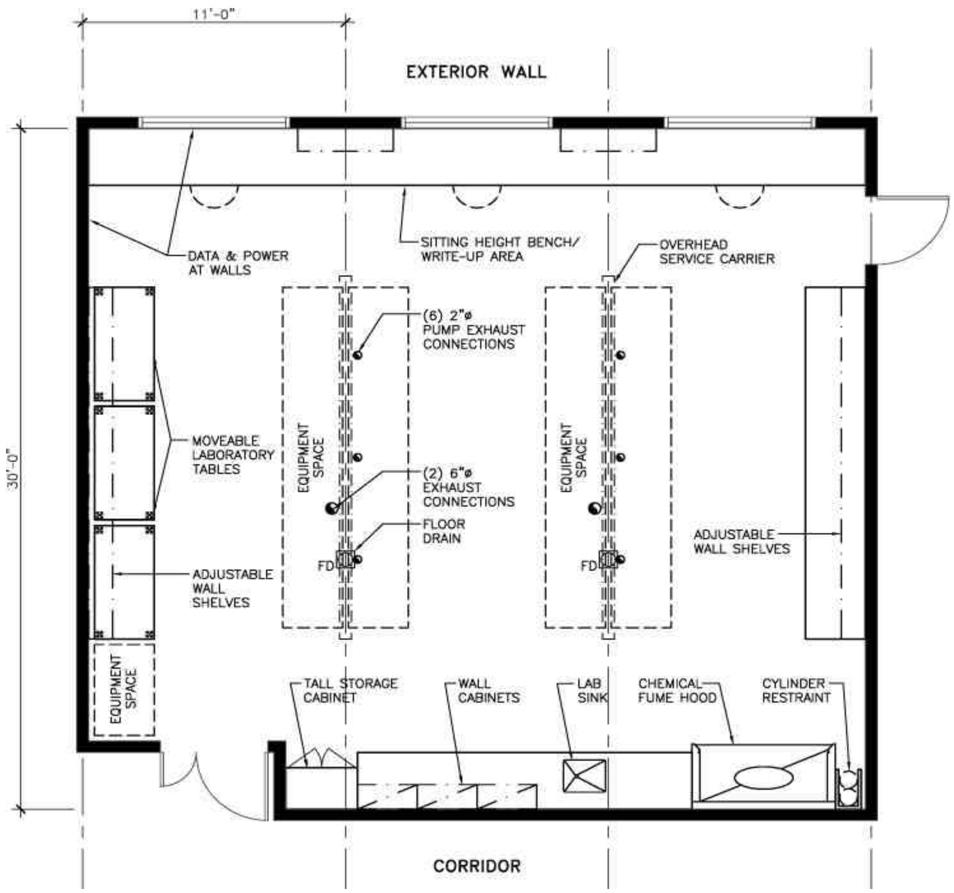
1. 1000-2000 microinches / second.

A1.02 — *Room Code*

MATERIALS AND NANOTECHNOLOGY — *Department*

MAIN RESEARCH LAB — *Space Name*

990 ASF — *Assignable Area*



General Notes

Room Code **A1.02**
Department **MATERIALS AND NANOTECHNOLOGY**
Space Name **MAIN RESEARCH LAB**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(1)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

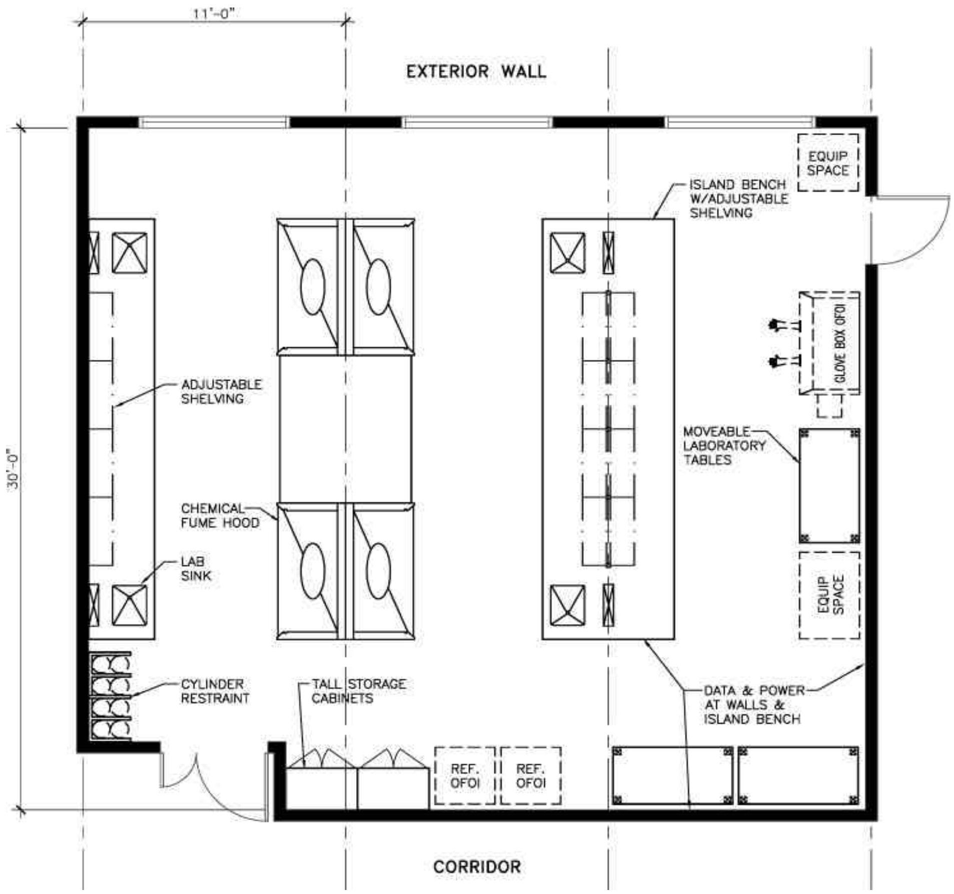
1 Glovebox.
2 1000-2000 microinches / second.

A1.03 — *Room Code*

MATERIALS AND NANOTECHNOLOGY — *Department*

SYNTHETIC CHEMISTRY RESEARCH LAB — *Space Name*

990 ASF — *Assignable Area*



General Notes

Room Code	**A1.03**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**SYNTHETIC CHEMISTRY RESEARCH LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(1)

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

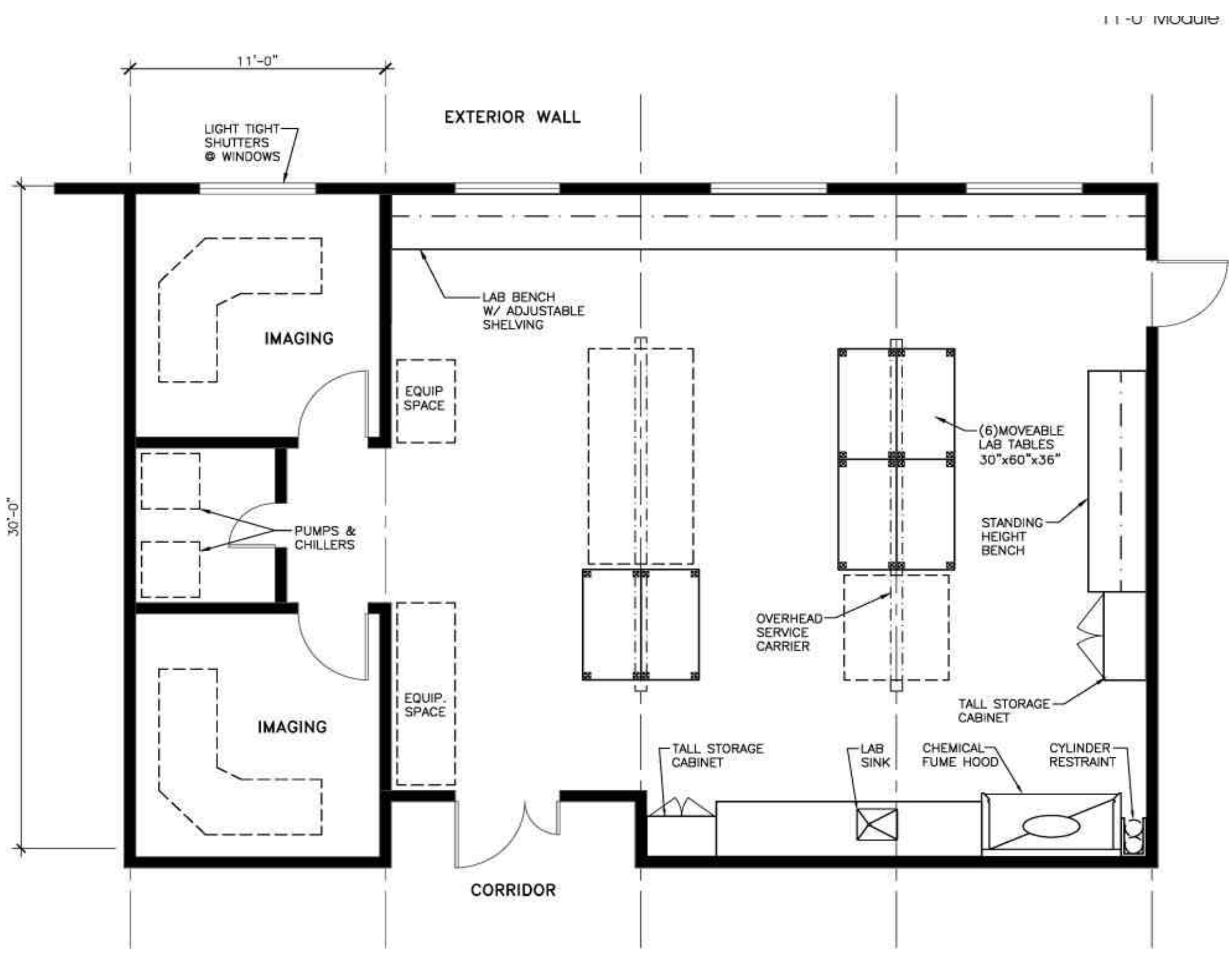
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Glovebox.
2. 1000-2000 microinches / second.

A2.01 *Room Code*
MATERIALS AND NANOTECHNOLOGY *Department*
SUPPORT IMAGING *Space Name*
1,320 ASF *Assignable Area*



General Notes

Room Code	**A2.01**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**SUPPORT IMAGING**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(1)
Light Sensitive	●
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
Other	

CHEMICALS

Bases	
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

Electron Microscope	●

General Notes

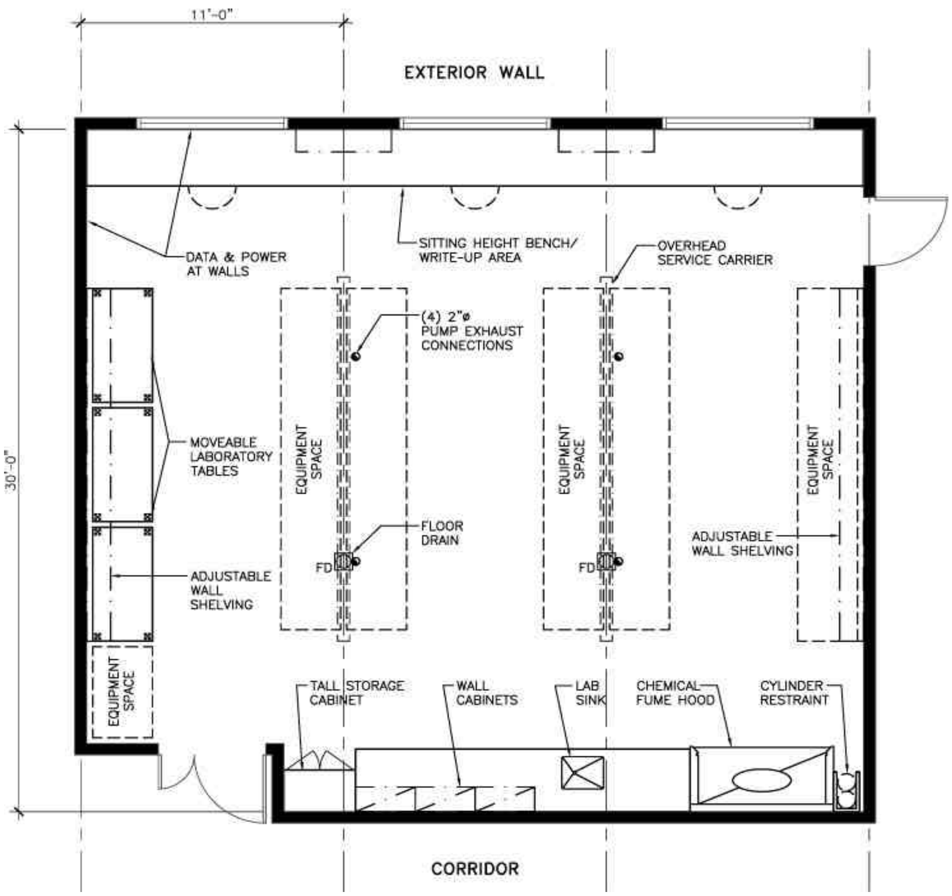
1. 1000 microinches / second.

A2.02 *Room Code*

MATERIALS AND NANOTECHNOLOGY *Department*

SUPPORT CHARACTERIZATION *Space Name*

990 ASF *Assignable Area*



General Notes

Room Code	**A2.02**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**SUPPORT CHARACTERIZATION**
Occupancy	

UTILIZATION	
Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL	
Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS	
Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT	
Vibration Sensitive	●(1)
Light Sensitive	●
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
Other	

CHEMICALS	
Bases	
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT	
Computer	●

General Notes

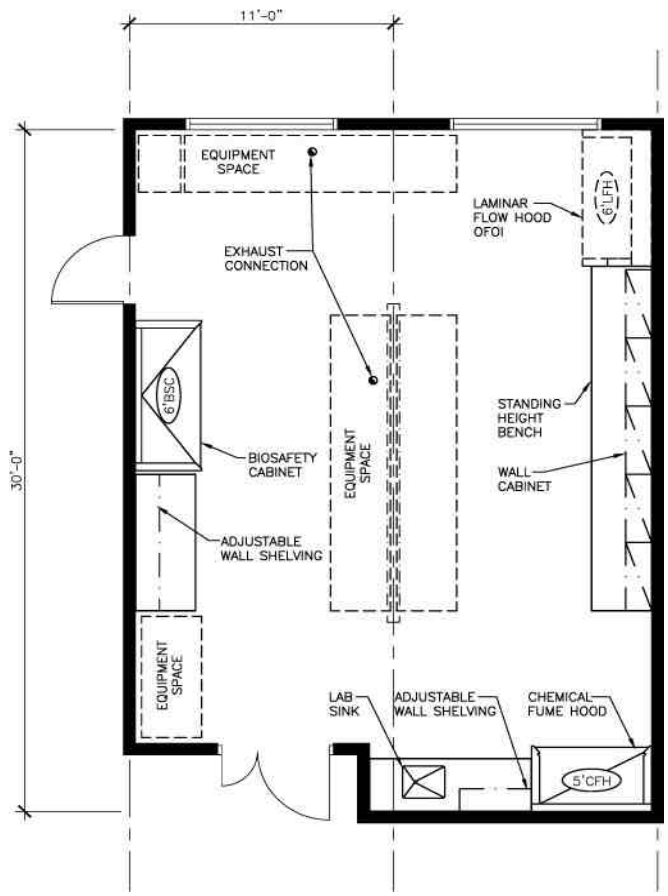
1. 1000 microinches / second.

A3.01 *Room Code*

MATERIALS AND NANOTECHNOLOGY *Department*

CORE / NANOBIOTECHNOLOGY *Space Name*

660 ASF *Assignable Area*



General Notes

Room Code	**A3.01**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**CORE / NANOBIOTECHNOLOGY**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	●
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(1)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide (C0$_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

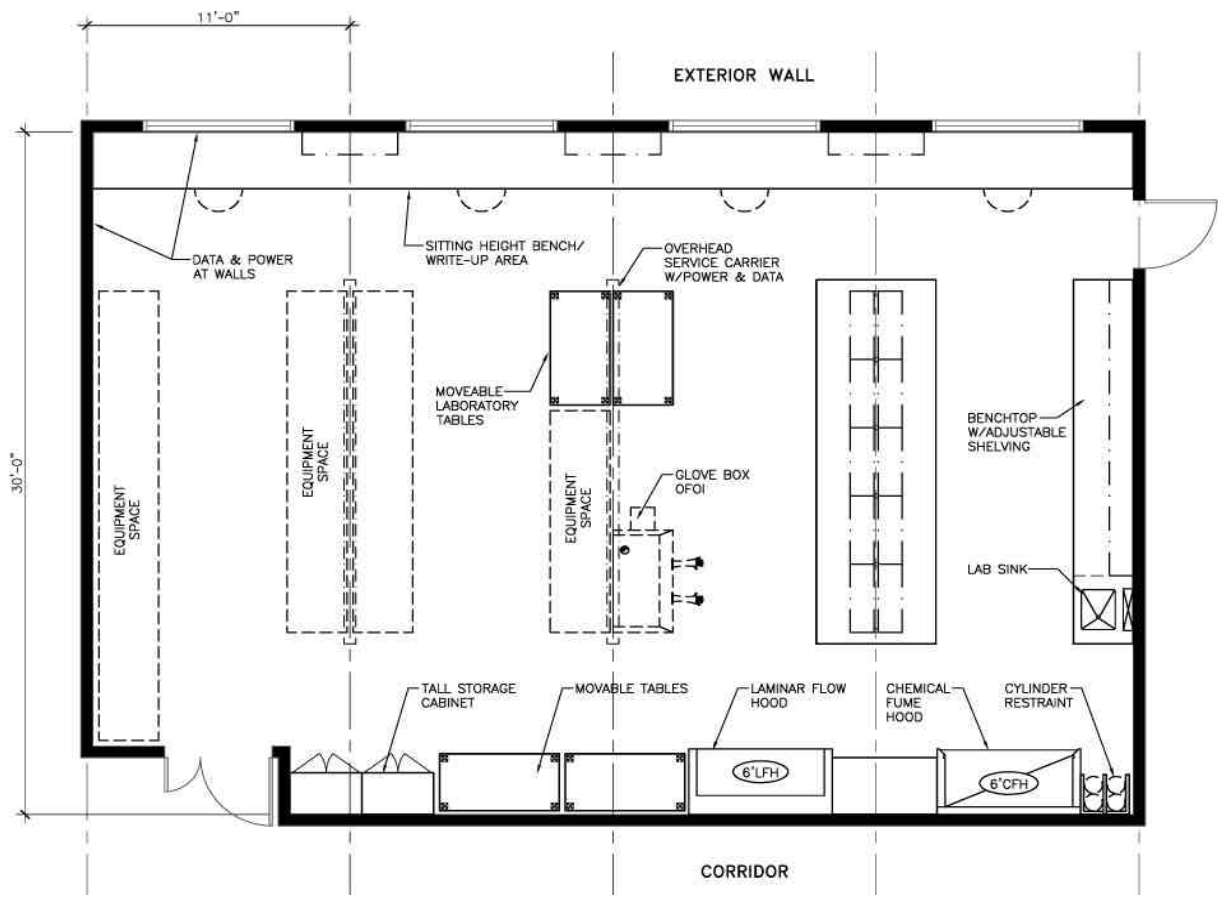
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. 1000 microinches / second.

A3.02	*Room Code*
MATERIALS AND NANOTECHNOLOGY	*Department*
CORE / NANOMATERIALS	*Space Name*
1,320 ASF	*Assignable Area*



General Notes

Room Code	**A3.02**
Department	**MATERIALS AND NANOTECHNOLOGY**
Space Name	**CORE / NANOMATERIALS**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(1)

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

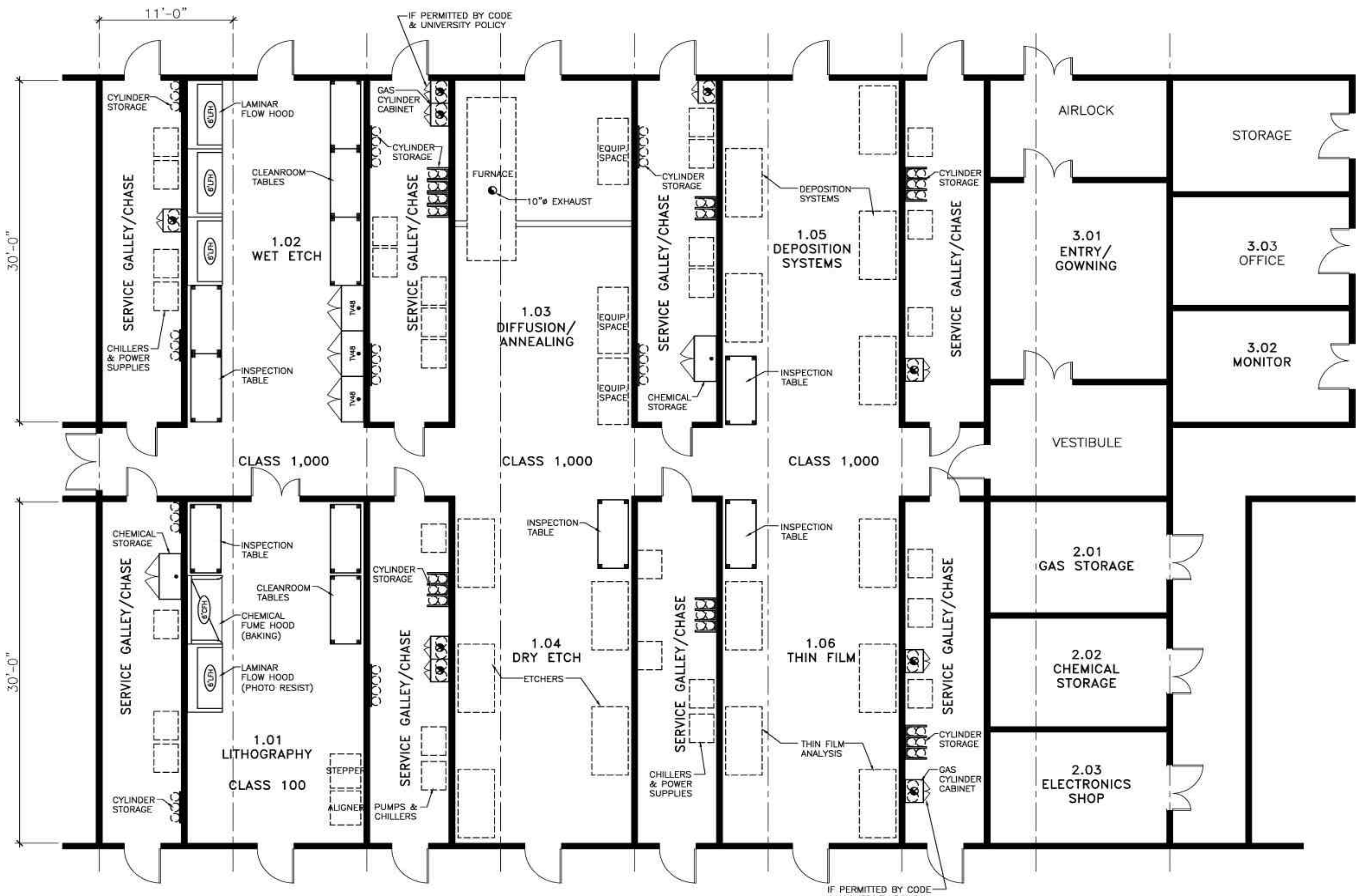
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

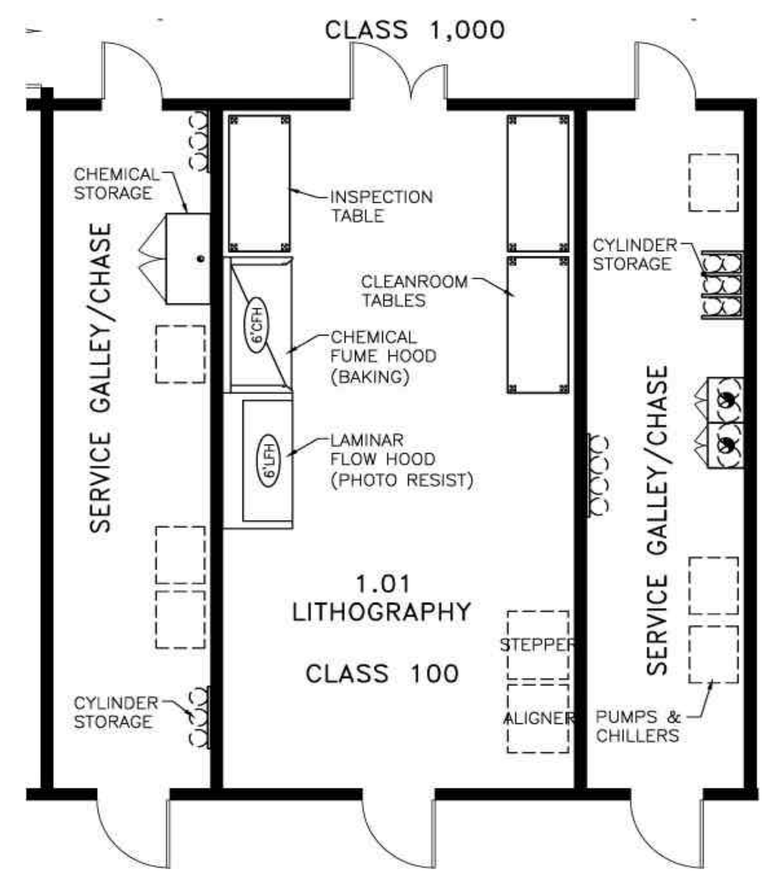
1. Glovebox.
2. 1000 microinches / second.

Room Code **B1.00**
Department **MATERIALS AND NANOTECHNOLOGY**
Space Name **CLEAN ROOM**
Assignable Area 6,790 ASF



General Notes

B1.01 *Room Code*
CLEAN ROOM CORE (CLASS 100) *Department*
LITHOGRAPHY *Space Name*
450 ASF *Assignable Area*



General Notes

Room Code	**B1.01**
Department	**CLEAN ROOM CORE (CLASS 100)**
Space Name	**LITHOGRAPHY**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
600 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(3)
Light Sensitive	●
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	●
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	●(1)
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

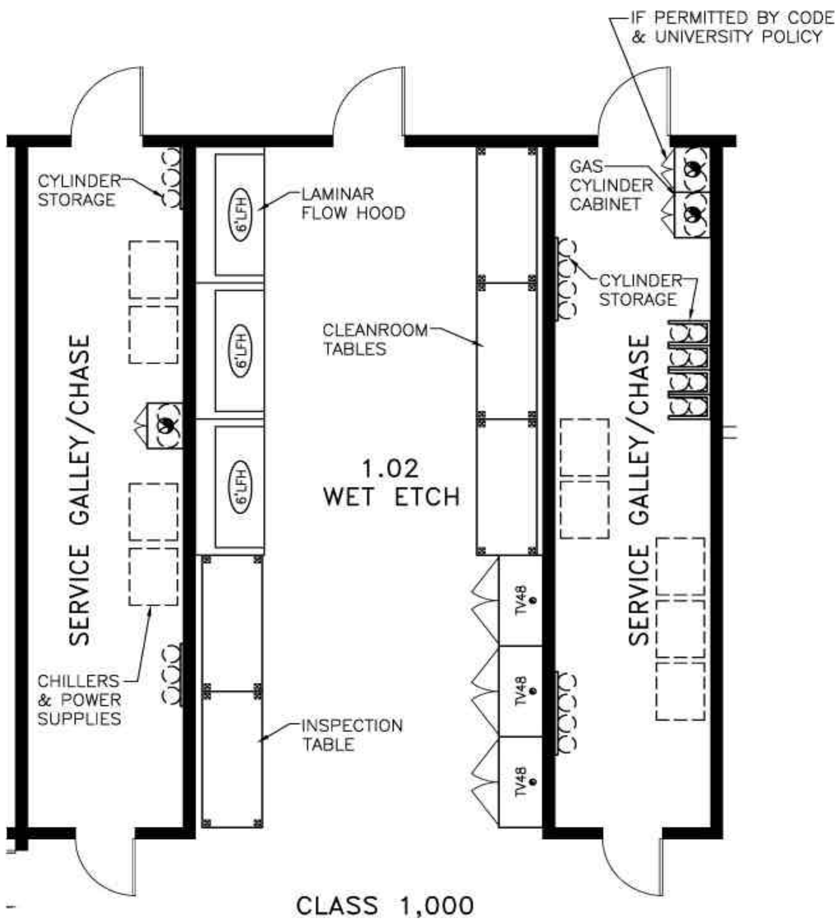
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(2)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(2)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●(1)
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Yellow light and yellow glass at windows and doors.
2. Clean room grade.
3. 250 microinches / second.

B1.02	*Room Code*
CLEAN ROOM CORE (CLASS 1,000)	*Department*
WET ETCH	*Space Name*
450 ASF	*Assignable Area*



General Notes

Room Code	**B1.02**
Department	**CLEAN ROOM CORE (CLASS 1,000)**
Space Name	**WET ETCH**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	●
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

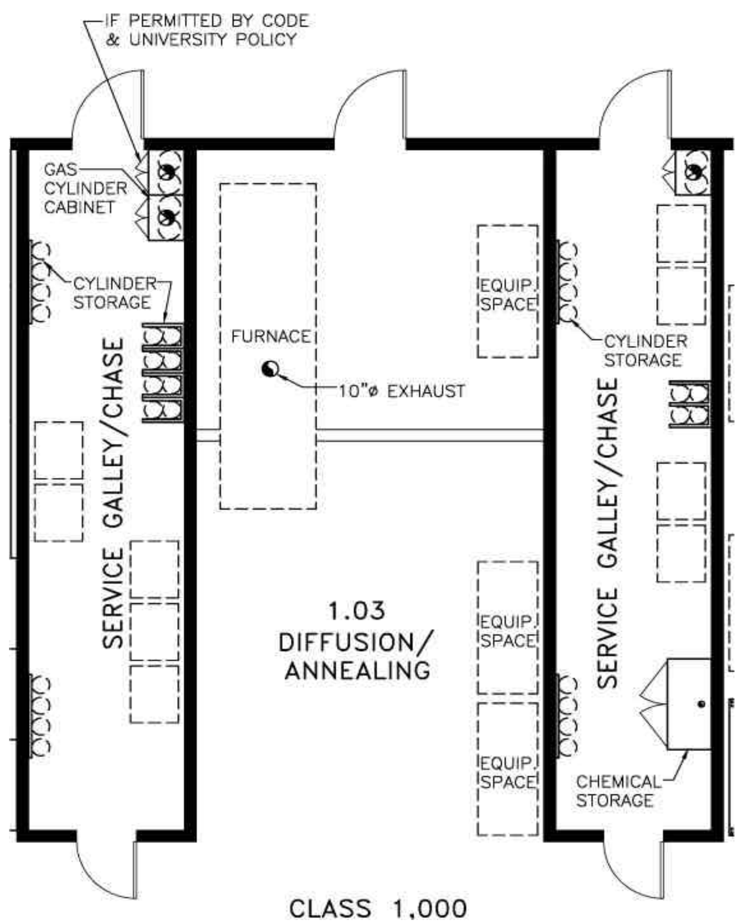
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Clean room grade.
2. 500 microinches / second.

B1.03	*Room Code*
CLEAN ROOM CORE (CLASS 1,000)	*Department*
DIFFUSION / ANNEALING	*Space Name*
450 ASF	*Assignable Area*



General Notes

Room Code	**B1.03**
Department	**CLEAN ROOM CORE (CLASS 1,000)**
Space Name	**DIFFUSION / ANNEALING**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(2)

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	●
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

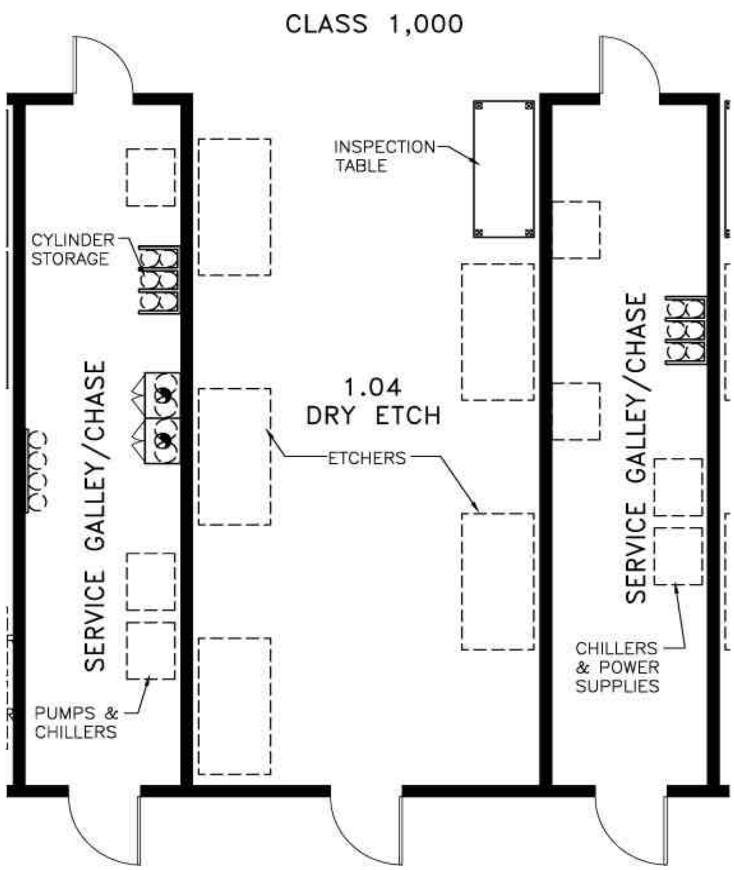
ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes
1. Clean room grade.
2. High heat load.

B1.04	*Room Code*
CLEAN ROOM CORE	*Department*
DRY ETCH	*Space Name*
450 ASF	*Assignable Area*



General Notes

Room Code	**B1.04**
Department	**CLEAN ROOM CORE**
Space Name	**DRY ETCH**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

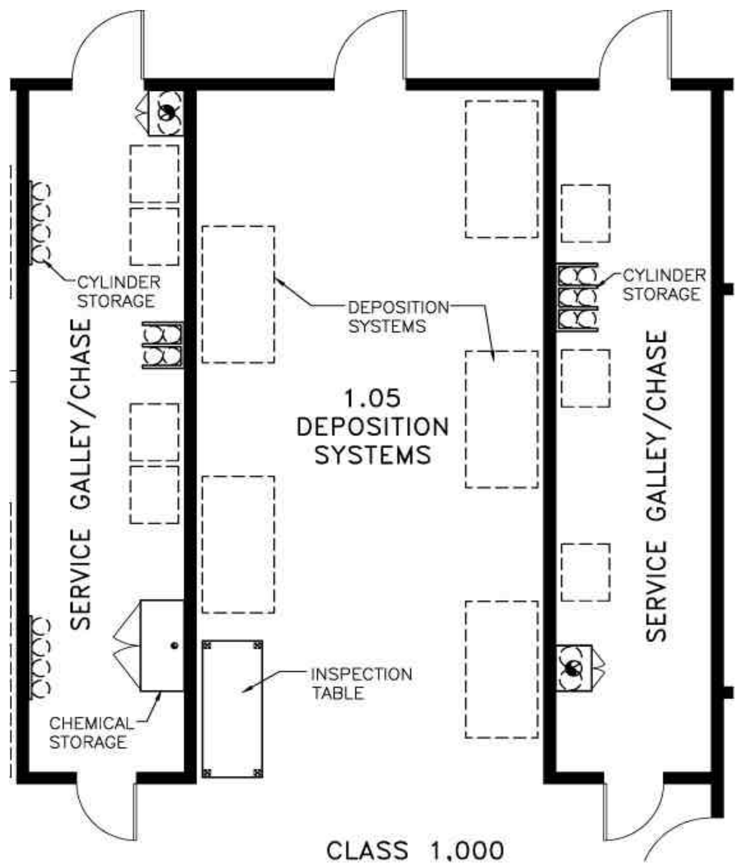
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Clean room grade.
2. 500 microinches / second.

B1.05	*Room Code*
CLEAN ROOM CORE	*Department*
DEPOSITION	*Space Name*
450 ASF	*Assignable Area*



General Notes

Room Code	**B1.05**
Department	**CLEAN ROOM CORE**
Space Name	**DEPOSITION**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

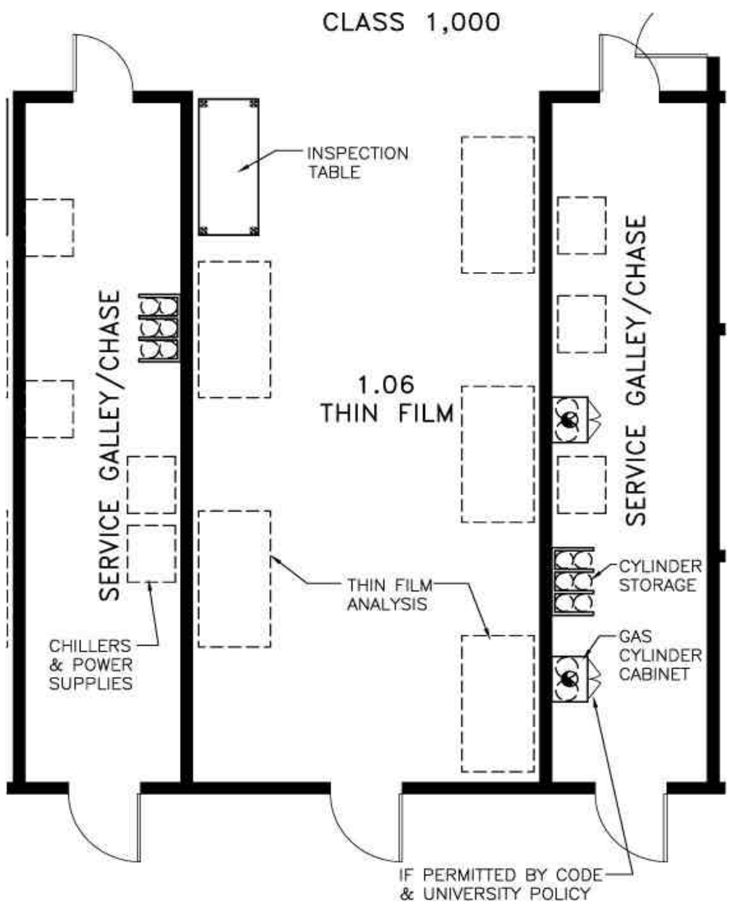
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Clean room grade.
2. 500 microinches / second.

B1.06	*Room Code*
CLEAN ROOM CORE	*Department*
THIN FILM	*Space Name*
450 ASF	*Assignable Area*



General Notes

Room Code	**B1.06**
Department	**CLEAN ROOM CORE**
Space Name	**THIN FILM**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 5%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS (100% EXHAUST)

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	●(2)
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
High Purity Water (HPW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

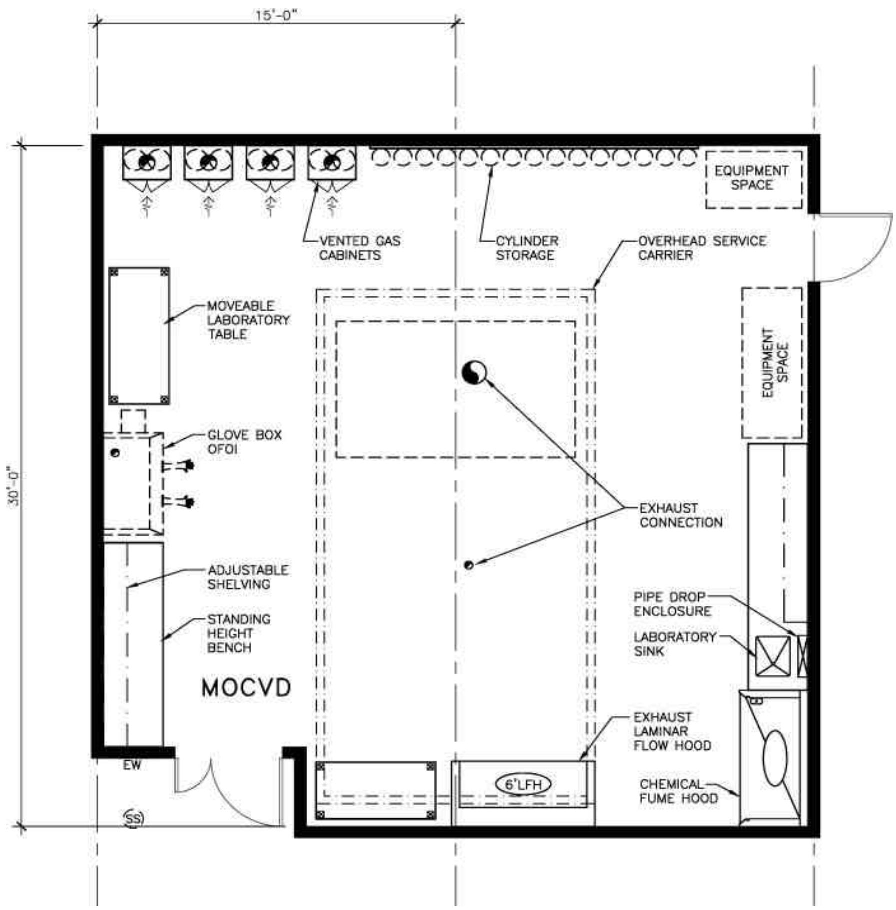
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Clean room grade.
2. 500 microinches / second

B1.07	*Room Code*
CLEAN ROOM CORE	*Department*
MOCVD	*Space Name*
900 ASF	*Assignable Area*



General Notes

Room Code **B1.07**
Department **CLEAN ROOM CORE**
Space Name **MOCVD**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	●
Air Filtration/Exhaust	●

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	●
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(1)

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

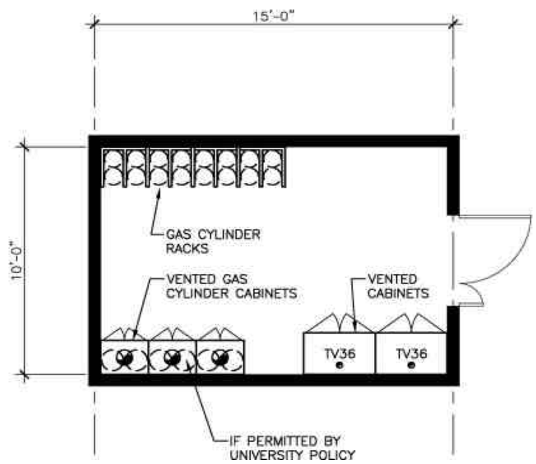
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	●
Gyp Board, Paint	
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Gas cabinets and glovebox (local scrubbing as required).

B2.01	*Room Code*
CLEAN ROOM CORE	*Department*
GAS STORAGE	*Space Name*
150 ASF	*Assignable Area*



General Notes

Room Code	**B2.01**
Department	**CLEAN ROOM CORE**
Space Name	**GAS STORAGE**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	
Uncontrolled	●
60 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(1)

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	
Data	
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

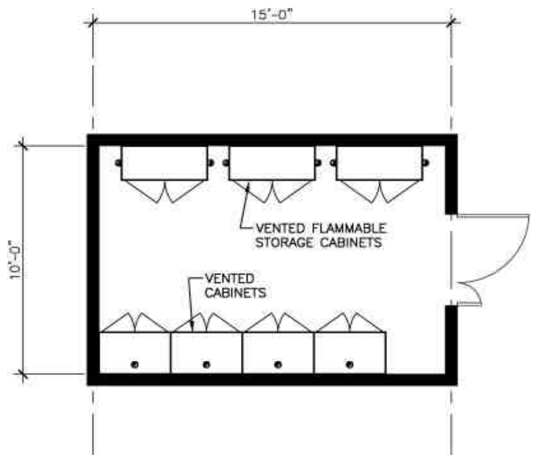
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Vented cylinder cabinets.

B2.02	*Room Code*
CLEAN ROOM CORE	*Department*
CHEMICAL STORAGE	*Space Name*
150 ASF	*Assignable Area*



General Notes

Room Code	**B2.02**
Department	**CLEAN ROOM CORE**
Space Name	**CHEMICAL STORAGE**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	
Uncontrolled	●
60 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

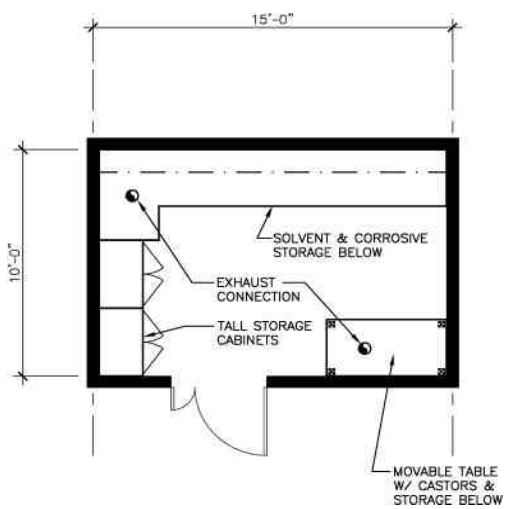
ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	●
Gyp Board, Paint	
Other	
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

B2.03 *Room Code*
CLEAN ROOM CORE *Department*
ELECTRONICS SHOP *Space Name*
150 ASF *Assignable Area*



General Notes

Room Code	**B2.03**
Department	**CLEAN ROOM CORE**
Space Name	**ELECTRONICS SHOP**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 10%	
Uncontrolled	●
60 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	●
Potable Cold Water (CW)	●
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	●
Gyp Board, Paint	
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

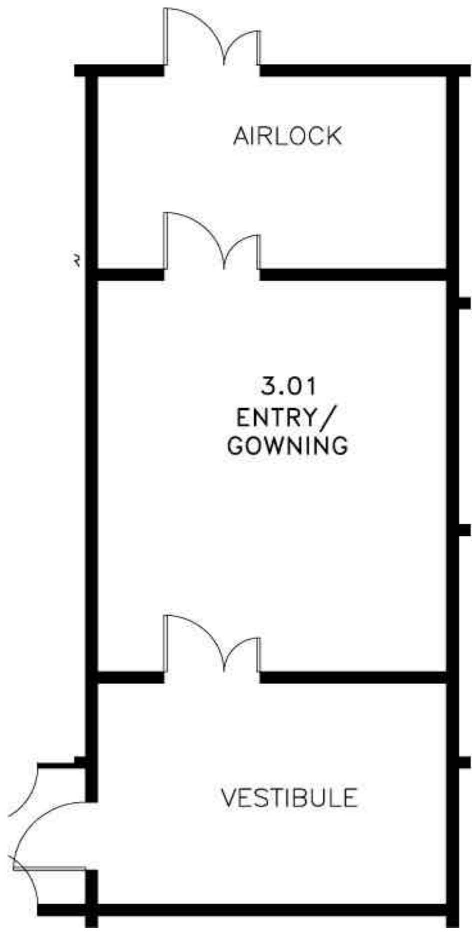
General Notes

B3.01 *Room Code*

CLEAN ROOM CORE (CLASS 10,000) *Department*

ENTRY / GOWNING *Space Name*

450 ASF *Assignable Area*



General Notes

Room Code **B3.01**
Department **CLEAN ROOM CORE (CLASS 10,000)**
Space Name **ENTRY / GOWNING**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	●
Uncontrolled	
67 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

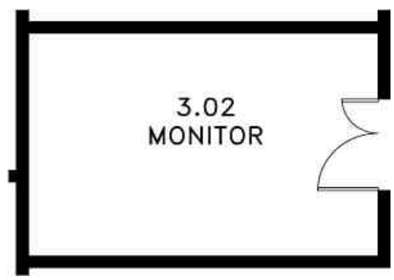
ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes
1. Clean room grade.

B3.02	*Room Code*
CLEAN ROOM CORE	*Department*
MONITOR / CONTROLS	*Space Name*
150 ASF	*Assignable Area*



General Notes

Room Code	**B3.02**
Department	**CLEAN ROOM CORE**
Space Name	**MONITOR / CONTROLS**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	•
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	•

MECHANICAL

Temperature	
72°F ± 2°F	•
68°-75° ± 2°F	
Other	
Humidity	
50% ± 10%	
Uncontrolled	•
60 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	•
100% Make-up Air	
Recirculated Air	•
Air Pressure Positive	
Air Pressure Negative	•
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	•
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	•
Data	•
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	•
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	•
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	•
Other	
Base	
4" Vinyl	•
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	•
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	•
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

B3.03	*Room Code*
CLEAN ROOM CORE	*Department*
OFFICE	*Space Name*
150 ASF	*Assignable Area*

General Notes

Room Code	**B3.03**
Department	**CLEAN ROOM CORE**
Space Name	**OFFICE**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 10%	
Uncontrolled	●
60 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

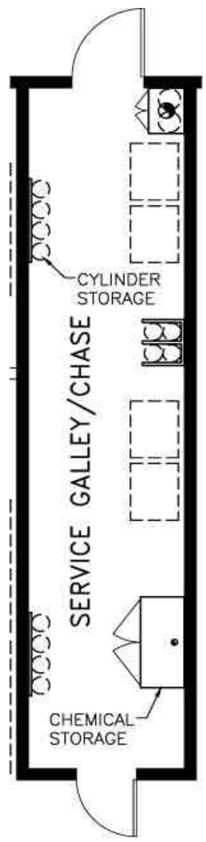
ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

B3.04	*Room Code*
CLEAN ROOM CORE	*Department*
SERVICE GALLEY	*Space Name*
210 ASF EACH (1,890 TOTAL)	*Assignable Area*



General Notes

Room Code	**B3.04**
Department	**CLEAN ROOM CORE**
Space Name	**SERVICE GALLEY**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	
Uncontrolled	●
60 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●(1)

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	●
Heat Producing	●
Noise Producing	●

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	●
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	●
Toxic	●
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

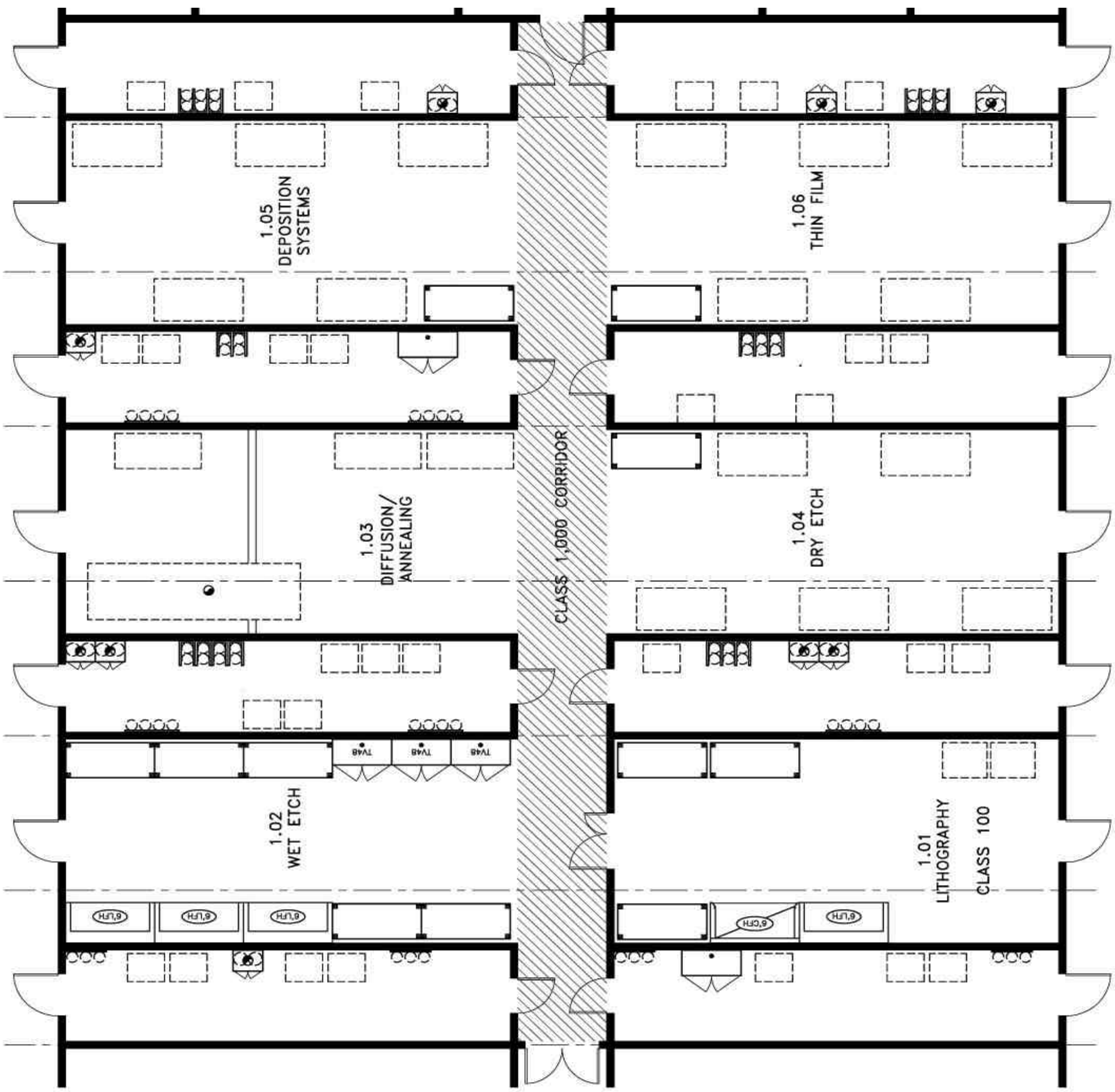
OWNER-FURNISHED EQUIPMENT

Chiller	●
Power supply	●
Vacuum pump	●

General Notes

1. Vented cylinder cabinets.

B3.05	*Room Code*
CLEAN ROOM CORE	*Department*
CLEAN CORRIDOR (CLASS 1,000)	*Space Name*
1,000 ASF	*Assignable Area*



General Notes

Room Code **B3.05**
Department **CLEAN ROOM CORE**
Space Name **CLEAN CORRIDOR (CLASS 1,000)**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 10%	●
Uncontrolled	
133 Air Changes/Hour	●
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	●
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

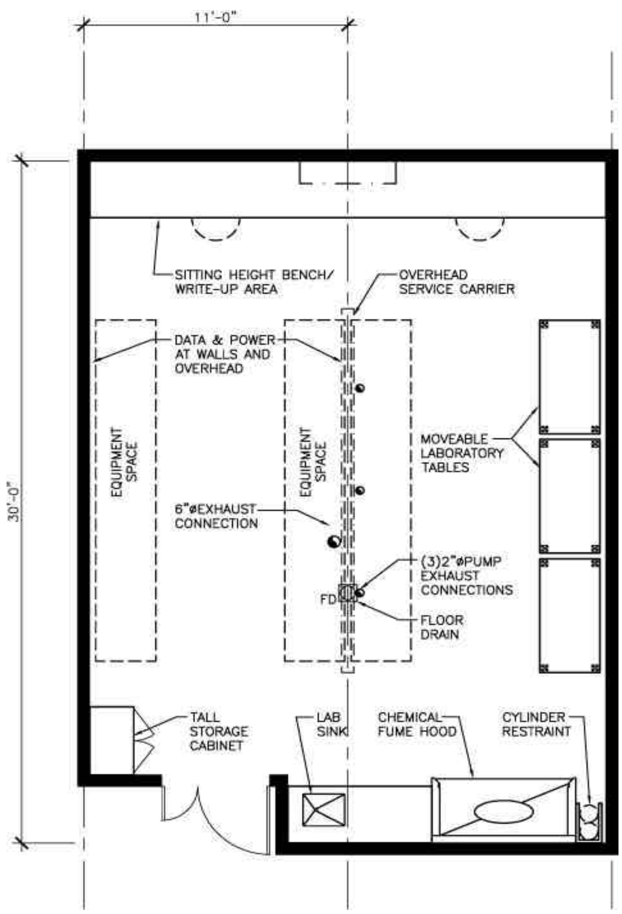
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	●
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Return Air)	●(1)
Base	
4" Vinyl	
Integral w/floor	●
Ceiling	
Open	
Acoustic Tile	●(1)
Gyp Board, Epoxy Paint	
Height	9'-0"
Doors	
3'-6" x 7'	●
3' x 7'	
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Clean room grade.

C1.01	*Room Code*
BIOENGINEERING	*Department*
MAIN RESEARCH LAB	*Space Name*
660 ASF	*Assignable Area*



General Notes

Room Code	**C1.01**
Department	**BIOENGINEERING**
Space Name	**MAIN RESEARCH LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	●(1)
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

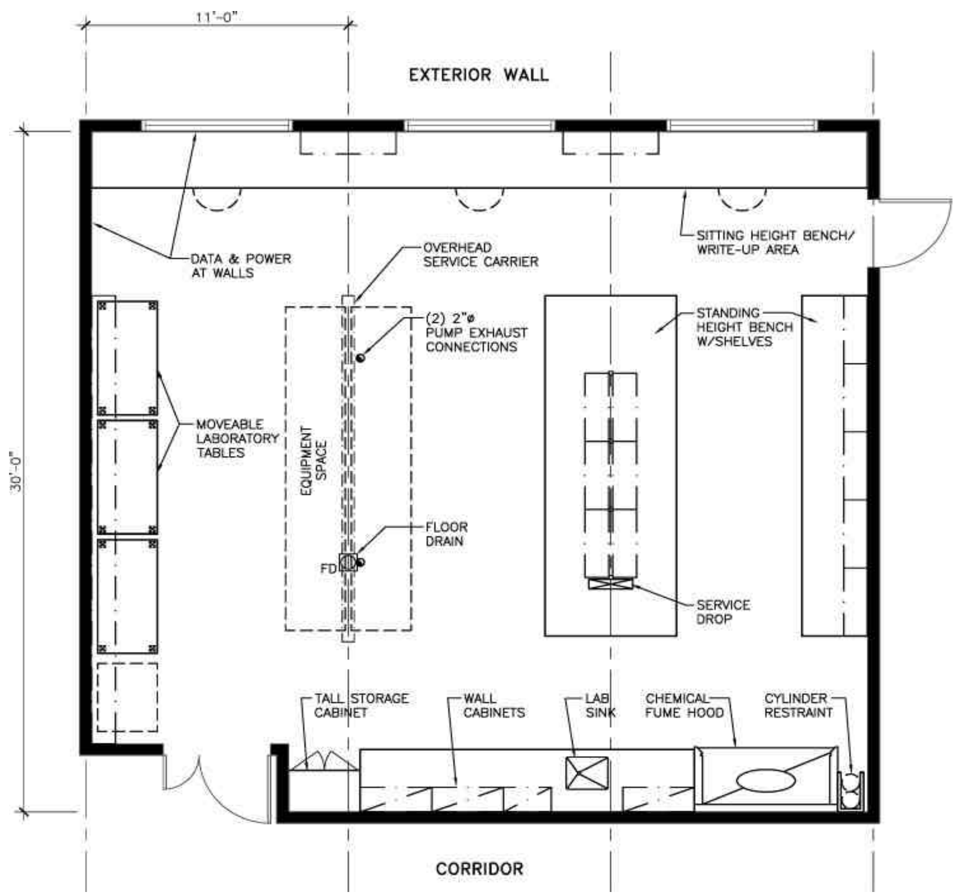
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Required in some configurations. Assume (6) in Programming.

C1.02 *Room Code*
BIOENGINEERING *Department*
MAIN RESEARCH LAB (OPTION 'A') *Space Name*
990 ASF *Assignable Area*



General Notes

Room Code	**C1.02**
Department	**BIOENGINEERING**
Space Name	**MAIN RESEARCH LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	●
Radioisotope Hood	●(1)
Laminar Flow Hood	
Biological Safety Cabinet	●(2)
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	●

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	●
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	●
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

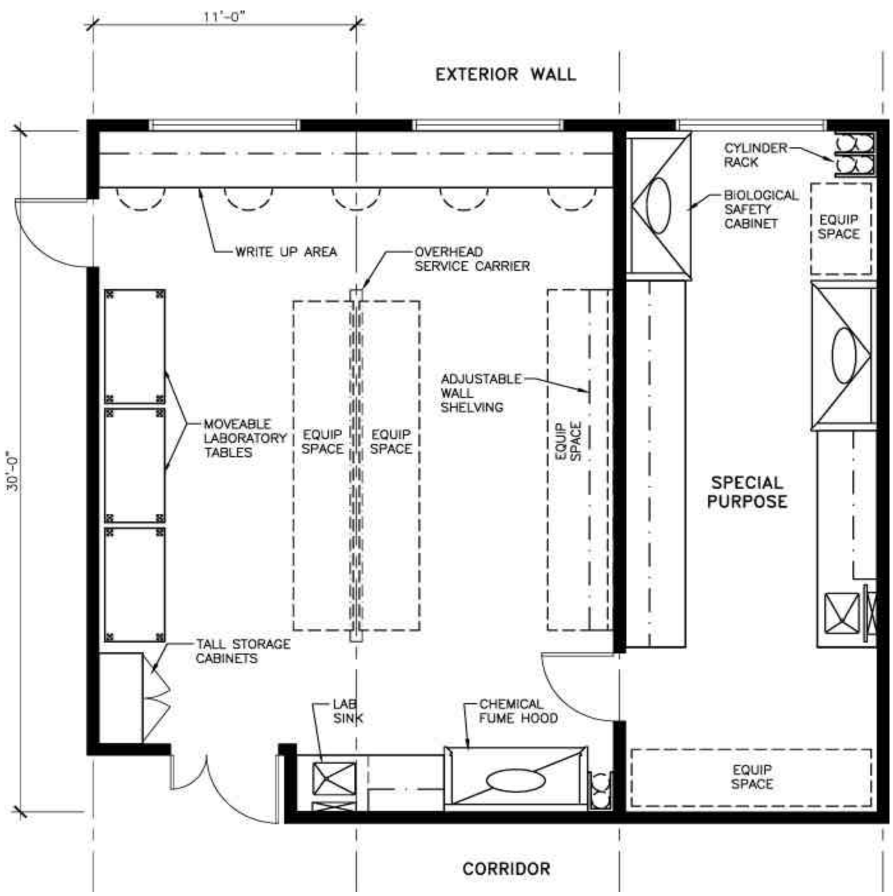
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

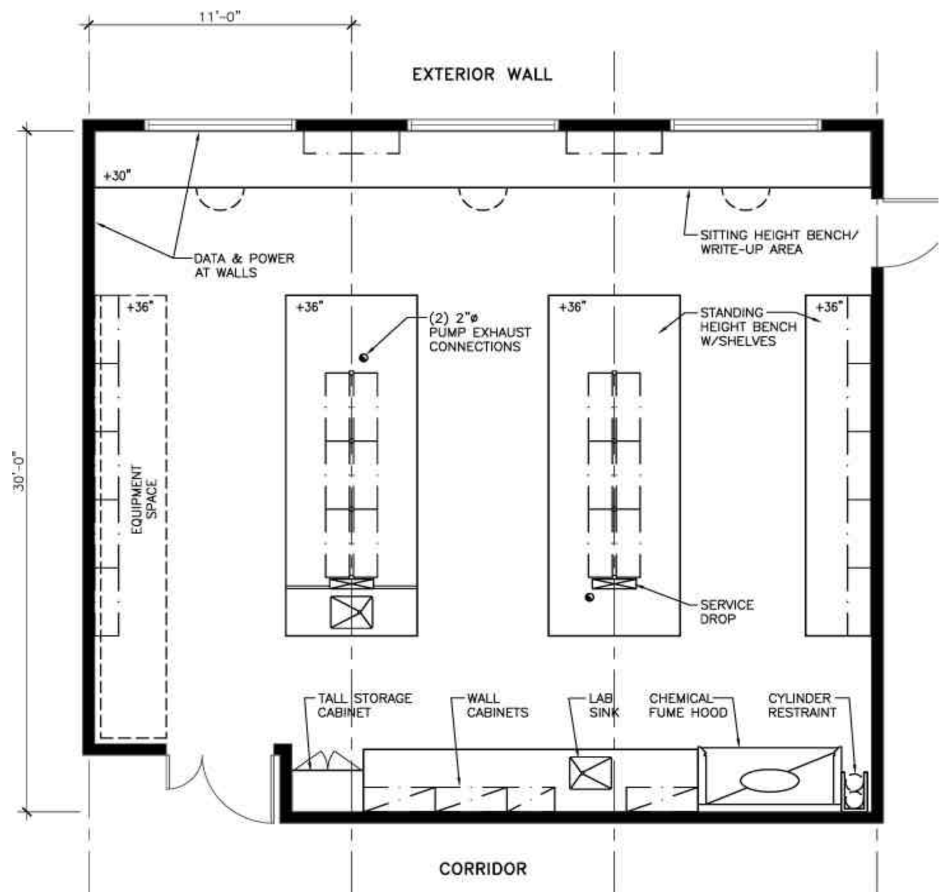
General Notes

1. Required in (1) Main Research Lab.
2. Required in some configurations. Assume (6) in Programming.

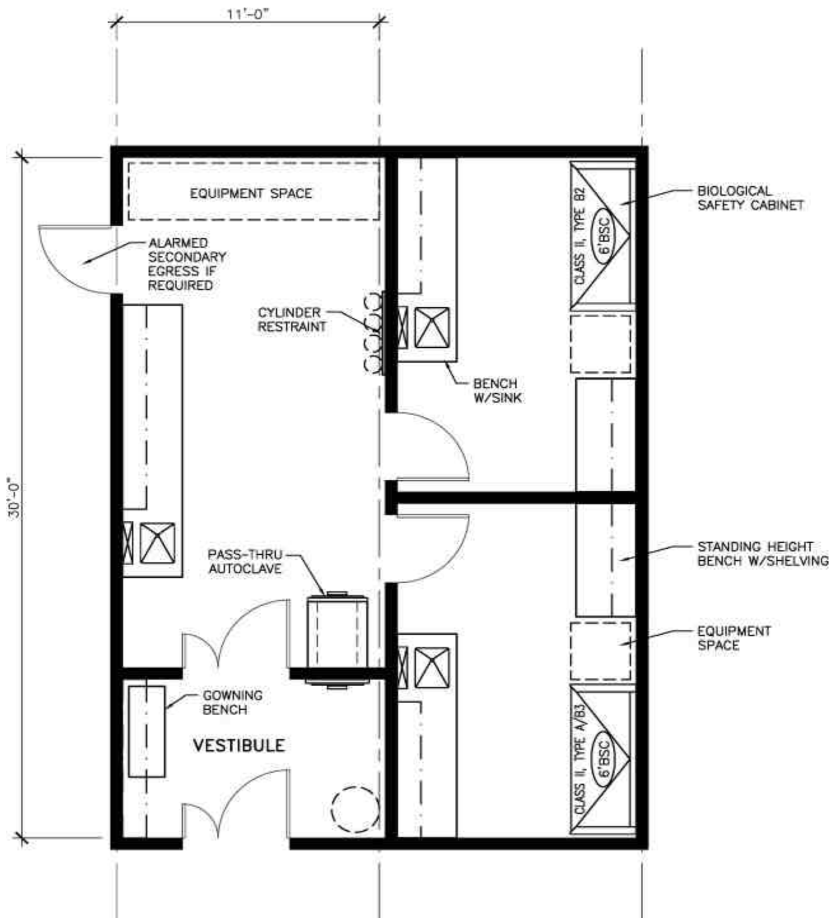
C1.02 *Room Code*
BIOENGINEERING *Department*
MAIN RESEARCH LAB (OPTION 'B') *Space Name*
990 ASF *Assignable Area*



Room Code **C1.02**
Department **BIOENGINEERING**
Space Name **MAIN RESEARCH LAB (OPTION 'C')**
Assignable Area **990 ASF**



C2.01 *Room Code*
BIOENGINEERING *Department*
BSL-3 *Space Name*
660 ASF *Assignable Area*



General Notes

Room Code	**C2.01**
Department	**BIOENGINEERING**
Space Name	**BSL-3**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	●

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	●
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●(1)
Noise Producing	

PLUMBING

Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	●
Safety Shower/Eyewash (SS)	●
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	●
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	●
Radioisotope Storage	
Chemical Storage	●

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

Incubator	●
Refrigerator	●
Microscope	●

General Notes

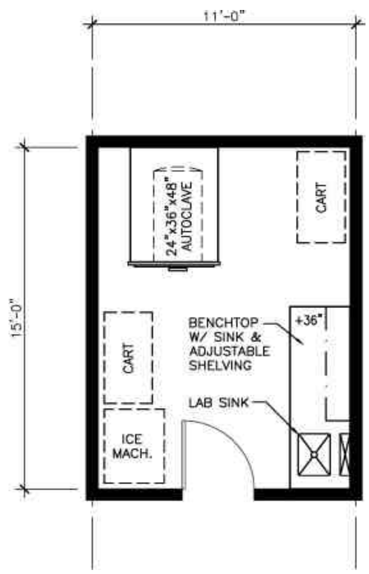
1. Autoclave.

C2.02 — *Room Code*

BIOENGINEERING — *Department*

AUTOCLAVE / ICE MACHINE — *Space Name*

165 ASF — *Assignable Area*



General Notes

Room Code	**C2.02**
Department	**BIOENGINEERING**
Space Name	**AUTOCLAVE / ICE MACHINE**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	●
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	●(1)
Noise Producing	●

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	●
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	●
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	
Data	
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	●
Gyp Board, Paint	
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	
Gyp Board, Epoxy Paint	●
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

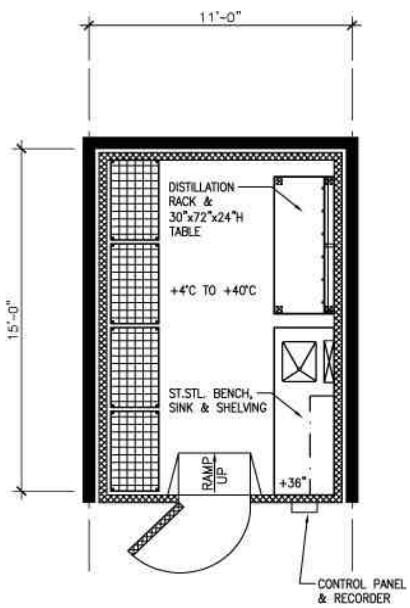
OWNER-FURNISHED EQUIPMENT

Ice Machine	●

General Notes

1. Autoclave.

C2.03 — *Room Code*
BIOENGINEERING — *Department*
ENVIRONMENTAL ROOM — *Space Name*
165 ASF — *Assignable Area*



General Notes

Room Code	**C2.03**
Department	**BIOENGINEERING**
Space Name	**ENVIRONMENTAL ROOM**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	●
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	
40°-104° ± 2°F	●
Humidity	
50% ± 10%	●
Uncontrolled	
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	●
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

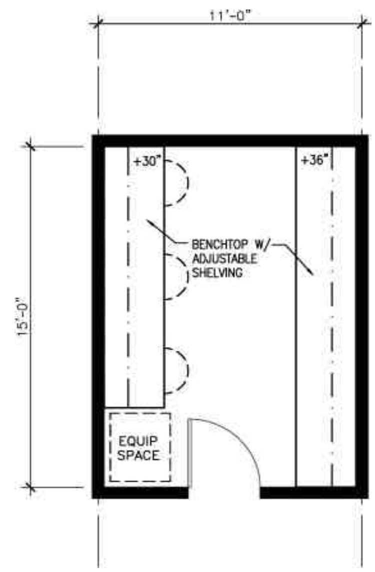
Floor	
VCT (Chemical Resistant)	
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	●
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other (Insulated panels)	●
Base	
4" Vinyl	
Integral w/floor	
Ceiling	
Open	●
Acoustic Tile	
Gyp Board, Epoxy Paint	
Height	8'-0"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

General Notes

1. Remote Condenser Unit.

C2.04	*Room Code*
BIOENGINEERING	*Department*
MICROSCOPY	*Space Name*
165 ASF	*Assignable Area*



General Notes

Room Code	**C2.04**
Department	**BIOENGINEERING**
Space Name	**MICROSCOPY**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	●
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●(1)
Natural Daylight	

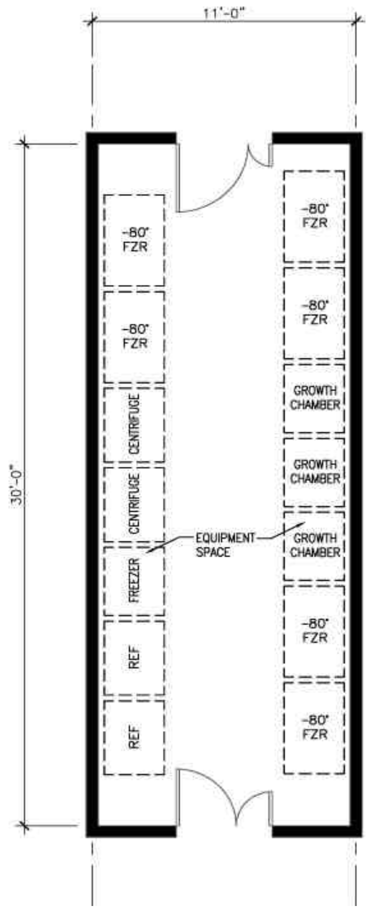
OWNER-FURNISHED EQUIPMENT

Microscope	●

General Notes

1. Light tight shutter.

C3.01	*Room Code*
BIOENGINEERING	*Department*
SHARED EQUIPMENT	*Space Name*
330 ASF	*Assignable Area*



General Notes

Room Code **C3.01**
Department **BIOENGINEERING**
Space Name **SHARED EQUIPMENT**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	●
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	●
6 Air Changes/Hour	
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	●
Heat Producing	●
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	●
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
75 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

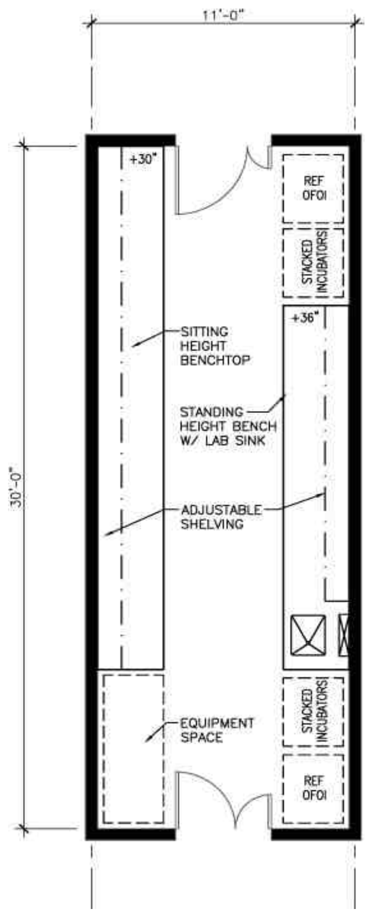
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

Freezer	●
Incubator	●
Shaker	●
Centrifuge	●

General Notes

C3.02	*Room Code*
BIOENGINEERING	*Department*
SHARED INSTRUMENTATION	*Space Name*
330 ASF	*Assignable Area*



General Notes

Room Code **C3.02**
Department **BIOENGINEERING**
Space Name **SHARED INSTRUMENTATION**
Occupancy

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	●
Recirculated Air	
Air Pressure Positive	
Air Pressure Negative	●
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	●
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	●
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	●
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	●
Nitrogen Gas (N_2)	●
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	●

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	●
UPS (OFOI)	
Phone	
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	●
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

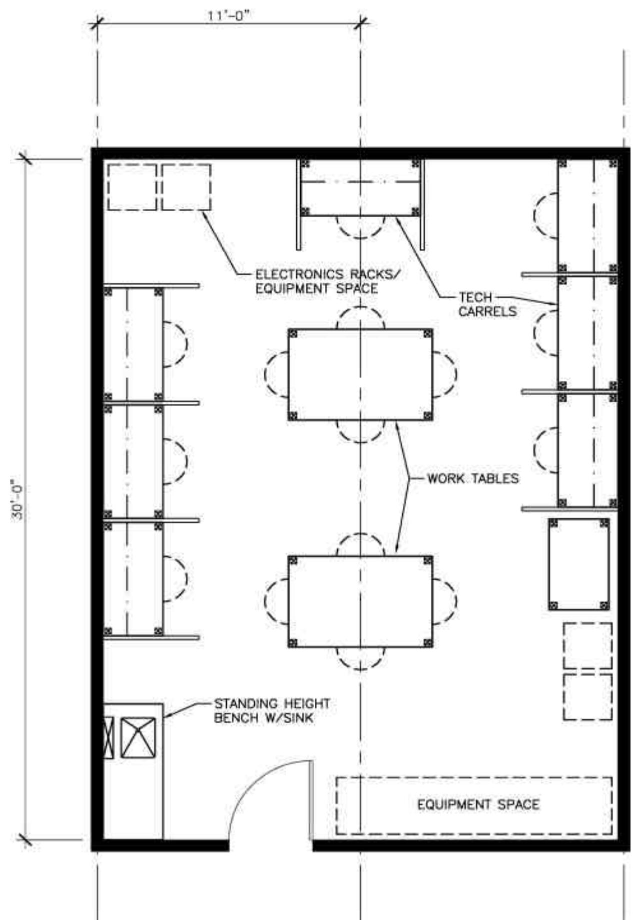
Floor	
VCT (Chemical Resistant)	●
VCT	
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	
Other	●
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

Refridgerator	●
Incubator	●

General Notes

D1.01	*Room Code*
INTERACTIVE ENGINEERING DESIGN	*Department*
RESEARCH LAB	*Space Name*
660 ASF	*Assignable Area*



General Notes

Room Code	**D1.01**
Department	**INTERACTIVE ENGINEERING DESIGN**
Space Name	**RESEARCH LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	●
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	●

MECHANICAL

Temperature	
72°F ± 2°F	●
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	●
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	●
100% Make-up Air	
Recirculated Air	●
Air Pressure Positive	
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	●
75 fc at bench/desk	
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	●
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Other	
Base	
4" Vinyl	●
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

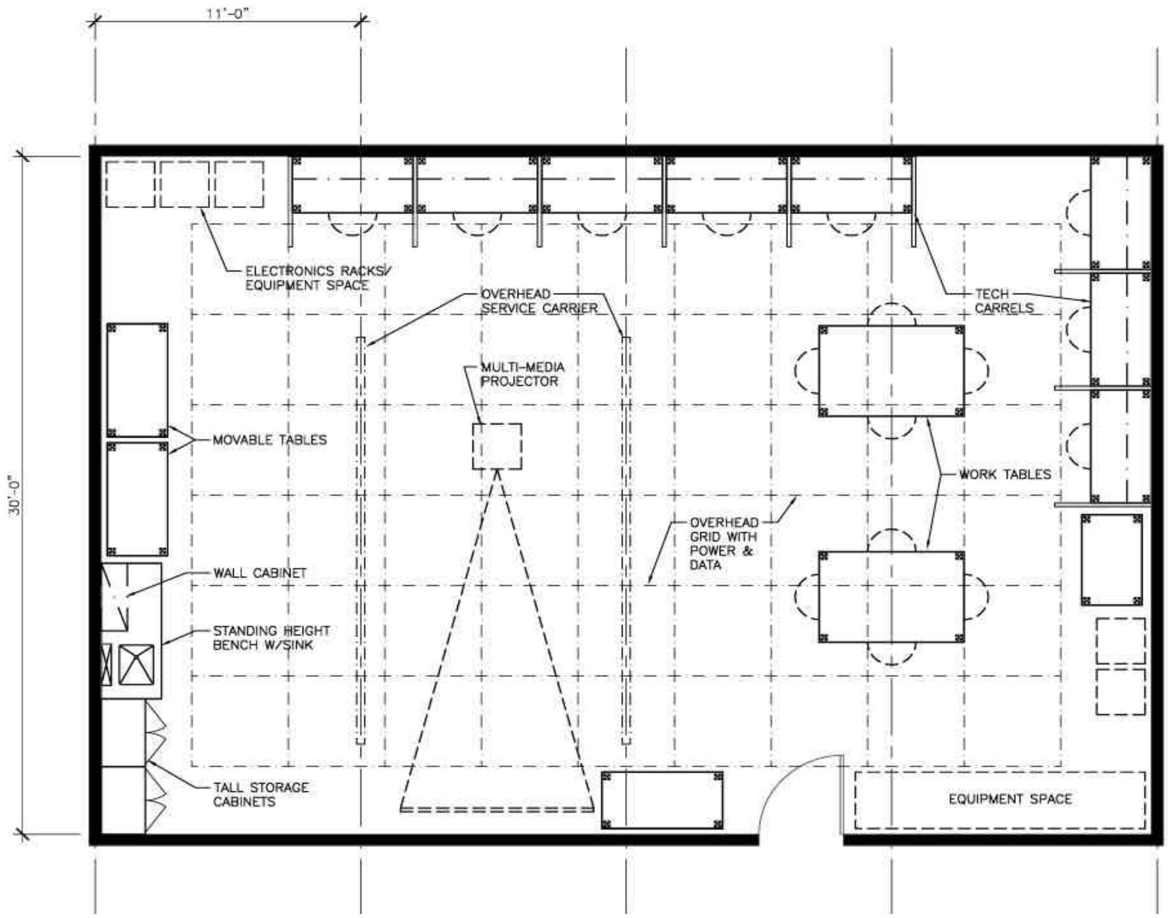
OWNER-FURNISHED EQUIPMENT

Computer	●
Printer	●
Server	●

General Notes

D1.02 *Room Code*
INTERACTIVE ENGINEERING DESIGN *Department*
DEMONSTRATION LAB *Space Name*
1,320 ASF *Assignable Area*

11'-0"



General Notes

Room Code	**D1.02**
Department	**INTERACTIVE ENGINEERING DESIGN**
Space Name	**DEMONSTRATION LAB**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	•
14 hours/day	
24 hours/day	
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	•

MECHANICAL

Temperature	
72°F ± 2°F	•
68°-75° ± 2°F	
Other	
Humidity	
50% ± 20%	
Uncontrolled	•
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	•
100% Make-up Air	
Recirculated Air	•
Air Pressure Positive	
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	•
Industrial Cold Water (ICW)	•
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	•
208V, 30A, 1 Phase	•
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	•
Data	•
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	•
75 fc at bench/desk	
Safe light	
Special Lighting	•
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	•
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	•
Other	
Base	
4" Vinyl	•
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	•
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	•
1'-6" x 7'	•
Light Tight Rotating Door	
Vision Panel	•
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

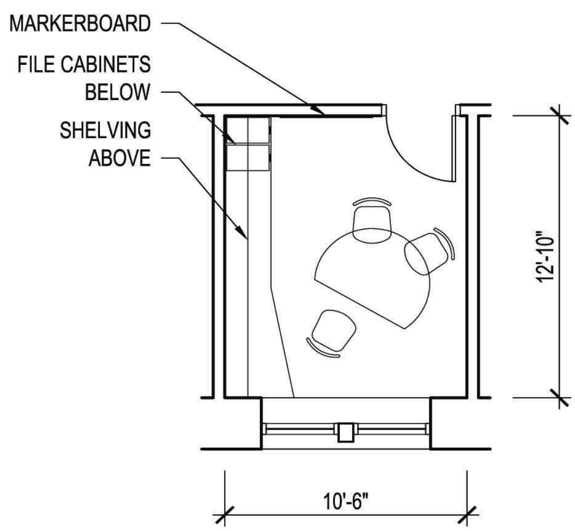
Computer	•
Printer	•
Server	•

General Notes

E 1.01 — *Room Code*

Faculty Office — *Room Name*

135 asf — *Assignable Area*



General Notes

Room Code **E 1.01**
Room Name **Faculty Office** Digital Learning

Assignable Area 135 asf

ARCHITECTURAL	
Occupants	1-4
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT	
PC	•
Printer	•
Copier	
Desk	•
Chairs	•
Table	
Shelving	•
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES	
Closet	
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL	
Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	•
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

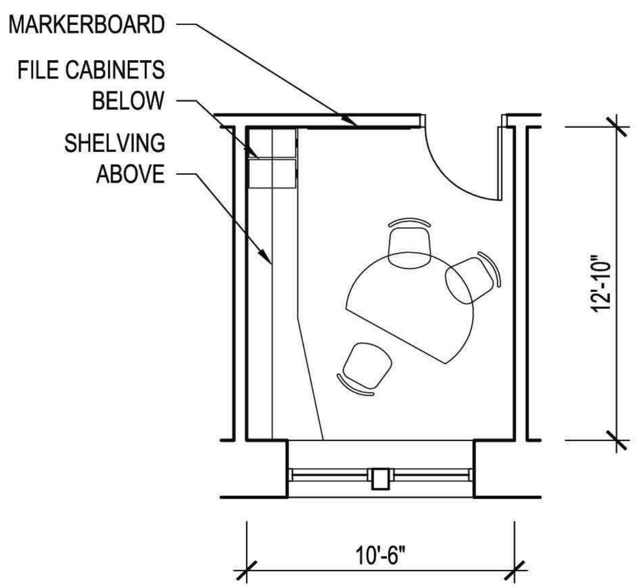
FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 1.02 — *Room Code*

Faculty Office — *Room Name*

135 asf — *Assignable Area*



General Notes

Room Code	**E 1.02**	
Room Name	**Faculty Office**	Bioengineering
Assignable Area	135 asf	

ARCHITECTURAL	
Occupants	1-4
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT	
PC	•
Printer	•
Copier	
Desk	•
Chairs	•
Table	
Shelving	•
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES	
Closet	
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL	
Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	•
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

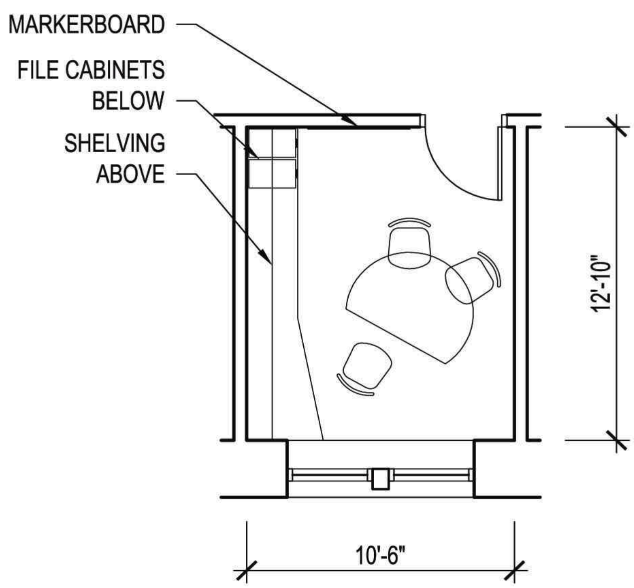
FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 1.03 *Room Code*

Faculty Office *Room Name*

135 asf *Assignable Area*



General Notes

Room Code **E 1.03**

Room Name **Faculty Office** Materials / Nanotechnology

Assignable Area 135 asf

ARCHITECTURAL

Occupants	1-4
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	●
Printer	●
Copier	
Desk	●
Chairs	●
Table	
Shelving	■
Other	

DATA / COMMUNICATIONS

Telephone	●
Data Port	●
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	
Tackboard	
Markerboard	●
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	■
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	●
Wireless System	●
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL

Heating	●
Cooling	●
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

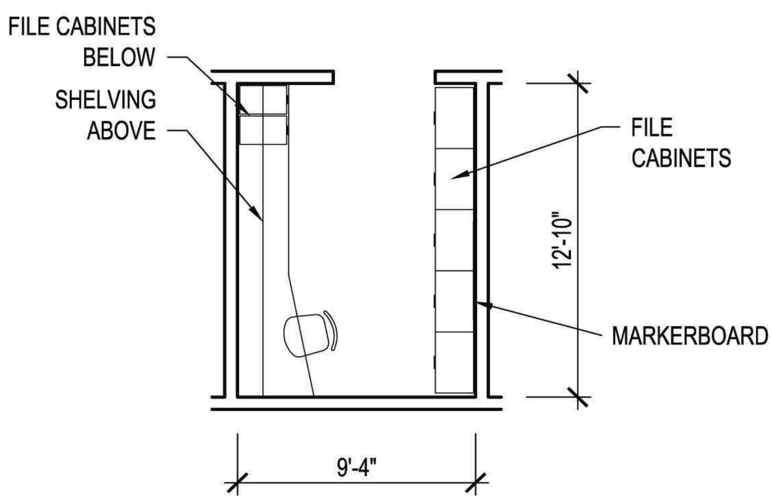
Sprinkler	●
Smoke/Heat Detection	●
Other	

General Notes

E 2.01 *Room Code*

Staff Office *Room Name*

120 asf *Assignable Area*



General Notes

Room Code	**E 2.01**
Room Name	**Staff Office**
Assignable Area	120 asf

ARCHITECTURAL

Occupants	3
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	•
Copier	
Desk	•
Chairs	•
Table	
Shelving	■
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	•
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

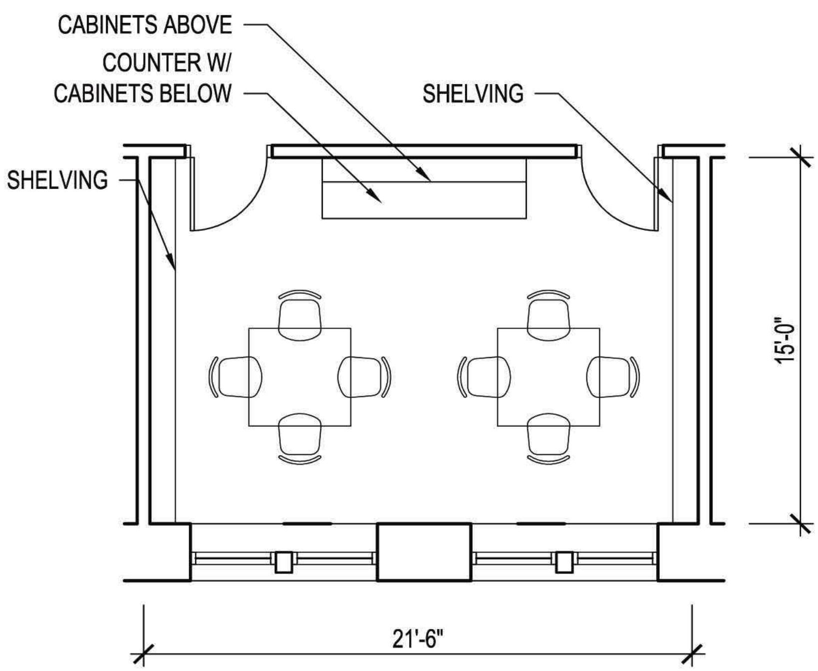
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 2.02 *Room Code*

Faculty / Graduate Student Lounge *Room Name*

330 asf *Assignable Area*



General Notes

Room Code	**E 2.02**
Room Name	**Faculty / Graduate Student Lounge**
Assignable Area	330 asf

ARCHITECTURAL

Occupants	3
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	•
Copier	
Desk	•
Chairs	•
Table	
Shelving	•
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	•
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

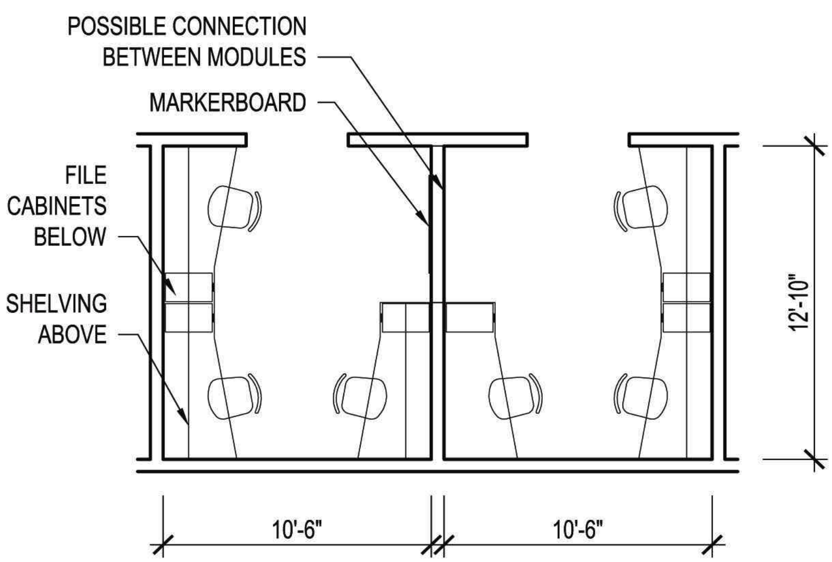
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 3.01 *Room Code*

Graduate Student Work Space *Room Name*

135 asf *Assignable Area*



General Notes

Room Code	**E 3.01**	
Room Name	**Graduate Student Work Space**	Digital Learning
Assignable Area	135 asf	3 per office module

ARCHITECTURAL		ELECTRICAL	
Occupants	3	Lighting Type	fluor.
Floor	carpet	Lighting Level	50 fc
Base	vinyl	Task Lighting	•
Wall	gwb	Zoned Lighting	oc.sensor
Ceiling	AT	Duplex Outlets	8
Doors	wd/vision	Service Outlets	
Windows	shades	Wiremold	
Other		Data Outlet	
		Fiber	
OWNER-FURNISHED EQUIPMENT		Ethernet / copper	•
PC	•	Wireless System	•
Printer	•	Dedicated Power	
Copier		Surge Protection	
Desk	•	Emergency Power	
Chairs	•	Clock	
Table		Security	
Shelving		Surveillance	
Other		Other	

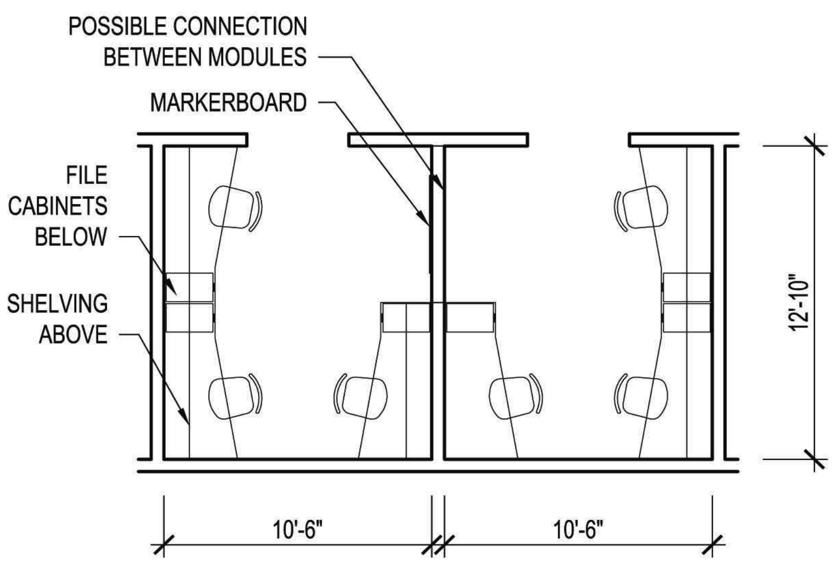
DATA / COMMUNICATIONS		MECHANICAL	
Telephone	•	Heating	•
Data Port	•	Cooling	•
Other		Temperature Range	68-74
		Humidity Control	
AUDIO / VISUAL		Exhaust	
Projector		Relative Pressure	
Camera		Other	
Microphones			
Podium / Controls		**PLUMBING**	
		Kitchenette	
SPECIALITIES		Sink	
Closet		WC	
Tackboard			
Markerboard	•	**FIRE PROTECTION**	
Chalkboard		Sprinkler	•
Projection Screen		Smoke/Heat Detection	•
Built-in Casework		Other	

General Notes

E 3.02 *Room Code*

Graduate Student Work Space *Room Name*

135 asf *Assignable Area*



General Notes

Room Code	**E 3.02**		
Room Name	**Graduate Student Work Space**	Bioengineering	
Assignable Area	135 asf	3 per office module	

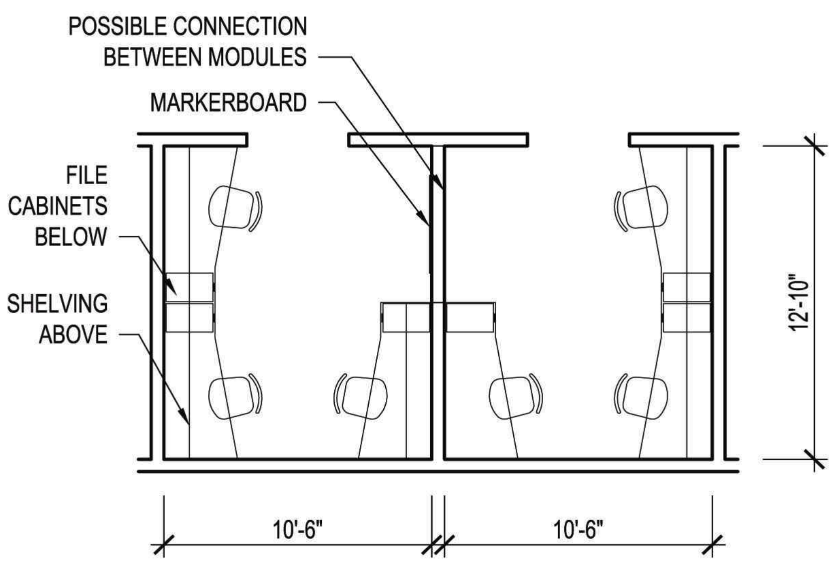
ARCHITECTURAL		*ELECTRICAL*	
Occupants	3	Lighting Type	fluor.
Floor	carpet	Lighting Level	50 fc
Base	vinyl	Task Lighting	•
Wall	gwb	Zoned Lighting	oc.sensor
Ceiling	AT	Duplex Outlets	8
Doors	wd/vision	Service Outlets	
Windows	shades	Wiremold	
Other		Data Outlet	
		Fiber	
OWNER-FURNISHED EQUIPMENT		Ethernet / copper	•
PC	•	Wireless System	•
Printer	•	Dedicated Power	
Copier		Surge Protection	
Desk	•	Emergency Power	
Chairs	•	Clock	
Table		Security	
Shelving	•	Surveillance	
Other		Other	
DATA / COMMUNICATIONS		*MECHANICAL*	
Telephone	•	Heating	•
Data Port	•	Cooling	•
Other		Temperature Range	68-74
		Humidity Control	
AUDIO / VISUAL		Exhaust	
Projector		Relative Pressure	
Camera		Other	
Microphones			
Podium / Controls		*PLUMBING*	
		Kitchenette	
SPECIALITIES		Sink	
Closet		WC	
Tackboard			
Markerboard	•	*FIRE PROTECTION*	
Chalkboard		Sprinkler	•
Projection Screen		Smoke/Heat Detection	•
Built-in Casework		Other	

General Notes

E 3.03 *Room Code*

Graduate Student Work Space *Room Name*

135 asf *Assignable Area*



General Notes

Room Code	**E 3.03**	
Room Name	**Graduate Student Work Space**	Materials / Nanotechnology
Assignable Area	135 asf	3 per office module

ARCHITECTURAL		ELECTRICAL	
Occupants	3	Lighting Type	fluor.
Floor	carpet	Lighting Level	50 fc
Base	vinyl	Task Lighting	•
Wall	gwb	Zoned Lighting	oc.sensor
Ceiling	AT	Duplex Outlets	8
Doors	wd/vision	Service Outlets	
Windows	shades	Wiremold	
Other		Data Outlet	
		Fiber	
OWNER-FURNISHED EQUIPMENT		Ethernet / copper	•
PC	•	Wireless System	•
Printer	•	Dedicated Power	
Copier		Surge Protection	
Desk	•	Emergency Power	
Chairs	•	Clock	
Table		Security	
Shelving	•	Surveillance	
Other		Other	

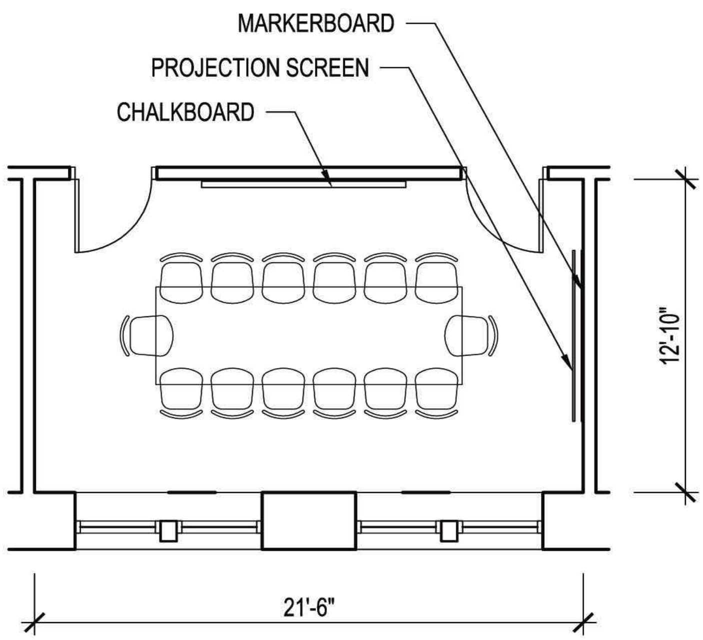
DATA / COMMUNICATIONS		MECHANICAL	
Telephone	•	Heating	•
Data Port	•	Cooling	•
Other		Temperature Range	68-74
		Humidity Control	
AUDIO / VISUAL		Exhaust	
Projector		Relative Pressure	
Camera		Other	
Microphones			
Podium / Controls		**PLUMBING**	
		Kitchenette	
SPECIALITIES		Sink	
Closet		WC	
Tackboard			
Markerboard	•	**FIRE PROTECTION**	
Chalkboard		Sprinkler	•
Projection Screen		Smoke/Heat Detection	•
Built-in Casework		Other	

General Notes

E 4.01 *Room Code*

Conference Room *Room Name*

135 asf *Assignable Area*



General Notes

Room Code	**E 4.01**
Room Name	**Conference Room**
Assignable Area	135 asf

ARCHITECTURAL

Occupants	12-16
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	AT/gwb
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	•
Copier	
Desk	•
Chairs	•
Table	
Shelving	□
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	
Tackboard	•
Markerboard	•
Chalkboard	•
Projection Screen	•
Built-in Casework	

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50fc
Task Lighting	
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

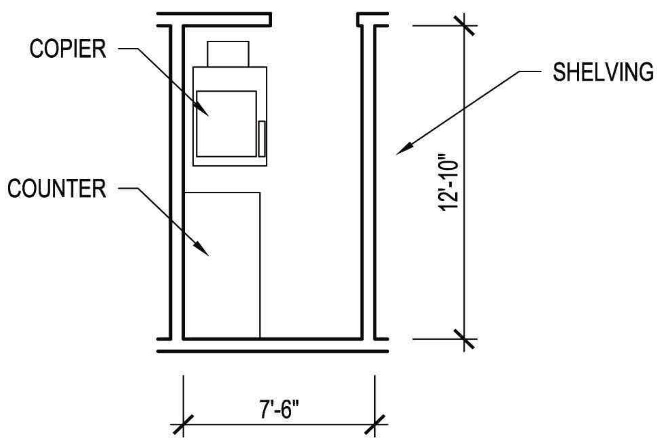
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 4.02 *Room Code*

Work Room *Room Name*

90 asf *Assignable Area*



General Notes

Room Code **E 4.02**
Room Name **Work Room**

Assignable Area 90 asf

ARCHITECTURAL	
Occupants	4
Floor	vct
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wood
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT	
PC	•
Printer	
Copier	
Desk	
Chairs	•
Counters	•
Shelving	•
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES	
Closet	
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	

ELECTRICAL	
Lighting Type	fluor.
Lighting Level	50fc
Task Lighting	
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	
Security	
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

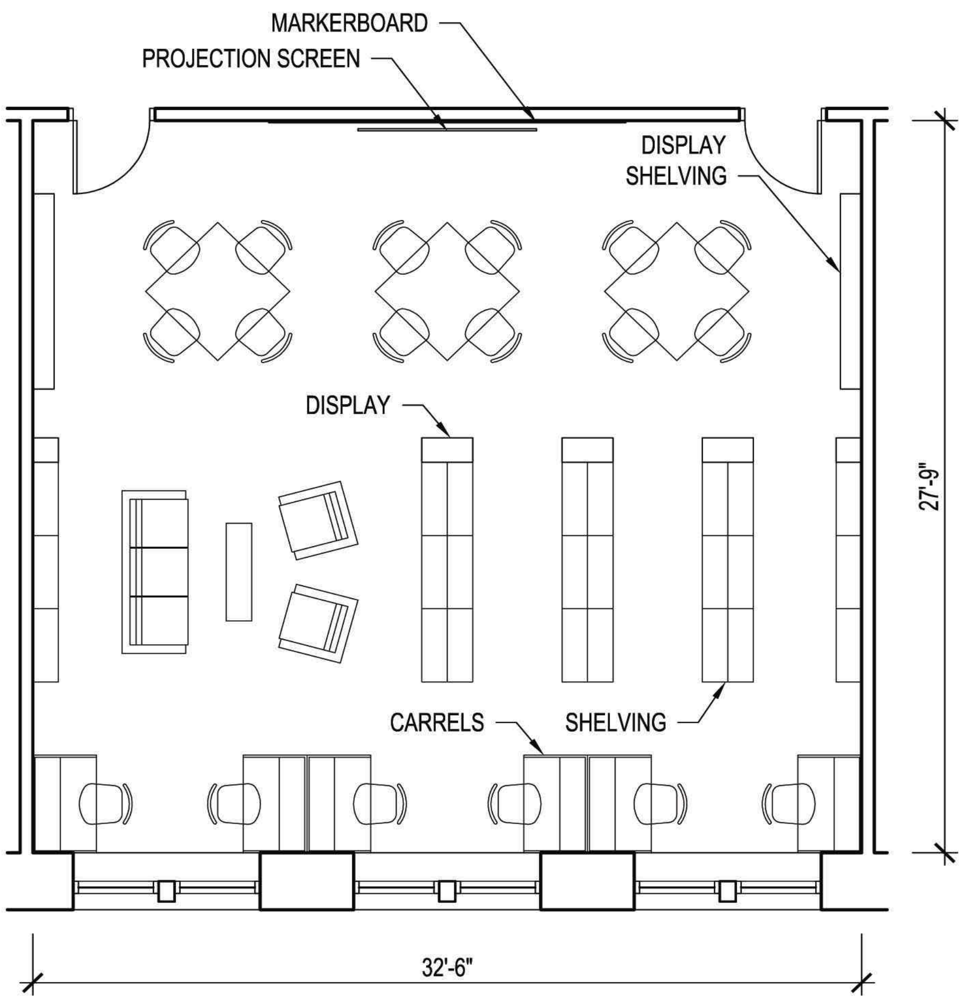
General Notes

E 4.03
Colloquiem Library

Room Code
Room Name

990 asf

Assignable Area



General Notes

Room Code **E 4.03**
Room Name **Colloquiem Library**

Assignable Area 990 asf

ARCHITECTURAL

Occupants	30-40
Floor	carpet
Base	wood
Wall	gwb
Ceiling	AT/gwb
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	•
Copier	•
Desk	•
Chairs	•
Table	•
Shelving	•
Lounge furniture	•

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	•
Tackboard	•
Markerboard	•
Chalkboard	•
Projection Screen	•
Built-in Casework	•

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50fc
Task Lighting	
Zoned Lighting	oc.sensor
Duplex Outlets	8
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	•
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	•
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

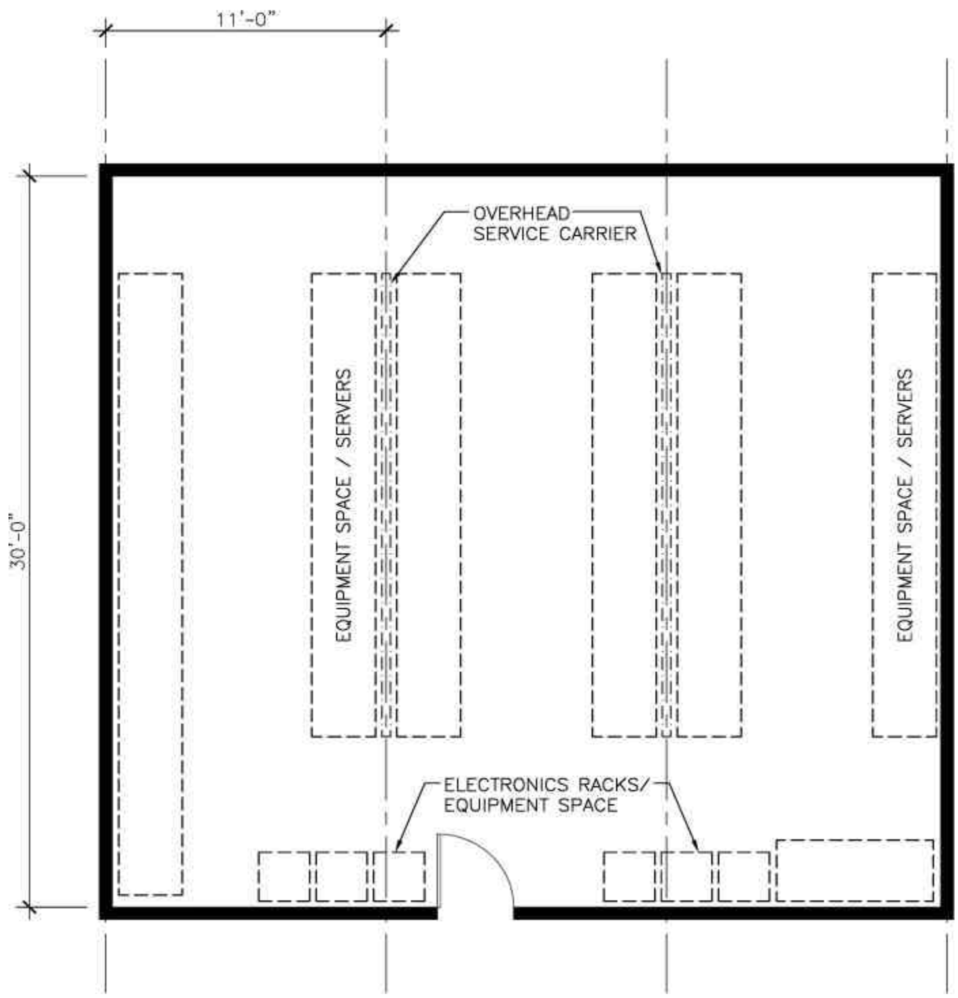
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

E 4.04 *Room Code*

Computational Research Support *Room Name*

990 asf *Assignable Area*



General Notes

Room Code	**E4.04**
Department	**OFFICES AND ACADEMIC SUPPORT**
Space Name	**COMPUTATIONAL RESEARCH SUPPORT**
Occupancy	

UTILIZATION

Hours of Use	
8 hours/day	
14 hours/day	
24 hours/day	•
Hours of Operation	
8 hours/day	
14 hours/day	
24 hours/day	•

MECHANICAL

Temperature	
72°F ± 2°F	
68°-75° ± 2°F	•
Other	
Humidity	
50% ± 20%	
Uncontrolled	•
15 Air Changes/Hour	
10 Air Changes/Hour	
6 Air Changes/Hour	•
100% Make-up Air	
Recirculated Air	•
Air Pressure Positive	
Air Pressure Negative	
Air Filtration/Supply	
Air Filtration/Exhaust	

HOODS

Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Other (Pump exhaust)	

LABORATORY EQUIPMENT

Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	•
Noise Producing	

PLUMBING

Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	
Industrial Cold Water (ICW)	
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (PW)	
Cooling Water (CWS/R)	
Steam/Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW, Potable Water)	

ELECTRICAL

110V, 20A, 1 Phase	•
208V, 30A, 1 Phase	•
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	•
UPS (OFOI)	
Phone	
Data	•
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
75 fc at bench/desk	•
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS

Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL

Floor	
VCT (Chemical Resistant)	
VCT	•
Welded Seam Sheet Vinyl	
Epoxy	
Carpet	
Sealed Concrete	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	•
Other	
Base	
4" Vinyl	•
Integral w/floor	
Ceiling	
Open	
Acoustic Tile	•
Gyp Board, Epoxy Paint	
Height	9'-6"
Doors	
3'-6" x 7'	
3' x 7'	•
1'-6" x 7'	•
Light Tight Rotating Door	
Vision Panel	
Natural Daylight	

OWNER-FURNISHED EQUIPMENT

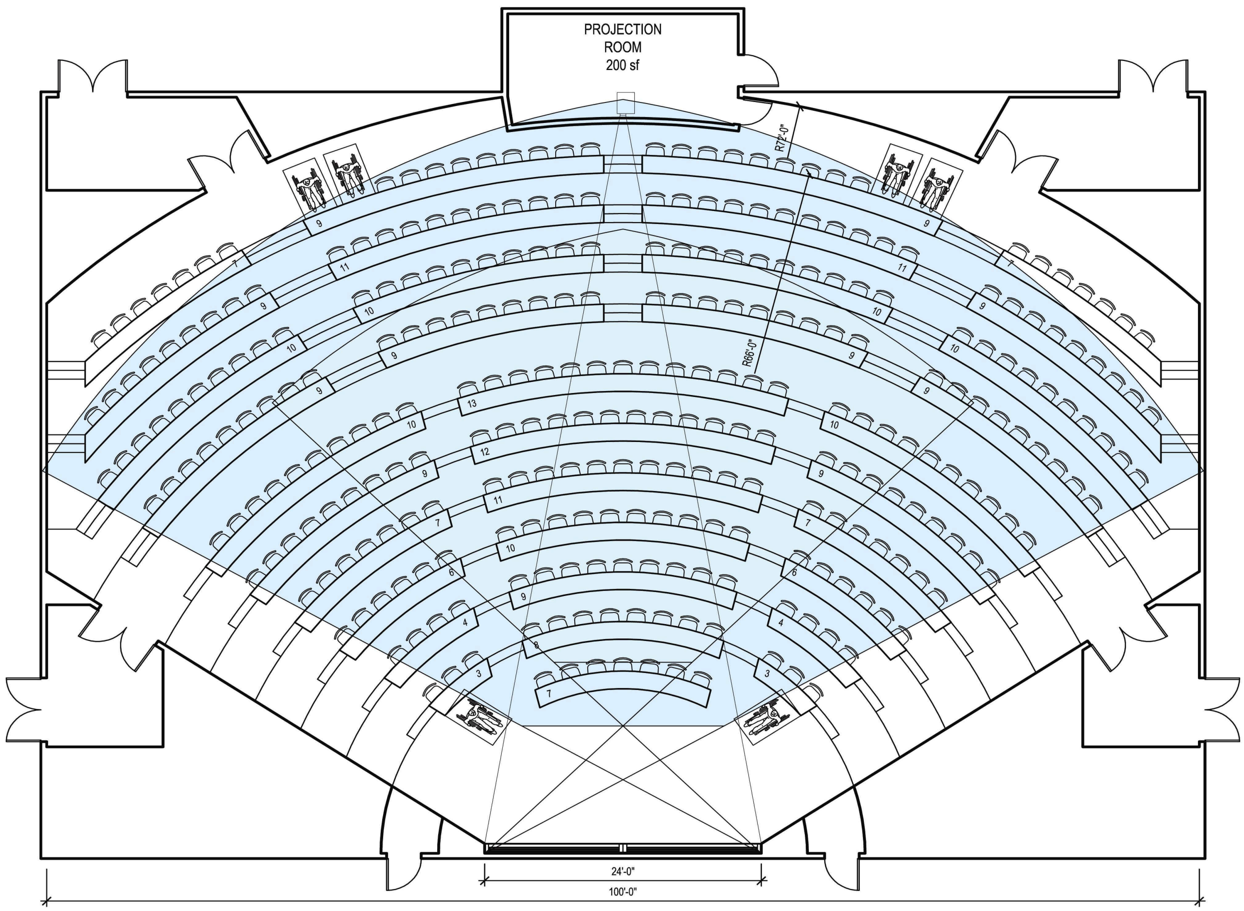
Computer	•
Servers	•

General Notes

F 1.01 *Room Code*

Demonstration Auditorium *Room Name*

7,500 asf *Assignable Area*



300 STATION CLASSROOM
7,500 sf @ 25 asf/station

296 STATIONS, 6 HC STATIONS
6,065 SF
20" DESK, 3'-0" CLEAR BTWN. DESKS
2'-3" BTWN. STATIONS
24' WIDE x 12' HIGH SCREEN

General Notes

Room Code **F 1.01**

Room Name **Demonstration Auditorium** 300 seats

Assignable Area 7,500 asf

ARCHITECTURAL	
Occupants	300
Floor	carpet
Base	wood
Wall	panels
Ceiling	acoustic
Doors	wood
Windows	na
Other	

OWNER-FURNISHED EQUIPMENT	
PC	
Printer	
Copier	
Desk	wood/p.lam
Chairs	swing arm
Table	
Shelving	
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	•
Camera	•
Microphones	•
Podium / Controls	•

SPECIALITIES	
Closet	•
Tackboard	•
Markerboard	•
Chalkboard	
Projection Screen	•
Built-in Casework	•

ELECTRICAL	
Lighting Type	varies
Lighting Level	varies
Task Lighting	stage
Zoned Lighting	•
Duplex Outlets	320
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	•
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	•
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

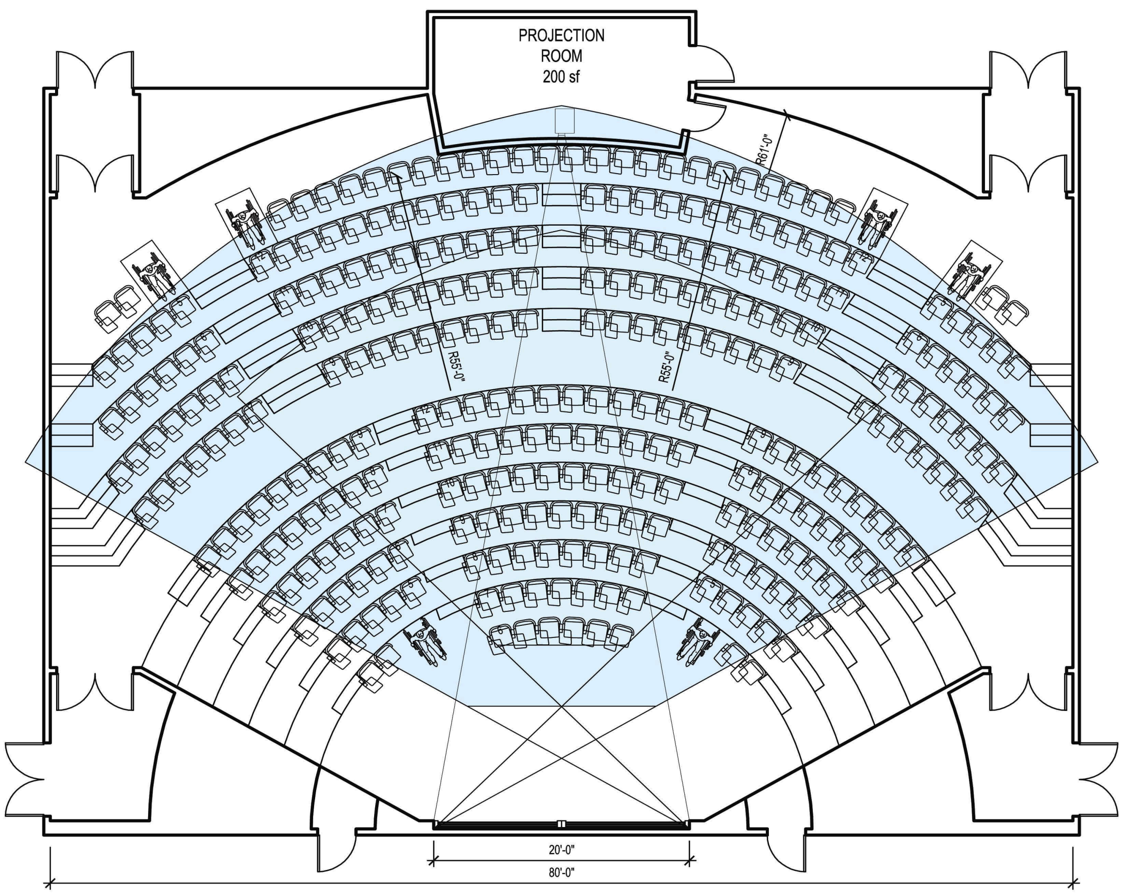
FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

F 1.02 *Room Code*

Lecture Auditorium *Room Name*

4,800 asf *Assignable Area*



300 STATION CLASSROOM
4,800 sf @ 16 asf/station

292 STATIONS, 6 HC STATIONS
4,315 sf
3'-2" WIDE TIERS-LOWER
3'-5" WIDE TIERS-UPPER
2'-3" BTWN. STATIONS
20' WIDE x 10' HIGH SCREEN

General Notes

Room Code **F 1.02**

Room Name **Lecture Auditorium** 300 seats

Assignable Area 4,800 asf

ARCHITECTURAL

Occupants	300
Floor	carpet
Base	wood
Wall	panels
Ceiling	acoustic
Doors	wood
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	
Printer	
Copier	
Desk	
Chairs	tablet arm
Table	
Shelving	
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	•
Camera	•
Microphones	•
Podium / Controls	•

SPECIALITIES

Closet	•
Tackboard	•
Markerboard	•
Chalkboard	•
Projection Screen	•
Built-in Casework	•

ELECTRICAL

Lighting Type	varies
Lighting Level	varies
Task Lighting	in front
Zoned Lighting	•
Duplex Outlets	315
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	•
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	•
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

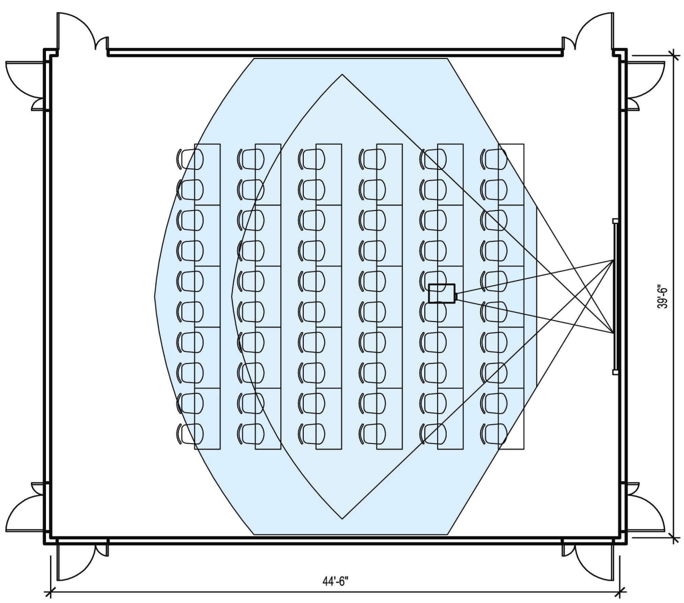
Kitchenette	
Sink	
WC	

FIRE PROTECTION

Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

F 1.03	*Room Code*
Medium Classroom	*Room Name*
1,800 asf	*Assignable Area*



60 STATION CLASSROOM
1,800 sf @ 30 asf / station

60 STATIONS, 0 HC STATIONS
1,800 sf
2'-0" DESK, 2'-9" CLEAR BTWN. DESKS
2'-3" BTWN. STATIONS
6' WIDE x 6' HIGH SCREEN

General Notes

Room Code	**F 1.03**
Room Name	**Medium Classroom** 60 seats
Assignable Area	1,800 asf

ARCHITECTURAL	
Occupants	60-70
Floor	carpet
Base	vinyl
Wall	panels
Ceiling	acoustic
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT	
PC	•
Printer	
Copier	
Desk	
Chairs	•
Table	•
Shelving	
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	•
Camera	•
Microphones	•
Podium / Controls	•

SPECIALITIES	
Closet	•
Tackboard	•
Markerboard	•
Chalkboard	•
Projection Screen	•
Built-in Casework	•

ELECTRICAL	
Lighting Type	varies
Lighting Level	varies
Task Lighting	tbd
Zoned Lighting	•
Duplex Outlets	15
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	•
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

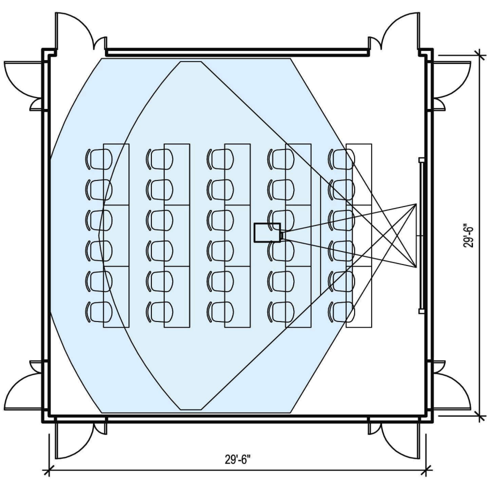
FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

F 1.04 *Room Code*

Small Classroom *Room Name*

900 asf *Assignable Area*



30 STATION CLASSROOM
900 sf @ 30 asf / station

30 STATIONS, 0 HC STATIONS
900 sf
2'-0" DESK, 2'-9" CLEAR BTWN. DESKS
2'-3" BTWN. STATIONS
5'-2" WIDE x 5' HIGH SCREEN

General Notes

Room Code	**F 1.04**
Room Name	**Small Classroom** 30 seats
Assignable Area	900 asf

ARCHITECTURAL

Occupants	30-40
Floor	carpet
Base	vinyl
Wall	gwb
Ceiling	acoustic
Doors	wd/vision
Windows	shades
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	
Copier	
Desk	
Chairs	•
Table	•
Shelving	
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	•
Camera	
Microphones	
Podium / Controls	•

SPECIALITIES

Closet	•
Tackboard	•
Markerboard	•
Chalkboard	•
Projection Screen	•
Built-in Casework	

ELECTRICAL

Lighting Type	varies
Lighting Level	varies
Task Lighting	tbd
Zoned Lighting	•
Duplex Outlets	20
Service Outlets	•
Wiremold	
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	•
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

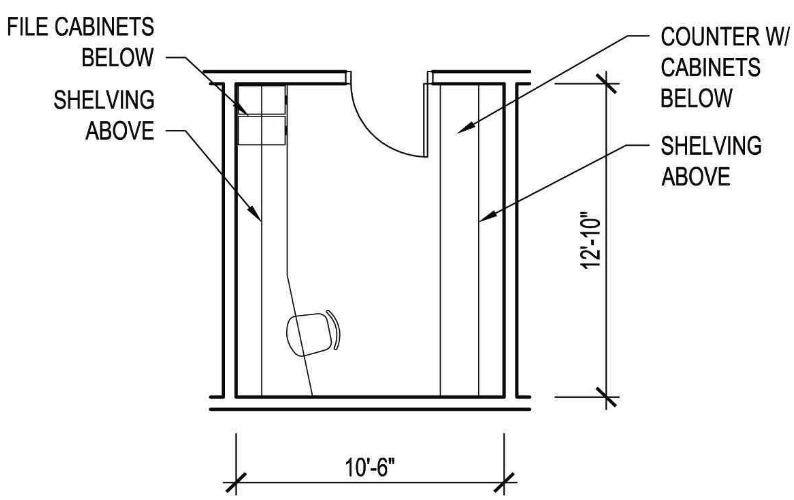
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

F 2.01 *Room Code*

Prep. /Storage *Room Name*

135 asf *Assignable Area*



General Notes

Room Code **F 2.01**
Room Name **Prep. /Storage**

Assignable Area 135 asf

ARCHITECTURAL	
Occupants	na
Floor	vct
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wood
Windows	na
Other	

OWNER-FURNISHED EQUIPMENT	
PC	
Printer	
Copier	
Desk	•
Chairs	•
Table	•
Shelving	•
Other	

DATA / COMMUNICATIONS	
Telephone	•
Data Port	•
Other	

AUDIO / VISUAL	
Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES	
Closet	
Tackboard	
Markerboard	
Chalkboard	
Projection Screen	
Built-in Casework	•

ELECTRICAL	
Lighting Type	fluor.
Lighting Level	40fc
Task Lighting	
Zoned Lighting	
Duplex Outlets	8
Service Outlets	•
Wiremold	possible
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	•
Security	•
Surveillance	
Other	

MECHANICAL	
Heating	•
Cooling	•
Temperature Range	
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

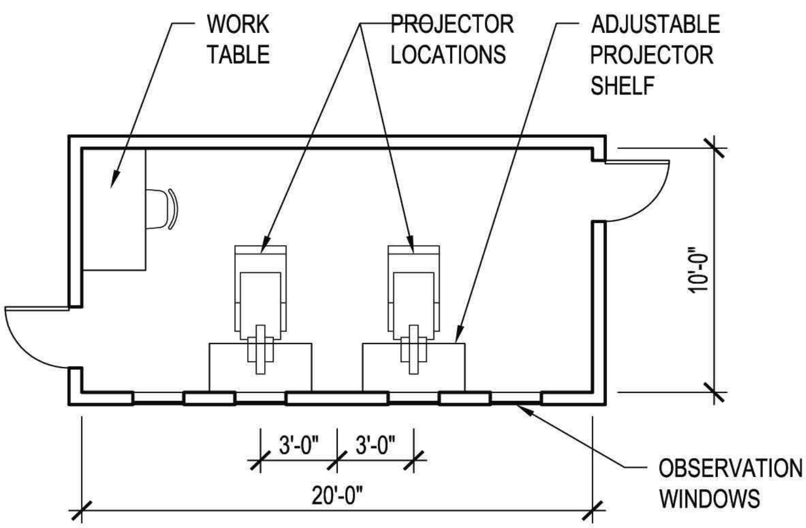
FIRE PROTECTION	
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

F 2.02 *Room Code*

Auditorium Control Room *Room Name*

200 asf *Assignable Area*



General Notes

Room Code **F 2.02**
Room Name **Auditorium Control Room**

Assignable Area 200 asf

ARCHITECTURAL	
Occupants	4-Feb
Floor	vct
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	wood
Windows	na
Other	

OWNER-FURNISHED EQUIPMENT	
PC	●
Printer	●
Copier	
Desk	●
Chairs	●
Table	●
Shelving	●
Other	

DATA / COMMUNICATIONS	
Telephone	●
Data Port	●
Other	

AUDIO / VISUAL	
Projector	●
Camera	
Microphones	
Control Systems	●

SPECIALITIES	
Closet	
Tackboard	
Markerboard	
Chalkboard	
Projection Screen	
Built-in Casework	●

ELECTRICAL	
Lighting Type	varies
Lighting Level	varies
Task Lighting	●
Zoned Lighting	●
Duplex Outlets	24
Service Outlets	●
Wiremold	
Data Outlet	
Fiber	●
Ethernet / copper	●
Wireless System	●
Dedicated Power	
Surge Protection	●
Emergency Power	
Clock	●
Security	●
Surveillance	
Other	

MECHANICAL	
Heating	●
Cooling	●
Temperature Range	68-74
Humidity Control	
Exhaust	
Relative Pressure	
Other	

PLUMBING	
Kitchenette	
Sink	
WC	

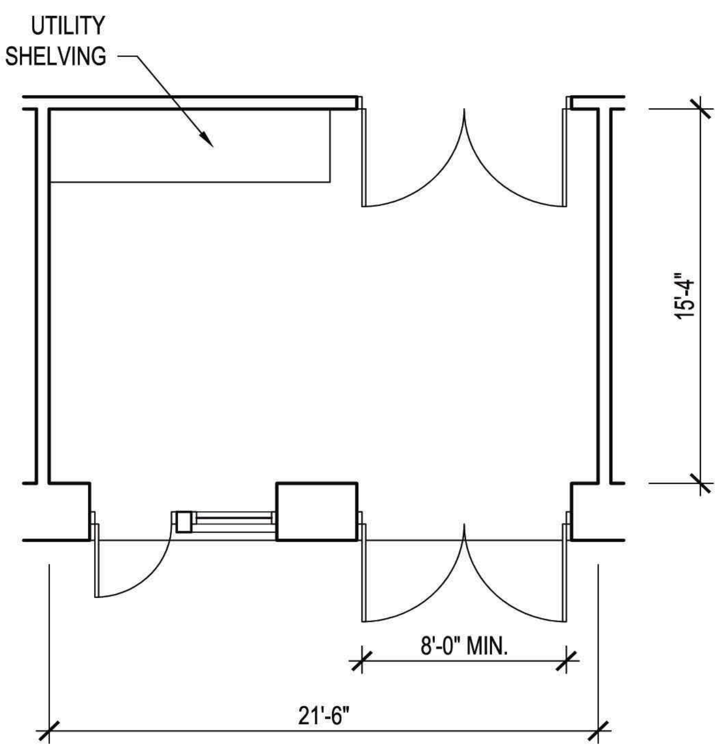
FIRE PROTECTION	
Sprinkler	●
Smoke/Heat Detection	●
Other	

General Notes

G 1.01 — *Room Code*

Shipping / Receiving — *Room Name*

330 asf — *Assignable Area*



General Notes

Room Code **G 1.01**
Room Name **Shipping / Receiving**

Assignable Area 330 asf

ARCHITECTURAL

Occupants	2-4
Floor	vct
Base	vinyl
Wall	gwb
Ceiling	AT
Doors	HM
Windows	
Other	

OWNER-FURNISHED EQUIPMENT

PC	•
Printer	•
Copier	•
Desk	•
Chairs	•
Table	•
Shelving	•
Other	

DATA / COMMUNICATIONS

Telephone	•
Data Port	•
Other	

AUDIO / VISUAL

Projector	
Camera	
Microphones	
Podium / Controls	

SPECIALITIES

Closet	•
Tackboard	
Markerboard	•
Chalkboard	
Projection Screen	
Built-in Casework	•

ELECTRICAL

Lighting Type	fluor.
Lighting Level	50 fc
Task Lighting	•
Zoned Lighting	•
Duplex Outlets	18
Service Outlets	•
Wiremold	possible
Data Outlet	
Fiber	
Ethernet / copper	•
Wireless System	•
Dedicated Power	
Surge Protection	
Emergency Power	
Clock	•
Security	•
Surveillance	•
Other	

MECHANICAL

Heating	•
Cooling	•
Temperature Range	68-74
Humidity Control	
Exhaust	•
Relative Pressure	
Other	

PLUMBING

Kitchenette	
Sink	
WC	

FIRE PROTECTION

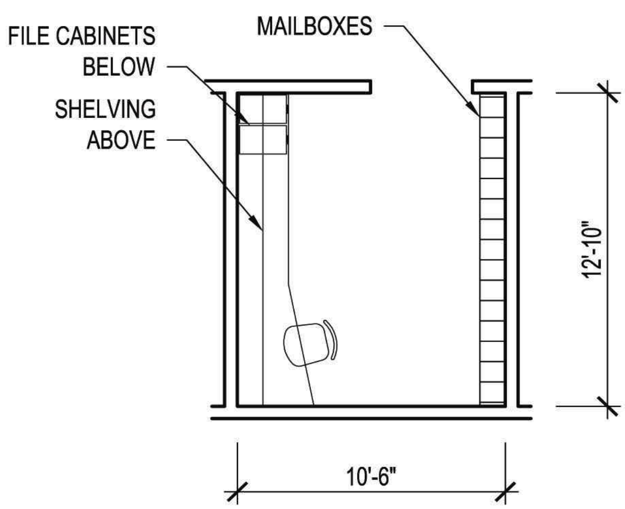
Sprinkler	•
Smoke/Heat Detection	•
Other	

General Notes

G 1.02 *Room Code*

Mailroom *Room Name*

135 asf *Assignable Area*



General Notes

Room Code **G 1.02**
Room Name **Mailroom**

Assignable Area 135 asf

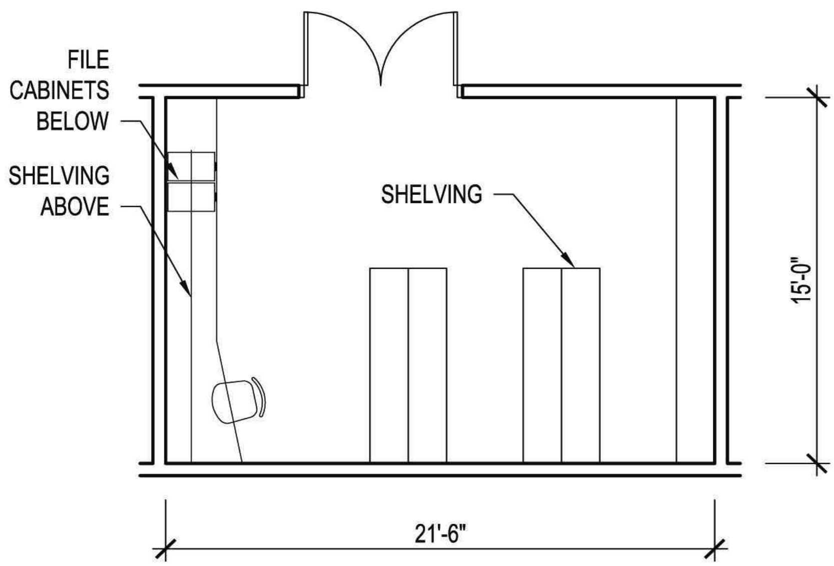
ARCHITECTURAL		ELECTRICAL	
Occupants	2-4	Lighting Type	fluor.
Floor	vct	Lighting Level	50 fc
Base	vinyl	Task Lighting	•
Wall	gwb	Zoned Lighting	
Ceiling	AT	Duplex Outlets	8
Doors	HM	Service Outlets	•
Windows		Wiremold	possible
Other		Data Outlet	
		Fiber	
OWNER-FURNISHED EQUIPMENT		Ethernet / copper	•
PC	•	Wireless System	•
Printer	•	Dedicated Power	
Copier		Surge Protection	
Desk		Emergency Power	
Chairs	•	Clock	•
Table	•	Security	•
Shelving	•	Surveillance	•
Other		Other	
DATA / COMMUNICATIONS		**MECHANICAL**	
Telephone	•	Heating	•
Data Port	•	Cooling	•
Other		Temperature Range	68-74
		Humidity Control	
AUDIO / VISUAL		Exhaust	•
Projector		Relative Pressure	
Camera		Other	
Microphones			
Podium / Controls		**PLUMBING**	
		Kitchenette	
SPECIALITIES		Sink	
Closet		WC	
Tackboard			
Markerboard	•	**FIRE PROTECTION**	
Chalkboard		Sprinkler	•
Projection Screen		Smoke/Heat Detection	•
Built-in Casework	•	Other	

General Notes

G 1.03 — *Room Code*

Storage — *Room Name*

135 asf — *Assignable Area*



General Notes

Room Code	**G 1.03**
Room Name	**Storage**
Assignable Area	135 asf

ARCHITECTURAL		*ELECTRICAL*	
Occupants	na	Lighting Type	fluor.
Floor	vct	Lighting Level	50 fc
Base	vinyl	Task Lighting	
Wall	gwb	Zoned Lighting	
Ceiling	AT	Duplex Outlets	
Doors	HM	Service Outlets	•
Windows	na	Wiremold	
Other		Data Outlet	
		Fiber	
OWNER-FURNISHED EQUIPMENT		Ethernet / copper	
PC		Wireless System	
Printer		Dedicated Power	
Copier		Surge Protection	
Desk		Emergency Power	
Chairs		Clock	
Table		Security	
Shelving	•	Surveillance	
Other		Other	
DATA / COMMUNICATIONS		*MECHANICAL*	
Telephone		Heating	•
Data Port		Cooling	
Other		Temperature Range	
		Humidity Control	
AUDIO / VISUAL		Exhaust	
Projector		Relative Pressure	
Camera		Other	
Microphones			
Podium / Controls		*PLUMBING*	
		Kitchenette	
SPECIALITIES		Sink	
Closet		WC	
Tackboard			
Markerboard		*FIRE PROTECTION*	
Chalkboard		Sprinkler	•
Projection Screen		Smoke/Heat Detection	•
Built-in Casework		Other	

General Notes

Appendix II

Meeting Notes

Contents

Chronology of Meetings

DPP BUILDING COMMITTEE MEETING #1 **KICK-OFF MEETING**

Project: UCR Materials Science & Engineering

Date: December 2, 2002

Time: 3:00 PM – 5:00 PM

Place: College Building North, Room 205

Present:

Gretchen Bolar	UCR-APB
Tim Ralston	UCR-Capital Planning
Tony Cook	UCR-Capital Planning
Ted Chiu	UCR-ODC
Dan Johnson	UCR-ODC
Satish K. Tripathi	UCR-BCOE
Steve Angle	UCR-CNAS
Dennis Rice	UCR-COE
Cindy Giorgio	UCR-CNAS
Mark Matsumoto	UCR-BCOE
Yat-Sun Poon	UCR-CNAS
Ashok Mulchandani	UCR-Chemical & Environmental Engineering
Chris Reed	UCR-Chemistry-CNAS
Harry Tom	UCR-Physics CNAS
Mart Molle	UCR-Engineering
Beverly McNeil	UCR-CNAS
Michael Ross	HGA
Fiske Crowell	KMW
Rayford Law	KMW
John Weinman	RFD
Tom Mistretta	RFD

Distribution: Those present, Luis Carrazana, Crystal Gillespie, Robert Clare, Gavriel Kullman, Liam Corley, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney, Loring Wou

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. PROGRAM

A. Introduction

The meeting commenced with general comments by Tim Ralston and the sequential introduction of all meeting attendees around the room.

1. Background

Tim Ralston offered a general background description for the project, highlighting the following:

a. The project was initiated through the pursuit of a new Center for Nanoscience and Engineering. Recent developments represent a larger initiative.

b. The original schedule for the (P) Phase of the project (Design and Construction Documents) was originally set for '05-'06. It has been advance one year to '04-'05.

c. Similarly, the DPP has advanced one year to a scheduled completion of Spring, 2003, with a subsequent PPG document available for submission to OP in late Spring.

d. This project is the largest current proposal in the State Plan for UCR.

e. The current project budget is $51.7 million. This budget has been set as a placeholder until the DPP is completed.

f. The project represents the first effort to combine the academic initiatives and programs of two Colleges on the campus.

2. Brief Presentation of HGA / KMW Team

A short overview of the design team's organization, team members and credentials was provided by Michael Ross, highlighting:

a. The team organization was illustrated by Michael Ross through the use of the organization chart presented at the interview.

b. The process anticipated for the DPP effort was described in summary terms by Fiske Crowell.

c. Rayford Law emphasized that the focus of this first meeting was to listen to the expressed needs and interests of the Building Committee.

3. Current Program Status

Tim Ralston provided a summary of the quantitative program expectations.

a. The total area of the building is projected at 130,000 gsf

b. This projection relates to an estimated assignable area of 77,000 asf.

c. The area projections include approximately 20,000 asf of classroom space.

d. There will be a combination of wet and dry laboratory space.

B. Dean's Vision

The next section of the meeting provided the Dean's with an opportunity to express the specific project goals and objectives of the Colleges.

1. Dean Satish Tripathi – College of Engineering

a. The current project is notably larger than the original nanoscience initiative.

b. The College's vision should be set "down the road" to identify the emerging areas of research that might be supported in the new facility.

c. Attention needs to be given to defining the nature of interdisciplinary research.

d. The building will not be large enough to house any one discipline for any of the involved departmental groups. The focus should be on the development of primary "core areas".

e. In considering the nature of the facility with respect to these core areas, the Dean suggested four possible components:

- Materials and Nanoscience Engineering
  - A model core which might consist of 10,000 sf +/-
  - State of the art clean room space, etc.
  - Core Faculty could move in and out (transient)

- Bioengineering
  - interdisciplinary, bring biology and engineering together
  - maybe a 5,000 sf core
  - depends on growth

- Biocomputing
  - high end technology and computing
  - starting to merge towards others noted above
  - both Colleges work together

- Digital Learning Spaces
  - interdisciplinary and collaborative
  - to better understand how people work with computers / human interaction
  - examples at University of Michigan and University of Colorado
  - digital learning spaces with CHASS

FOLLOW-UP – QUESTIONS AND ISSUES (led by John Weinman of RFD)

f. Animals / Bioengineering
   - Bioengineering might call for animals for research
   - Definitely some need, but not clear yet

g. Imaging Core
   - Related to several areas, including animals
   - Need to consider possible use of NMR's, which when past 600 Mhz, will affect cost and planning issues

h. Digital Learning Space
   - Reference was made to the MIT Digital Media Lab
   - Other references included the University of Colorado / Boulder (undergraduate facility) and the University of Michigan (graduate student orientation)
   - "Caves" – 3D modeling, simulation (fluid dynamics)

i. Biocomputing
   - Discussion of "dry" vs. "wet" lab space and what these terms mean
   - Interfacing options are broad
   - Reference to computational research at Berkeley
   - This project may want a central core facility as well as intense computational capability in labs.
   - This was described as an "intense hardware environment."
   - Need connectivity and infrastructure

j. Nanoscience and Interdisciplinary Research
   - Micro-processing and biotechnology
   - Maybe both, needs further discussion
   - Nanoscience: interdisciplinary silicon processing

k. Occupancy / "Hotel"
   - Examples of "shared" use and frequent turnovers, such as the Beckman Institute at Cal Tech.
   - Grant and research based, typically.
   - Need to set up a clearly structured program to operate, manage and "run" the building.
   - Hard decisions to be made, possibly by non-departmental authority.
   - Reference made to NASA and Howard Hughes.

2. Dean Steve Angle –College of Natural and Agricultural Sciences (CNAS)

a. The College has evolved from both the physical and agricultural sciences.

b. “Core” requirements will need to address both materials and nano technology.

c. The building should be designed for flexible growth:

- Ability to add on with future additional funding
- Yet avoid “fragmentation” of facility with such increments
- Strive to make building work as a whole, initially and over time.

d. Will need to discuss balance between generic and specialized program components

e. Chemistry and Physics will be the key players for CNAS.

f. Need to review best way to incorporate bioengineering, as this vision is not as far along as the others….i.e. maybe a future vivarium.

g. Possible consideration of a future inter-college graduate program in materials science.

h. The greatest current problem for CNAS is a shortage of “quality” laboratory space.

i. The space needs are somewhat in flux.

j. Modeling and simulation capabilities are also of interest to CNAS.

k. Concurs that the facility will not be large enough to house any “single” discipline – and must therefore contain shared facilities and be interdisciplinary in operation – and will change over time.

l. Physicists, Organic Chemists and Physical Chemists might be housed here.

m. Condensed matter research will definitely occur in the labs.

n. Bioinformatics will be more related to Genomics.

o. Vibration and shielding will be important design issues.

C. Faculty Input

The next section of the meeting allowed for commentary from the faculty representatives to the Building Committee.

1. Goals and Expectations

Harry Tom - Physics

a. We’re lacking high quality lab space

b. Soon we’ll have 2,000 SF Clean Room which will hold 3 people only. It will have to last until this building is built.

c. This building has to house many toxic components as it will be the only

d. major physical science research lab on campus.

e. Anything less than 10,000 SF Clean Room is unthinkable

f. 5,000 for Semiconductor / 5,000 sf for biotechnology

g. Currently planned Clean Room is a “B” occupancy; if it becomes “H” occupancy, it will have additional design and cost implications. This will be a major consideration for the new building which must be resolved in the DPP phase.

h. Condensed matter needs to be in this building – a model of interdisciplinary science

Chris Reed - Chemistry

a. UCR is a rare campus where the Physical Sciences work with Engineering

b. Goal is to Design a Building that serves both.

c. As the project can't fit everything, a greater demand will be on flexibility

d. The building needs high quality generic labs – "when you hire good people and give them good facilities, good things happen."

e. Possibly consider renaming project as "Materials Science Building" or "Institute of Materials Science". This discussion was tabled until a clear decision is made as to the final program for the building.

f. Chris put forth a concept in which the building might be divided into four equal parts:

Engineering	Chemistry & Bio Chemistry	Physics
50%	25%	25%
	In the Chem & Bio Chem area, about 75% would be wet labs	

g. Envisioned the following in the Chemistry portion:

1. Organic Chemists
2. Polymer Chemists
3. Synthetic Chemists

h. All would require a high degree of Fume Hoods.

i. Vibration Control is critical. The Physical Science 1 Building was designed to 2000 Micron/inch per second. This building would require similar vibration resistance.

j. Questioned if the upper floors could be made usable from a vibration standpoint.

k. Would endorse mixed disciplines on each floor.

l. Suggests two 30-person interaction rooms.

General

a. General assignment classrooms were defined as needing separate access and some degree of separation due to the high volume of student traffic.

b. The classroom program and vibration sensitive labs all want a ground floor location, which potentially "pushes" a large ground floor footprint for the building.

c. The classroom program will include (2) 350 seat sloped auditoria (at least) – one to replace a similar room in engineering that is being converted to alternate use, and another as a new room for demonstration science.

d. There maybe (3) 50 seat classrooms as well, but further review and discussion is necessary.

e. Discussion was held regarding the importance of a "mix of space" ethic which will support cultural interaction between the departments and colleges. This should be supported by collaboration spaces in the program.

f. Interest was expressed for 20-30 seat rooms to support spontaneous meetings and collaborative discussions.

II. PLANNING

A. Key Lab Planning Issues
John Weinman's discussion (as recorded earlier in these notes) constituted the identification of key lab planning issues. See page 2 of this memo.

B. Benchmarking
Discussion was held regarding comparable buildings that would offer some value to the team during the programming phase. It was generally agreed (through explanation by John Weinman) that the possible "comparable" projects are mostly in the design or construction stages and that there are no clear prototypes for this type of interdisciplinary facility in close proximity – or anywhere. The new UCSD Bioengineering building was determined to be worth a visit.

1. Similar Labs worth a visit

a. It was agreed to visit the new Bioengineering Building (in the final stages of construction) at the University of California, San Diego the week of December 9th.
b. KMW representatives (Law and Crowell) will visit the building on December 3rd.

C. Campus / Site Planning Issues
A very general discussion was held regarding the possible site options.

1. Possible Sites

a. Three possible sites were identified, including:
   - East side "Science Sector" across from PS1.
   - Playing field site on entry road across from Bourns Building.
   - General "internal" site locations near the Physics Building.

b. These sites will be evaluated in a preliminary fashion by KMW for discussion at the next Project Meeting.

III. SCHEDULE & BUDGET

A. Schedule
A brief discussion of overall schedule was held.

1. DPP and Project

a. The design team stressed the importance of carefully defining and committing to a schedule for the DPP effort, as the total duration of the phase has been clearly set. A great deal of discussion (and many strategic decisions) need to be made in a relatively short period of time. Full cooperation and meeting attendance is expected.

B. Budget

1. Cost and Budget Assumptions

a. The budget guidelines were discussed previously in the opening remarks by Tim Ralston. See page one of these minutes.

Next Meeting

It was agreed that our next meeting DPP #2 would be the week of December 16.

- The Consultant team will bring preliminary lab concepts and examples of other lab layouts for discussion.
- The Consultant team will examine three site alternatives for preliminary area testing.

Action Items Document

Attached to this memo is a 2-page matrix of "action items" required of the Project Team.
The task designations are categorized as:

A. Program

B. Planning

DPP BUILDING COMMITTEE MEETING #2

Project:	UCR Materials Science & Engineering	
Date:	December 18, 2002	
Time:	8:00 AM – 12:00 PM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Ted Chiu	UCR-ODC
	Steve Angle	UCR-CNAS
	Dennis Rice	UCR-BCOE
	Cindy Giorgio	UCR-CNAS
	Mark Matsumoto	UCR-BCOE
	Yat-Sun Poon	UCR-CNAS
	Ashok Mulchandani	UCR-Chemical & Environmental Engineering
	Chris Reed	UCR-Chemistry-CNAS
	Harry Tom	UCR-Physics CNAS
	Mart Molle	UCR-Engineering
	Mihri Ozkan	UCR-EE & CEE
	Cengiz Ozkan	UCR-ME
	Robert Clare	UCR-Academic Senate
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Satish Tripathi, Beverly McNeil, Fiske Crowell, Tom Mistretta, Gavriel Kullman, Liam Corley, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

Introduction

The meeting commenced with the sequential introduction of all meeting attendees around the room. A total of 5 Building Committee meetings have been scheduled. Each meeting will discuss questions and issues about three components - programming, planning, and budget & schedule.

1. The meeting minutes from the Meeting #1 were agreed upon with the exception of a change by Chris Reed to item A.1.f. Delete “4 equal parts”. Change table to read: 50% engineering, 25% Chemists & Biologists, and 25% Physicists. Delete “Other” column. (Final copy of meeting minutes included).

I. PROGRAM

A. Classroom Program

Luis Carrazana stated that the Campus is in need of a variety of different classroom sizes, therefore the program for the 20,000 ASF allocated for classrooms will likely represent this need.

- Large demonstration type classroom (300 seats)
- 120 – 150 seat classroom
- 30 – 60 seat classrooms

The details of the classrooms will be flushed out in the Focus Groups.

B. Lab Concepts

John Weinman made a presentation of examples of various lab and clean room concepts that might apply.

1. Nanosciences
   a. Stanley Hall Interdisciplinary Research Building – UC Berkeley (Nano-tech Facility)
      - Bio-Nano Technology Clean room
      - 10,000-11,000 SF

   b. Engineering Building – UCLA (Clean Room)
      - Bio-Nano Technology for bioengineering phase
      - 10,000 – 11,000 SF
      - Labs are part of the clean room
      - There is no SF/faculty assigned for the labs. The people who are assigned to the space, take care of the clean rooms, they are a resource to the faculty. The size of the lab is driven by the tools and the process. Processes lead to bays, which drives the size of the labs.

   c. California Nanosystems Institute - UCSD
      - Silicon based clean room
      - AFM's (Atomic Force Microscope) and STF's (Scanning Tunneling Microscope) wrap around the periphery.

   d. Physical Sciences Building – Ohio State University
      - Clean room area that doesn't look like Motorola Facility
      - 1,200 – 1,500 SF

   e. Powell-Focht Bioengineering Building – UCSD
      - Micro-bio fabrication Lab
      - 600 SF
      - Costs half or less of a clean room
      - Space contains a clean room
      - HEPA filtration in the room, but no recirculating fan, no high volume air changes. Looks and acts like a regular lab.

   f. Materials Science, Engineering & Nanotechnology – University of Virginia
      - HEPA filters supplied for materials.
      - Integral service galley in back

   g. Engineering & Science Research Complex – University of Maine
      - They have Class 1000 clean room and filtered rooms next door.
      - Pass throughs between clean room and non clean room spaces
      - A functional clean room, but not large

2. BioEngineering
   a. Powell-Focht Bioengineering Building – UCSD (Biomedical Lab)
      - Fixed casework along the wall
      - Middle tables in the center with no specific use.
      - Middle area is flexible.
      - Could have special controlled rooms on the side.
   b. Powell-Focht Bioengineering Building – UCSD (DNA Chip Facility)
      - Looks like tissue culture lab
      - Used as core space
   c. Powell-Focht Bioengineering Building – UCSD (Interdisciplinary Lab)
      - Total interdisciplinary nature of bioengineering
      - People with varied backgrounds work here
      - 1,500 SF
   d. Powell-Focht Bioengineering Building – UCSD (Instrumentation Core)
      - Core lab
   e. Stanley Hall Interdisciplinary Research Building – UC Berkeley (Imaging)
      - Core space
      - 250,000 SF building
   f. Engineering Building – UCLA (Research Labs)
      - Overhead service carriers allows instruments to be interconnected
      - Simple design of lab
      - Rigid casework around room
      - Open center
   g. Basic Research Sciences Building – Texas Tech (Shared Analytical Laboratory)
      - Split benches – services from behind
      - Core space
      - Core spaces don't have to be large. They need to be managed
      - HPLC's (High-Pressure Liquid Chromatography)
   h. Basic Research Sciences Building – Texas Tech (Imaging)
      - SEM (Scanning Electron Microscope) /TEM (Transmission Electron Microscope)
   i. Media Laboratory Expansion - MIT
      - 12,000 SF
      - The concept is they don't have specific disciplines assigned. The labs merge into a U-shape.
      - Multi-disciplinary
      - The lab is different from traditional media lab

3. Chemistry / Materials Sciences
   a. Center for Nano-Fabrication & Molecular Self-Assembly – Northwestern University
      - High hood density, but adjacent to a glove box
      - Labs behave like an organic chemist's lab.
      - Laser lab may or may not be included in our project
      - Clean room similar to chemical sciences
   b. Stanley Hall Interdisciplinary Research Building – UC Berkeley (General Interdisciplinary Research Lab)
      - 2,000 SF
      - Universal lab. Basic lab workable for everyone in building
      - 3-1/2 bays
   c. Physical Sciences Building – UC Santa Cruz (Material Chemistry Lab)
      - Materials Chemistry lab looks like condensed matter physics
      - Toxic

- No benches

d. Physical Sciences Building – UC Santa Cruz (Clean Room)
- Chemistry-trace metals

4. Physics / Condensed Materials

a. Physical Sciences Research Building – Ohio State University (Generic)
- 100% physics building with a lot of condensed materials.
- Concept: open middle with benches at the end.
- Grid on top of ceiling for services

b Physical Sciences Research Building – Ohio State University
- One man's materials chemist lab
- Grid on top
- Part clean room – using HEPA filters
- His protocols will help clean room

c. Robinson Laboratory Replacement – Ohio State University (Materials Engr. Research)

d. Physics and Astronomy Building – UCLA
- This lab has pits
- Condensed Matter Physics labs have pits 6'-0" to 8'-0" deep. They need to be located on the ground floor. UCR must decide if our building is going to have this type of lab.

5. BioSciences

a. Stanley Hall Interdisciplinary Research Building – UC Berkeley (General Interdisciplinary Research Lab)
- This type of lab has less hoods
- Same basic layout
- 3 Grad students per modular bay which is more dense than standard. UCR needs to decide for their project.

b. Bioengineering Building – University of Washington
- This lab has bio sciences on one end and chemistry on the other.
- Along the front are smaller support labs

c. Chemistry Building – Yale University
- Lab used by chemical biologists and various other chemists; approach more chemical than bio
- Not open type labs. Cellular labs used which are connected through doors because they are being used by Synthesis chemists.

6. Computational / Visualization

a. Engineering Building – University of Kentucky
- Virtual Environment Data Analysis Lab – has a CAVE (Computer Aided Visualization Environment). 3-D with 6 camera projection into a cube of space; become part of the experiment.
- High tech classroom – power panel on wall.

b. Stanley Hall Interdisciplinary Research Building – UC Berkeley (Computer Lab)
- Philosophy of this building was for minimal separation between departments. Occupied by applications that are interesting
- Not a traditional computer lab building. Computer research unit put in adjacent to wet lab to promote interaction and communication between theorists and experimentalists
- Infrastructure for computer lab the same as wet lab; computer lab space is zoned for fume hoods, so there is a built in flexibility. However, this flexibility comes with a higher cost. Structural costs may also be higher.

- 250,000 SF building; 7 floors above, 3 floors below grade. Funded by FEMA, Federal and State funds.
- UCR must determine how much computational space is needed and what type of experimentation will be done.

C. General
1. Core labs will be a key part of this project.
2. Dennis Rice asked what type of building would be delivered? For Engineering II, they received an empty building. Luis responded that the difference between a wet lab and Engineering II is that for Engineering II, they wanted to keep the building flexible. For the MS&E building the labs will have to be fixed. They will include the casework and fume hoods. Exactly how much will be outfitted needs to be discussed. For clean rooms, most is tool space and not included in the construction cost.
3. Harry Tom stated that a 5,000 SF semi-conductor clean room will accommodate 20 people at a time. Large schools have more graduates that's why most of these examples of clean rooms is in the 10,000 SF range. Every bay will accommodate 1 – 2 students.
4. Ted Chiu pointed out that the wet labs will drive the design. This is an important issue.

D. Goals & Objectives of the DPP
1. The DPP is the vision for the project, the mission statement.
2. The DPP will evolve through Focus Group meetings. There will be 6 Focus Groups
3. The DPP will develop the scope of the project, so that a cost can be determined.
4. The DPP will develop the mission of what the building is about. How the building will work? How flexible it will be? What are the cores and what they are not.
5. The DPP will test what we do on the site working within the cost and program.
6. The DPP will set the capacity and profile of the building (John Weinman)
7. John Weinman discussed the goals for the DPP
   a. Develop a space program with detailed line items
   b. Determine for a particular type of lab the amount of clean room space that will be required.
   c. Need to develop specific sizes of "core" spaces
   d. Need to develop types of spaces.
8. Luis Carrazana explained that the DPP will form the Project Planning Guide (PPG) which becomes the contract with the State used to acquire the project funds.
   - Based on Focus Group meetings, the DPP will determine what's in the building – what types of spaces will be for research and classrooms, how many labs and what type.
   - There will be a model created to test the program we develop
   - 120,000 – 130,000 gross SF
   - When we move into design, we will get into more detail.
   - Assumptions will be made for this process
   - The DPP process will set key issues and the budget.
   - This stage is critical and must determine the vision of the project.

E. Focus Group Meetings
The list of planned Focus Group meetings was reviewed and discussed.
- Materials & Nanoscience
- Clean Room
- Computational Science
- Bio-Engineering
- Digital Learning
- Classrooms

1. Typically the building is defined before going into Focus Group meetings, however, in our case the timing for our project does not allow for this sequence.
2. Cindy Giorgio noted from her past experience in Focus Group meetings, that participants were disappointed with the results. Cindy suggested that each Focus Group is prefaced to clarify expectations. The purpose of the Focus Group is a discovery process to understand the needs and synergy for each group.
3. Capital Planning scheduled the meetings with 5-8 people in each group from a list of Focus Groups and attendees determined by the Deans of both colleges.
4. Materials & Nano-sciences includes:
   - Condensed Matter Physicists
   - Chemists
   - Bio Engineers
5. The job of the Focus Groups is to identify all areas and specific needs, but not to identify distribution.
6. John Weinman explained each Focus Group will clearly define what types of lab they need and what are the requirements. We will prepare create a picture of these needs and test them against the cost.
7. John Weinman emphasized again, that determining what the "core" will be in the building is very important. If you have more core, there will be less space for faculty.
8. The Focus Groups will help to determine the range of the types of labs based on the budget constraints.
9. After the Focus Group meetings, the Committee can determine a vision. The point of the Focus Group meeting is to provide information to the Committee so they can determine the vision for the project..
10. Discussion about the scheduling of the Focus Group Meetings. Members of the DPP Committee were invited to participate in the Focus Group Meetings. Luis Carrazana said that he would distribute a list of the scheduled meetings tomorrow. The list will show who is in each group.
11. Committee members to sit in on the Focus Group meetings are Ashok Mulchandani and Yat Sun Poon. The Design Team will chair the Focus Group meetings. Consultants will ask specific questions of each faculty.
12. The Focus Groups need people with vision.

II. P LANNING

A. Site Alternatives

Rayford Law presented four site alternatives, highlighting the following.

1. It was agreed that we would focus on East Campus sites.
2. Review of the available open space on the east campus.
3. Criteria for Site Selection.
   - Primary criteria of the site is the physical capacity to accommodate the program
   - Fiscal/budget Limitations
   - Look at splitting laboratory and classroom spaces
   - Look at potential for future expansion. Look at long term impact on maintenance of land bank for future expansion
   - Looked at matrix of existing conditions
     1) Building heights
     2) Current service and pedestrian circulation
     3) Solar/climate
     4) Utility plan – steam, electrical, chilled water service

- Adjacency to the existing programs that relate directly to MS & E functions.

4. Rayford Law made some assumptions and prepared a program to test against the four possible sites.
   a. Assumptions: 10,000 ASF offices
   6,000 ASF clean room
   21,000 ASF wet research area
   20,000 ASF Dry Research Labs
   20,000 ASF classroom
   Total 130, 000 Gross SF
   5-story, 25, 880 SF/floor
   4-story, 32,350 SF/floor
5. Rayford used the architectural alphabet of potential building shapes "I", "L" and "C".
6. Discussed four possible sites:
   A. Playing field site on Aberdeen Road across from Bourns Hall.
      - Pros:
        1) Location across from Bourns Hall and adjacent to the Physical Sciences related facilities.
        2) Site would allow for future expansion
        3) Site adjacent to campus entry (New Master Plan Study forthcoming).
      - Cons:
        1) Future expansion to the West constricted by proposed Performing Arts Complex.
   B. East side (Parking Lot 10) south of PS1
      - Pros:
        1) Location in Science precinct
        2) There is barely sufficient land to build on, and might need to reroute road to Botanic Garden.
        3) It would be possible to bridge from PS1
        4) Future expansion to the East is possible.
      - Cons:
        1) Botanic Garden road relocation would be required.
        2) Need to confirm setback along Campus Drive
   C. General "internal" site locations near the Physics Building.
      - Pros:
        1) This site is in center of the Physical Sciences related facilities between BCOE and CNAS Library adjacent to both colleges.
      - Cons:
        1) Using this site would require at least partial demolition of existing Physics Building (removal of the existing breezeway) which would make the funds available for new construction less thus reducing the amount of new construction.
        2) There would be an issue of where to put the displaced current users.
        3) Emergency vehicle/service vehicle access to Geology and Sciences Lab Building would need to be maintained, further reducing the building footprint capacity of the site.
   D. General "internal" site locations near Pierce Hall
      - Pros:
        1) Site near BCOE and CNAS

- Cons:
  2) Site too small
  3) A tower is not viable for labs

7. After some discussion it was decided that only sites A and B will be evaluated further. It was decided that on Sites C and D it would not be possible to fit our program, so these sites would be better used for future expansion for the Physics Building and Pierce Hall.

III. SCHEDULE & BUDGET

A. Next Meetings

1. The Digital Learning Focus Group Meeting will be held Wednesday, December 18, 2002 from 12:00 – 1:30 PM.
2. It was agreed that the next Focus Group Meetings will be held on Monday, January 6th and Tuesday, January 7th. Luis Carrazana will confirm the time.
3. It was agreed the next Building Committee Meeting #3 will be held on Tuesday, January 7th.
4. The Follow-up Focus Group Meetings will tentatively be held January 21st and 22nd.
5. Confirmed Focus Group and Building Committee Meeting Schedule:

Monday, January 6:	9:00 AM - 10:30 AM	Computational Science & Engineering
	10:30 AM – 12:00 PM	Bio-Engineering
	2:30 PM – 4:00 PM	Clean Room
	4:00 PM – 5:30 PM	Nano Technology
Tuesday, January 7:	8:30 AM – 10:30 AM	Building Committee Meeting
	10:30 AM – 12:00 PM	Campus Working Group

IV. Action Items Document

A. Attached is a copy of the Agenda for the next Focus Group and Building Committee Meetings.

B. Attached is a copy of the revised Meeting Minutes #1

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

FOCUS GROUP – INTERACTIVE ENGINEERING DESIGN #1 (*FORMERLY DIGITAL LEARNING*)

Project:	UCR Materials Science & Engineering	
Date:	December 18, 2002	
Time:	12:00 PM – 1:30 PM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Victor Zordan	UCR-CSE
	C.V. Ravishankar	UCR-CSE
	Tom H. Payne	UCR-CSE
	Shankavi Mahalingam	UCR-ME
	Dennis Rice	UCR-COE
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Steve Angle, Satish Tripathi, Cindy Giorgio, Mark Matsumoto, Yat-Sun Poon, Ashok Mulchandani, Chris Reed, Harry Tom, Mart Molle, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Mihri Ozhan, Carol Lerner, Fiske Crowell, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the sequential introduction of all meeting attendees around the room. Luis Carrazan stated that the purpose of this meeting was to find out what Digital Learning is and how does it fit into our building.

A. Michael Ross offered a brief background on the Consultant Team's scope of work and the purpose of the Focus Group Meetings, highlighting the following:

1. The Consultant Team was hired to develop a DPP (detailed project program) for a new Materials Science and Engineering building.

2. There are six (6) Focus Groups that the Consultant Team will be meeting with to learn what each discipline's focuses are that will affect this building. The Focus Group is a discovery process to understand the needs and synergy for each group.

3. The 6 Focus Groups are:
   - Materials & Nano Science
   - Clean Room
   - Computational Science
   - Bio-Engineering
   - Digital Learning
   - Classrooms

4. The University of California Riverside, Office of the President has agreed to a $51.8 million all-inclusive budget for the project of approximately 130,000 gross square feet.

   The Consultant Team goal is to develop a DPP, which defines the programmatic needs (scope), budget, and schedule for the Materials Science and Engineering Building.

II. **Interactive Engineering Design (*formerly Digital Learning)***

During the next section of the meeting the Digital Learning Focus Group explained how engineering becomes implemented in a computer environment and why digital learning is in this building, highlighting:

A. What is Digital Learning?
1. Digital Learning is tied to computational science.
2. Human interfacing with emphasis on group interaction versus personal interaction.
3. Providing facilities for group collaboration
4. Two components of Digital Learning
   - Creating devices to foster interaction and testing of devices
   - Visualization
5. Digital Learning focuses on:
   - Helping computers facilitate learning
   - Studying how to transfer information – capture the process of design. Assist in modification; interaction of interdisciplinary teams
6. Tom Payne – Digital Learning needs
   a. Permanent hardware used as resource
   b. Flexibility – projects occur with computer clusters on the edge
   c. Microphone, video camera, speakers, projection and display devices
   d. Bulk equipment in room
7. Computation is the 3rd paradigm (theory and experiment)
   - Virtual experiments (cheaper than real experiments)
   - Looked at as a theory. Fill the gap between theory and experiment
8. Envision using mobile devices in this project (ie. Equipment can move into clean room)
9. Envision people using space for research with offices elsewhere

B. Typical Facilities:
1. Visualization - virtual reality environment
2. Art environment - University of Michigan (www.ummu.umich.edu) brings together scientists, engineering and art at Media Union. See virtual reality tour on website.
   - Using Interactive performance devices to study dynamics of motion in dance
3. University of Colorado prototype. ITLL – Integrated Teaching Learning Laboratory
4. Georgia Tech prototype – Quieter space off a large room
5. Motion Capture Environment – dance and music. Also measuring motion at a molecular level.
6. Motion modeling Environment

C. Digital Learning Requirements:

1. Visualization facilities (A lot of space which looks like computational, but is farther reaching.) An example is the MIT Media Lab.
2. May include CAVE (Computer Aided Visualization Environment) space
3. Faculty space (10 faculty) Physical proximity and intellectual affinity. Proximity of offices is important for good interaction.
4. Exhibition space
5. Lab requirements: The requirements for these labs are more associated with adequate electrical power and data accessibility than with fume hood density and vibration. Nevertheless, this space cannot be equated with office space since the electrical power and resulting heat loads are in the order of four-six times that of academic or administrative office space
6. Permanent home for hardware (not necessarily in the building)
7. Utilities – electrical, data, lighting (In floor versus overhead, use overhead for flexibility)
8. 15'-0" – 18/-0" floor to ceiling height requirement
9. Smart classrooms NOT a part of this space
10. Types of spaces:
    - Large room
    - Flexible space
    - 900-1000 SF CAVE (computer Aided Visualization Environment) – 6 projectors
11. Types of finishes:
    - Flooring material: use carpet (less formal type of space). Acoustics softer
    - No vibration criteria

FOCUS GROUP – COMPUTATIONAL SCIENCE #1

Project: UCR Materials Science & Engineering

Date: January 6, 2003

Time: 9:00 AM – 10:30 AM

Place: College Building North, Room 205

Present:

Luis Carrazana	UCR-APB-CPP
Tony Cook	UCR-Capital Planning
Nita Bullock	UCR-APB-CPP
Joanne Cate	UCR-APB-CPP
Dennis Rice	UCR-COE
Robert Clare	UCR-Physics/Academic Senate
Tom Morton	UCR-Chemistry Department
Dimitri Morikis	UCR-COE
Chris Reed	Chemistry/CNAS/Academic Senate
Chris Switzer	Chemistry/CNAS
Yat-Sun Poon	CNAS
Gary Zank	IGPP/Physics
Michael Ross	HGA
Loring Wou	HGA
Rayford Law	KMW
John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Steve Angle, Satish Tripathi, Cindy Giorgio, Mark Matsumoto, Ashok Mulchandani, Harry Tom, Mart Molle, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Mihri Ozhan, Carol Lerner, Fiske Crowell, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney.

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the sequential introduction of all meeting attendees around the room. Michael Ross offered a brief background about the DPP that the Consultant Team will be producing and the purpose of the Focus Group Meetings.

1. The DPP will define the program and the size of the project and budget.
2. The focus of this meeting is on computational sciences and its relationship to materials science and nano technology.

II. Computational Science

A. There are 4 areas where computers are being used for Research Computation.

1. Training (instructional)/Research Service
   - The 50 foot rule (neighborhood concept) is that training and research should be near the core facility
   - Instructional labs are important and they should have a visual connection to the offices.
   - There is a need for instruction research space for graduate students
   - This training space is not assigned

2. Use of computers in "Wet" environments (fume hoods)
   - CNAS would like its labs to have fume hoods throughout with computational ability. John Weinman said this was wasteful and not necessary. Air requirement for hoods is once through air. Air for computers is recycled. Having all once through air has cost implications.
   - This space is assigned

3. Use of computers as a Research organizing force - Computational Research:
   - CNAS – computation – supplementary to main research space
   - COE – Computation as fundamental to engineering

4. Core Facility to house Main Frame equipment (Hardware)
   - Temperature Control
   - Noise Control
   - Sufficient Power Supply
   - Accessibility
   - Core facility could be decentralized. Currently main frame is housed in separate building.

B. Rayford offered a matrix for the lab and core layout. (Appendix A)

C. Requirements
1. Adequate electrical power: 40 watt/square feet which would translate into amps/module.
2. Adequate data accessibility

III. Next Step

John Weinman offered to come up with different scenarios for allocating computational space for the 2 colleges for discussion. Programming is an evolutionary process.

IV. Next Meeting

The next meeting will be held during the week of January 21st.

FOCUS GROUP – BIO ENGINEERING #1

Project:	UCR Materials Science & Engineering	
Date:	January 6, 2003	
Time:	10:30 AM – 11:00 AM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Chi Kwan Fong	UCR-Design & Construction
	Mihri Ozhan	UCR-EE & COE
	Chris Reed	UCR-Chemistry/CNAS
	Dennis Rice	UCR-COE
	Mark Matsumoto	UCR-COE
	Robert Clare	UCR-Academic Senate
	Harry Tom	UCR-Physics
	Ashok Mulchandani	UCR-Chem & EE
	Vladimir Parpura	UCR- Neuroscience
	Allen Mills	UCR-Physics
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Steve Angle, Satish Tripathi, Cindy Giorgio, Yat-Sun Poon, Mart Molle, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Carol Lerner, Fiske Crowell, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with John Weinman stating that bioengineering is inherently interdisciplinary and that the purpose of our meeting is to learn:

- *What range of research would occupy the building*
- *What will be needed in their main research lab, their support labs and core facilities*

II. Bioengineering

During this section of the meeting the Bioengineering Focus Group discussed what they are currently working on, what type of equipment they will need and what will their labs look like, highlighting:

A. Issues discussed:

1. **Use of Animals**
   There was a long discussion about the use of animals (mainly transgenic mice) in the new building, highlighting:
   a) Vladimir Papura agreed to prepare a paragraph summarizing how animals would be used in bioengineering for research in this building.
   b) There was a strong feeling that bioengineering needs animals in order to do their research. Not having animals in the building would be a limitation. Some uses:
      - Need primary cell lines
      - DNA Computing – bio sensors
   c) Could the housing of animals could be done elsewhere?
   d) Luis Carrazana offered that he does not believe the campus will support putting a vivarium in this building. The campus is looking to centralize the housing of animals.
   e) Vivarium Campus Master Plan
      - Luis Carrazana will give the Consultant Team a copy
      - Some existing vivaria may be renovated to increase capacity and capability.
      - A new campus vivaria facility has been programmed into the new Psychology Building project.
   f) Based on the bioengineering needs and the master plan, the Consultant Team will determine an approach.

2. **Bio-Terrorism Component**
   A bio-terrorism lab was mentioned during the meetings. It is recommended that this area be kept relatively small perhaps no more than 300-450 asf. Even at this size there are major considerations since this type of space, depending on closer definition, ranges from BSL3+-BSL4 and could involve an effluent kill pit as well as a dedicated air supply and exhaust system and other safety considerations
   1) Vladimir Papura agreed to prepare a paragraph outlining the bio-terrorism need.
   2) Having this type of space in this project will add cost more than a regular bio- engineering lab.
   3) Containment Issues

3. **BSL-3 Component**
   A facility of 900-1,000 asf was proposed which will include an autoclave, upgraded room finishes and air supply/exhaust.

4. **Flexibility**

   Flexibility between bioengineering and materials sciences labs is a major issue for this project since one of the consequences of approaching a materials research program from an interdisciplinary framework is the certainty that laboratories will "morph" back and forth as well as take on characteristics of both types. This will unquestionably result in basic requirements that are more demanding than found in a "pure" bioengineering laboratory.

5. **Vibration**
   Bioengineering uses Atomic Force Microscopes (AFMs) and near field optics which require vibration control.

6. **Cooling Water**
   Materials Building and Bioengineering both use chilled water cooling in the labs. The supply of chilled water needs further discussion.

7. **Classrooms**
   There was discussion about having the classrooms as part of this building. The Bioengineering Group felt that classrooms and labs are not good neighbors. There are vibration issues and toilet usage during class breaks can affect experiments.

8. **"Clean Room" Like Lab**
   John Weinman discussed having a small clean room-like lab for bioengineering. Almost like a clean room, but not a certified clean room.
   - HEPA filtration in ceiling
   - Smaller areas with hood
   - Uses once through air.

9. **Faculty Offices & Housing of Grad Students**
   - There was discussion about whether faculty offices should be included
   - Graduate and Post Doc students will be housed outside of labs
   - There will be no teaching assistant's in the building; they would TA out of their own spaces.
   - BCOE is targeting 5-6 graduate students/Postdocs per faculty by the time MS&E is occupied.
   - 3 or 4 graduate and post doctorates can share an office.

10. Bioengineering Fabrication
11. Support Labs -
12. Physicists are doing research in bioengineering from molecules to cells, tissue culture and to live animals

B. Discussion about what labs would be like:

1. Hood Density: 1 hood/800 SF
2. Centralized Lab Vacuum system
3. No instructional lab in building
4. Tissue cultures to be done locally in labs
5. Main Research Lab (MRL)
   - Glassware Washing in individual labs
6. Support Lab
   - Autoclave
   - Cold Room
   - Environmental Room
   - Equipment spaces for sharing of equipment. (Equipment rooms and service corridors)
   - Consumable Storage
   - Optical Microscopy
   - Microscopy Core – SEM
7. Type of utilities
   - Gases (hard piped or cylinder)

III. Summary Bioengineering

These laboratories will have a moderate high fume hood density, approximately one six foot fume hood per 1000 asf (similar to a molecular biology lab), but vibration control will be an issue due to extensive use of lasers.

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

FOCUS GROUP – NANO TECHNOLOGY & CLEAN ROOM #1

Project:	UCR Materials Science & Engineering	
Date:	January 6, 2003	
Time:	2:30 PM – 5:30 PM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Timothy Ralston	UCR-APB-CPP
	Chi Kwan Fong	UCR-Design & Construction
	Dennis Rice	UCR-COE
	Yat-Sun Poon	UCR-CNAS
	Chris Reed	UCR-Chemistry/CNAS
	Mark Matsumoto	UCR-COE
	Robert Clare	UCR-Academic Senate
	Cengiz Ozkan	UCR-Mechanical Engineering
	Harry Tom	UCR-Physics
	Robert Haddon	UCR-CNAS/BCOE
	Ping Yun Feng	UCR-Chemistry
	Ludwig Bartels	UCR-Chemistry
	Yushan Yan	UCR-Chem/EE
	Roland Kawakami	UCR-Physics
	Ward P. Beyermann	UCR-Physics
	Alex Balandin	UCR-EE
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Dan Johnson, Ted Chiu, Steve Angle, Satish Tripathi, Cindy Giorgio, Ashok Mulchandani, Mart Molle, Gavriel Kullman, Liam Corley, Mihri Ozhan, Carol Lerner, Fiske Crowell, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the sequential introduction of all meeting attendees around the room. The Materials and Nano Technology and the Clean Room Focus Groups are basically comprised of the same people. The meeting started off focusing on Materials and Nano Technology issues, then proceeded to discuss specific Clean Room issues, highlighting:

II. Materials & Nano Technology

A. There were two goals of these Focus Groups.

1. Determine conceptually how a clean room relates to the overall program of the building.
2. Look at the specific components of Nano Technology:
   - Nano Electronics (clean room)
   - Nano Bio Technology
   - Nano Materials

   a. Nano Electronics houses functions most easily assigned to clean room requirements

   b. Nano Bio + Nano Materials have special environmental requirements, but don't require as stringent and costly as those in Nano electronics.

   c. All 3 components overlap and depend on each other

   d. The goal is to put together a package that encourages the three types of users:

      1) People in building

      2) People on campus who would come to use the facilities

      3) People from private industry who would be encouraged to enter into agreements for projects at UCR because of the tripartite organization that offer them benefits they can't find anywhere else in area.

   e. Discussion on the characteristics of the labs: Part synthesis chemistry, part condensed matter physics and part instrumentation, development and process. Interesting types of labs – diverse types of uses.
3. There was a discussion about the breakdown of the individual spaces and faculty.
4. John Weinman tried to determine the range of gases which would be used, which will impact the building classification. The building cost will be less expensive if the classification is B2, rather than H6 or H8 and this will depend on the amounts of Arsine and Phosphine being used.

III. Breakdown of Components of Nano Technology

A. Clean Room (Nano Electronics) – Will be most expensive space

Silicon Processing (uses Silane (Si), Arsine (As), Phosphine (Ph) includes

- Photo Lithography
- Wet Etching
- Dry Etching/Thin Film
- Chemical Vapor Deposition (CVD)
- (MOCVD) If this is included the classification may be driven to H-6
- E-Beam
- FIB (Focused Ion Beam)
- Diffusion (major exhaust load – 4 stacks)
- 100% Recirculating Air
- Vibration criteria
- What gases to be used and in what quantities
- Clean Room should accommodate industrial size equipment (Ludwig Bartels)

B. Nano Bio Technology Processes includes:

- Nano Lithography
- Soft Lithograph
- Tissue Culture
- DNA Array on Semi Conductor (Could be part of Nano Materials – Polymers)

C. Materials and Nano Science Processes includes:

- Polymers
- Organics

- Bio Materials
- 100% Exhaust Air

D. Main Research Lab (MRL) Processes includes:
- Synthetic Chemistry Labs
- Condensed Matter Physics (dilution refrigeration with pits)
- Raman Spectograph
- Laser Chemistry
- Dilution refrigerators
- (MOCVD) – doesn't have to be on the ground floor, can be on top to exhaust out
- Areas with glove boxes
- Will be driven by vibration, pits and exhaust
- Heavy use of hoods. Request for longer lengths of hoods

E. Characterization includes:
- SEM/STM
- AFM/STM
- Ellipse
- Profilometers
- (ESCA/SIMS - Auger)

F. Imaging (Support Labs) includes:
- Squid
- NMR (400 mhz-500 mhz)
- Confocal
- X-RD

G. Utility Requirements
1. Cooling Water Supply/Return (CHW S/R)
2. High Purity Water (HPW) – For wet etching, 18 microns
3. Nitrogen gas (N_2) – central vs. tanks
4. Compressed Air (A) – 100# - 120#, Newport Bench
5. Laboratory Vacuum (LV)
6. 120 /208v/3 Phase/5 wire System
   - Building will provide accessibility to 480 v for specific equipment
   - 120v will be throughout. 1 outlet/2,000 sf
7. Emergency Power
8. Data (Switch) - UPS will be done locally
9. Telephone - As few as possible. Locate near equipment which needs service
10. Chemical Ground
11. Security Card Access
12. Lighting - Fluorescent 60 hz; locate RF suppression where needed; laser benches to have incandescent lighting; photo lithography to have yellow light
13. HVAC – Final filter in building 85%-90% filter + HEPA Filtration as needed
14. Operable windows in labs and offices. Non-operable windows in clean room

IV. Summary

A. Cleanroom

While the actual size of the facility has not yet been developed it appears that the area will be between 6000 and 10000 asf including any clean corridor. Our first round of interviews with the faculty indicates that the facility will be a semiconductor, primarily silicon processing type including the following processes:

- Photolithography
- Wet etch
- Dry etch, thin film
- Chemical vapor deposition
- Diffusion

The photolithography area, perhaps in the nature of 400-800 asf would will most likely need vibration criteria of 250-500 microinches/sec velocity which is far beyond that of typical laboratory space. The remainder of this area should be designed in the 1000 microinches range which is also not without cost considerations. If this part of the building cannot be on a grade condition, the structural costs need to be carefully evaluated.

Given the processes being discussed, there will be some use of toxic and pyrophorric gases that may push the area toward an H-6 classification. This has cost implications for the exhaust system, alarm systems, etc., as well as adding gross area to the building. Even if the Cleanroom remains in H-8 there will still be these concerns that must be handled.

The photolithography area is expected to require Class 100 and the remainder a mixture of 1,000 to 10,000.

The Cleanroom facility will require both a high purity water system (electronic grade) as well as a instrumentation cooling water system. The latter will be extended to the Materials Sciences laboratories discussed below.

B. Nano-technology Core
This area will likely be adjacent and connect to the Cleanroom. While it is not expected to have the same stringent environmental and safety concerns of the Cleanroom area, this area will require attention to air filtration and vibration control and some biological containment.

C. Materials Engineering
This type of lab will range in requirements, however some of materials labs will be similar to synthesis chemistry and will have a relatively high fume hood density, approximately 1 hood per 150 asf. It has not been determined how much of the lab space will have this capability, but we might expect approximately 1000 asf. While other areas in materials sciences will have somewhat less dense an exhaust requirement, there will be need for fume hoods, vacuum pump and gas cabinet exhaust greater than the bioengineering labs. In addition, some of these labs will have stringent vibration requirements not too dissimilar to photolithography. There will be wide use of lasers

D. Flexibility
Flexibility between bioengineering and materials sciences labs is a major issue for this project since one of the consequences of approaching a materials research program from an interdisciplinary framework is the certainty that laboratories will "morph" back and forth as well as take on characteristics of both types. Based on the brief discussion above, this will unquestionably result in basic requirements that are more demanding than found in a "pure" bioengineering laboratory.

E. Scrubbing
Scrubbing and treating of effluent done local to instrument in academic settings rather than by building for several reasons:
1) Building doesn’t maintain – faculty maintains
2) Hard to get cost in construction cost
3) Hard to define scrubber and burn box
4) If treat locally, have a clean duct. If treat centrally have a contaminated duct.

DPP BUILDING COMMITTEE MEETING #3

Project:	UCR Materials Science & Engineering	
Date:	January 7, 2003	
Time:	8:30 AM – 11:00 AM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Ted Chiu	UCR-ODC
	Dennis Rice	UCR-BCOE
	Cindy Giorgio	UCR-CNAS
	Carol Lerner	UCR-CNAS
	Mark Matsumoto	UCR-BCOE
	Yat-Sun Poon	UCR-CNAS
	Ashok Mulchandani	UCR-Chemical & Environmental Engineering
	Chris Reed	UCR-Chemistry-CNAS
	Robert Clare	UCR-Academic Senate
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Satish Tripathi, Steve Angle, Harry Tom, Mart Molle, Gavriel Kullman, Beverly McNeil, Liam Corley, Cengiz Ozkan, Mihri Ozkan, Fiske Crowell, Thomas Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Program

A. Introduction

The meeting commenced with opening remarks by Michael Ross. The Consultant Team had a series of meetings yesterday with the Focus Groups. All Research Focus Groups (Digital Learning, Bioengineering, Computational Science, Materials & Nano Science and Cleanroom) had met. The Classroom Focus Group meeting is in the process of being scheduled. An additional meeting with the Campus Working Group – Service Departments (EH & S, Fire, Police, etc) will be held to provide information to the Consultant Team.

1. General Assignment Classrooms

There was a discussion about the rationale for the coupling of the general assignment classroom component to this Research Building

A. While the faculty all agree there is a need for more general assignment classrooms on campus, some felt that putting them in this building was a problem. They see the agendas for the classrooms and research as being in conflict. The main issues were:
- Competition for space on the Ground Floor
- The traffic of the classrooms conflicts with the research program’s need to minimize vibration. The 350 seat auditorium will have a large amount of pedestrian traffic
- Hourly classroom toilet usage, can creates down time for research, unless the plumbing is designed to accommodate both.

B. Luis Carrazana stated that there are ways to successfully accommodate the different needs of the colleges in this project through siting or routing of campus traffic. Rayford explained that some components can be architecturally separated or strategically located to minimize the conflict.

C. Luis Carrazana explained the $51.7 million project budget includes classrooms. The University has found it is more cost effective to build larger buildings with classrooms, than two smaller buildings, so they have been trying to couple the classrooms when they can. The MS & E project is the next in the queue. The CHASS building has 25,000 ASF of classrooms.

The 20,000 SF for general assignment classrooms in this project is set, based on fulfilling a campus need. The ranges of classroom types are expected to be 30-60 seat, 300 seat demonstration and 120-150.

D. There was discussion that the needs of the Research Building based on the Focus Group meetings is greater than the 57,000 asf that is available. Chris Reed offered there is a need to house 38 COE faculty and 30 CNAS faculty for a total of 101,000 asf.

E. Ted Chiu reminded the group that reducing the 20,000 asf of general assignment classrooms will not generate an addition of an equivalent amount of research space. The cost of research space is more expensive than classroom space.

2. Focus Group Meeting Summary

John Weinman provided a brief summary of Research Focus Group meetings.

A. Digital Learning

1. This Focus Group addressed 2 questions:
   - How does engineering become implemented in a computer environment
   - Why is digital learning in this building? Digital Learning is tied to computational and materials science.
2. Requirements:
   - Visualization facilities space which looks like computational, but is farther reaching in terms of equipment requirements. An example is the MIT Media Lab.
   - May include CAVE (Computer Aided Visualization Environment) space
   - Faculty space (10 faculty)
   - Exhibition space

B. Computational Science

It was a very interesting meeting because it noted the differences in how the two colleges approach this segment of the project. There are 4 areas where computers are being used for Research Computation.

1. Training/Research Service
2. Use of computers in "Wet" environments.
3. Use of computers as a Research organizing force - Computational Research:
   - CNAS – computation – supplementary to main research space
   - COE – Computation as fundamental to engineering
4. Core Facility to house Main Frame equipment

C. Bioengineering

1. Issues discussed:
   a. Use of animals
      1) Vladimir Papura agreed to prepare a one-page summary on how animals would be used for research in this building. There was a discussion that not having animals would be a limitation and about whether the housing of animals could be done elsewhere.
      2) The Consultant Team will look at the needs and determine an approach. Luis Carrazana will give the Consultant Team a copy of the campus vivarium master plan.

   b. Bio-Terrorism Component
      1) Vladimir Papura agreed to prepare a one-page summary outlining this need.
      2) Having this type of space in this project will add cost more than a regular bio-engineering lab.
      3) Containment Issues

   c. BSL-3 Component

2. Discussion about what these labs would be like:

   - Hood density
   - Support Requirements: Autoclaves, cold rooms, environmental rooms, equipment spaces for sharing of equipment.
   - Type of utilities
   - Flexibility
   - The interdisciplinary nature of bioengineering.
   - Tissue cultures to be done locally in labs
   - 1 faculty supports 5-6 graduate or post doctorate students.
   - House graduates and post docs outside of lab space
   - Discussion about the need for faculty offices in the building

D. Cleanroom and Materials & Nano Technology

1. There were two goals of these Focus Groups.
   a. Determine conceptually how a cleanroom relates to the overall program of the building.
   b. Look at Nano Technology:
      - Nano Electronics (cleanroom)
      - Nano Bio Technology
      - Nano Materials

2. Nano Electronics houses functions most easily assigned to clean room requirements
3. Nano Bio + Nano Materials have special environmental requirements, but don't require as stringent and costly as those in Nano electronics.
4. All 3 components overlap and depend on each other
5. The goal is to put together a package that encourages the three types of users: 1) People within building; 2) People on campus who would come to use the facilities; 3) People from private industry who would be encouraged to enter into agreements for projects at UCR because of the tripartite organization that offer them benefits they can't find any where else in area.
6. There was a discussion about the breakdown of the individual spaces and faculty
7. Discussion on the characteristics of the labs: Part synthetic chemistry, part condensed matter physics and part instrumentation, development and process. Interesting types of labs – diverse types of uses.
8. Discussion about utility requirements.

E. Luis Carrazana asked the DPP committee if there were any issues that they wanted to further discuss - something that they think should be part of this building or is there something that was missed?
   1. Materials research may require pits for dilution refrigerators (3'x4'x6'deep, qty. 2)
   2. Does Condensed Matter Physics need to move into this building? No, just Condensed Matter Physics that is related to Materials Science.
   3. The sum of what was discussed in Focus Group meetings was vastly larger than what can fit in the 57,000 asf.
   4. The building should contain new programs, not existing programs. The majority of the faculty to move into this building will be new.

F. John Weinman offered the next step will be for the Consultant Team to develop ideas of what the program might be and quantify them for discussion. It will be essential for the University leadership to determine what is the highest priority for the space in the building.

II. Planning

Rayford Law presented further development on the 2 sites selected at the last meeting. There was a discussion about the pedestrian/vehicular access, utilities and about alternate building configurations on Site A and Site B highlighting the following:

A. Discussion of topography and pedestrian/vehicular access to each site.
B. Utilities
   1. Site A. Utilities are currently not available for Site A. However, UCR has a separate project underway to supply them to this part of campus. The utilities will be available before MS & E starts construction.
   2. Site B. Utilities are available on this site. The criteria for the utilities is similar to Physical Science 1.

C. Site Analysis
   1. Site A (Lower Intramural Field site on Aberdeen Road across from Bourns Hall.)
      a. Advantages:
         - Larger site allows flexibility and separate component for general assignment classrooms.
         - Allows for future expansion of other building and academic complex
         - Service access off Aberdeen Road
         - Within walking distance of engineering buildings
         - Topography could allow general assignment classroom student traffic to be separate from MS & E research traffic
      b. Disadvantages:

- Topography may require ramps and stairs to the level below street level for service.
- Further from CNAS

2. Site B (Parking Lot 10) south of Physical Science 1
   a. Advantages:
      - Closer for CNAS personnel
      - Compact site to create pedestrian gateway from the East
   b. Disadvantages:
      - Constrained site area (basin flood control boundaries, botanic garden
      - Difficult to separate classroom wing
      - Lack of space for expansion
      - 100-year flood plain causes other requirements that impact cost and flexibility.

D. Associate Dean Yat Sun Poon recommended that since one of the goals is to invite engineering to partner in future programs, he supports locating MS & E on Site A. Site A will also provides more flexibility for future expansion.

E. There was more discussion about whether classrooms should be part of this building. Rayford Law offered as the next step he would further study Site A with a program, and also look at Site B without a large lecture hall for the next meeting.

F. The Committee agreed that Site A offered the most flexibility to accommodate the proposed program and recommended Site A as the Building Site. The site recommendation along with the committees concerns with the proposed classroom program and related site issues will be presented in an upcoming meeting with Dean Angle and Dean Tripathi.

III. SCHEDULE & BUDGET

A. Next Meetings
1. The next series of Focus Group Meetings will be held the week of January 20th.
2. Confirmed Focus Group Meeting Schedule:

Tuesday, January 21st:	8:30 AM - 10:00 AM	Classroom
	10:15 AM – 11:15 AM	Computational Science
	11:30 AM – 12:30 PM	Digital Learning
	1:45 PM – 2:45 PM	Bio Engineering
	3:00 PM – 5:00 PM	Nano Technology/Clean Room

IV. ACTION ITEMS

A. Consultant Team to meet with the Deans of COE and CNAS and the Vice Chancellor of Academic Planning & Budget to learn how to prioritize the program to meet the 57,000 asf.

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

CAMPUS WORKING GROUP #1

Project:	UCR Materials Science & Engineering	
Date:	January 7, 2003	
Time:	10:30 AM – 11:30 AM	
Place:	College Building North, Room 205	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Joanne Cate	UCR-APB-CPP
	Yat-Sun Poon	UCR-CNAS
	Dennis Rice	UCR-COE
	Russ Lewis	UCR-Materials Management
	Earl Levoss	UCR-Physical Plant
	Russell Vernon	UCR-Environ Health & Safety
	Ross Grayson	UCR-Environ Health & Safety
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	John Weinman	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Steve Angle, Satish Tripathi, Cindy Giorgio, Mark Matsumoto, Ashok Mulchandani, Chris Reed, Harry Tom, Mart Molle, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Mihri Ozhan, Carol Lerner, Fiske Crowell, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the sequential introduction of all meeting attendees around the room. Luis Carrazana stated that the purpose of this meeting was to introduce this project to the Campus Working Group.

A. Michael Ross offered a brief background on the Consultant Team's scope of work and the purpose of the Focus Group Meetings, highlighting the following:

1. The Consultant Team was hired to develop a DPP (detailed project program) for a new Materials Science and Engineering building.

2. There are six (6) Focus Groups that the Consultant Team will be meeting with to learn what each discipline's focuses are and how they will affect this building. The Focus Group is a discovery process to understand the needs and synergy for each group.

3. The 6 Focus Groups are:

    1. Materials & Nano Science
    2. Clean Room
    3. Computational Science
    4. Bio-Engineering
    5. Digital Learning
    6. Classrooms

4. The University of California Riverside, Office of the President has agreed to a $51.8 million all-inclusive budget for the project of approximately 130,000 gross square feet.

B. Luis Carrazana provided a brief overview of the project to the Campus Working Group. The Materials Science & Engineering building is similar in size to the Physical Science I.

II. Campus Working Group

A. Classrooms

1. Discussion about the separation of the classrooms and the research facility. Classrooms are being embedded into the new building.

B. John Weinman provided a brief summary of the information we have received from the six research Focus Groups to date, highlighting:

1. Materials Science
    a. Clean Room space. Silicon processing which includes the following types of processes:
        - Photo Lithography
        - Diffusion
        - Chemical Vapor Deposition (CVD)
        - Thin Film
        - Possibly MOCVD (not going to build)

    b. Gases used would include silane (Si) with smaller amounts of arsine (As) and phosphine (Ph)

2. Bio Engineering will include the following:
    - BSL-3 – 1,000 sf
    - No single PI assignment
    - 1 equipment room with 3 hood rooms
    - Core
    - Standard culture tissue area distributed in lab
    - Possible Bio-terrorism component. Focus Group preparing one-page summary outlining their needs
    - Will house some chemistry – organic chemistry-like labs; more synthetic than chemical
    - Overriding philosophy – ability to have flexibility in how the labs work
    - 2 colleges coming together
    - “Bioengineering is 1 foot into materials”
    - Vibration will lead
    - Locate hoods upstairs
    - Clean Room on 1st floor
    - Be able to interchange where possible. Not headed towards separate clean rooms for bio and materials research.

- Discussion about arsine and phosphine in the clean room. Ludwig wanted to use these gases in other labs. (This was retracted in a following meeting. These gases will be limited to cleanroom and/or MOVCD areas).

C. Campus Working Group Issues

1. Access and Security
   a. Card key access
   b. Patriot Act dictates if there are certain agents in the building, certain laws must be followed – control of equipment and chemicals.
   c. Classrooms should not have access into the research building. Classrooms should have separate access, separate toilets; they should be separate pods.
   d. Earl LeVoss offered it is a challenge to provide security and access. The Patriot Act will be a driving factor.
   e. John Weinman offered it is a management question – how people are assigned to a space.

2. Building Classification
   a. There was a discussion about the classification of the new building. Ross Grayson asked if the intent is to keep the building B occupancy. John Weinman said the Clean room would probably be H-6 or H-8, while the rest of the building would be B. We would not want to have the whole building H-6. Discussion about H-6 or H-8 classification. In California it is possible to have H-8 classification that can save money, since B classification exhaust can be expensive. H-8 involves containment, spill control. Ross Grayson said UCR has a good record for containment.

3. Services
   a. Discussion about the location of the service dock. Site A fields are more accessible.
   b. For delivery of chemicals to the loading dock, there should be no crossing of paths of students.

4. Prevailing Winds
   a. The Campus Working Group had concern about the prevailing winds. Russell Vernon stated that the prevailing winds are primarily from the northwest and blow over the soccer field. CPP to get meteorological data and study.
   b. Exhaust stacks on top of Bourn
   c. Discussion about wind study and stack height.
   d. Ross Grayson offered that they have been using a gang system with high velocity discharge.

5. Large Elevator Requirement
   a. There will be need for a separate, large freight elevator to move large equipment into and out of the building (ie. The laser tables that must move through the building in one piece).
   b. Russ Lewis will provide information on the type of standard large platform elevator that will be needed.

III. Site

A. Luis Carrazana offered a brief background about the site selection process. We initially looked at 4 possible sites, but have narrowed the list down to two.
B. Rayford Law presented the 2 site options, highlighting:
   1. Assumed provisions for utilities for both sites equal.
   2. Looking at a 3-4 story building with approximately 32,000 SF building foot print.
   3. Vibration will be an issue
   4. Site A – East side of Lower Intramural Fields
      - This site provides more space to work with

- Service could be from north
- Nita Bullock offered the possibility of reusing 300,000 cubic yards of dirt from culvert to back fill to the north, south and east sides of new building to provide more direct access at grade at lower floor and 2nd floor.
- Possibility to look at filling in service access off Aberdeen to the north

5. Site B – Across from Physical Science I
   - Physical Science I is 80' to the north of this site. The new building on this site could relate to Physical Science I and create a portal to the campus. Nita Bullock expressed a concern about a wind tunnel effect if the buildings were too close.
   - Vehicular access to the site is from the north
   - The maximum footprint for this site is 32,000 SF, so the program requirements for ground floor space (including the emergency generator) may not fit.
   - Locate mechanical equipment on roof
   - Fire access to the site can be from the north.
   - The Campus Working Group pointed out that there may not be enough space to develop a 40' truck turnaround.
   - The site constraints to the south are from Fish & Game
   - Earl Levoss suggested locating the emergency generator to the southwest on grade

6. Summary
   1. The Campus Working Group will be included in future Building Committee meetings.
   2. The Consultant Team will proceed developing Site A, the preferred site.
   3. Rayford Law will look at a reduced program (research only) for Site B, without further development.

FOCUS GROUP – CLASSROOMS #1

Project:	UCR Materials Science & Engineering	
Date:	January 21, 2003	
Time:	8:30 AM – 10:00 AM	
Place:	Commons Terrace Room D	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Joanne Cate	UCR-APB-CPP
	Chi Kwan Fong	UCR-ODC
	Elizabeth Bennett	UCR-Registrar's Office
	Mart Molle	UCR-CSE
	Tom Payne	UCR-CSE
	Larry McGrath	UCR-Computing & Communications
	Chuck Rowley	UCR-Computing & Communications
	Sam Namminga	UCR-APB
	Allen Zych	UCR-Physics
	Gary Scott	UCR-Chemistry
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	Fiske Crowell	KMW
	John Weinman	RFD
	John Lewis	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Nita Bullock, Dan Johnson, Ted Chiu, Satish Tripathi, Steve Angle, Cindy Giorgio, Mark Matsumoto, Yat-Sun Poon, Ashok Mulchandani, Dennis Rice, Chris Reed, Harry Tom, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozkan, Mihri Ozkan, Carol Lerner, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with a sequential introduction of all attendees. No one from CHASS was present. Luis Carrazana offered a description of the project, highlighting:

- *This programming effort is for the Materials Science & Engineering building, a joint venture between CNAS and COE, to develop an instructional research facility for materials science, nano and bio-engineering. Part of the program includes a classroom component to accommodate some of the general assignment classroom need on campus.*

A. Michael Ross offered a brief background about the programming process. The Consultant Team has had a series of meetings with the Deans, Building Committee and one round with various research Focus Groups to determine what should go into the building.
   1. Based on the all inclusive budget of $51.7 million established by the Office of the President, the project will be approximately 77,000 asf of which 20,000 asf has been allocated for general assignment classroom. The balance will be for research labs and offices.
   2. The purpose of our meeting is to determine the type and size of classroom which will constitute the 20,000 asf. The Consultant Team understands there is a range of classroom needs: a large 300-seat, a 150-160 seat and smaller 30-60 seat.

II. General Assignment Classrooms

A. 2 documents distributed by Capital Planning were discussed::
   1. "UCR Projected Classrooms for Fall 2001 and Fall 2002"
      - Shows Fall Classroom Inventory 2002
      - Engineering 2 Building – Currently under construction. Classrooms will come online December 2004
      - CHASS to begin design this summer. 17,000 asf of classrooms will come online October 2006.
      - None of these buildings has demonstration classrooms, so this item should be discussed for this project
      - This project (MS&E) will come online in 2008-2009.

   2. "CHASS Instruction & Research Facility List of Proposed General Assignment Classrooms"
      - Provides more details of the types of classroom spaces in CHASS.

B. Luis Carrazana clarified that the "20,000 asf for general assignment classrooms" being discussed is an approximate number. The actual amount of space is contingent on final program and budgetary considerations.
   - 20,000 asf would represent between 1,300 –1,700 students depending on mix or types of classrooms.

C. Rayford Law presented a graphic Program Analysis – Assignable Area showing several sizes and configurations of classrooms. He asked the Classroom Focus Group to discuss their thoughts on the types and mixes of classrooms and current and emerging technology for education delivery so that we can begin to assemble a program for the general assignment classrooms. Highlighting:
   - The graphic program analysis shows the program for MS&E based on assumptions that the Consultant Team has made from the initial directive from the University.
   - The graphics show laboratories are a large component with some faculty offices and support space.
   - The graphics for the 20,000 asf shows the following classrooms:
     1) One 300 seat demonstration type classroom (approx. 5,200 sf)
     2) One 150 seat demonstration type and/or tier
     3) A mix of 30-60 seat flat floor classrooms (4 classrooms @ 60 seats or 6 classrooms @ 30 seats)
     4) Orientation of the classrooms won't be constricted by the shape of the room.

D. The faculty discussion regarding the classroom types, highlighting:
   1. Number of seats in a row:
      - Gary Scott stated there is a big problem administering exams in existing classrooms which have too many seats in a row without an aisle break. He felt rows should not be longer than 8 to 10 seats.

- Fiske Crowell stated we need a guideline for how many sf/seat should be used. The design team is currently using 17 sf/seat for the large 300 seat classroom. Luis Carrazana noted the University has been planning auditorium spaces at 14-15 asf per seat. At the end of the meeting, the design team agreed to reduce the allowance to 16 asf per seat for the auditorium space.
- For the 120 seat classroom arrangement, Fiske Crowell confirmed a planning unit of 28 asf per seat. For the 30 and 60 seat classrooms, this was raised to 30 asf per seat.
- The percentage of aisle space to seats is not a function of the shape of the room.
- Luis Carrazana stated this issue should be noted in the program, however, our task is to come up with the guidelines for the design, not the design itself. What is critical for this Focus Group to determine what types of classrooms are going to be put into this building. If the Focus Group tells us that there will be no demonstration classroom in this building during the programming phase, it will not be in the budget and therefore it could not be added during the design phase.
- Fiske Crowell asked, "How many types of classrooms are really needed?"
  a. Tom Payne responded that it depends on the state budget. The faculty is forced to teach larger sections, as the budget limits the number of new faculty that can be hired.
  b. Chuck Crowley offered that one faculty member in statistics is already using a "virtual balcony". He has one 30 seat lab and one 20 seat lab with bi-directional video.
     - "Virtual balcony" – learning in adjacent room with interactive, bi-directional video. 150 –280 with built in tables.

2. Demonstration classroom - having science demonstration capabilities. The room will be wired, fixed seats and tables, plumbed and have fume hood exhaust capabilities.

3. Physics 2000
   - Allen Zych offered that typically all large Physics lectures use the Physics 2000 type of demonstration capabilities (rotating stage, ample support staff behind, etc), and currently other disciplines use Physics 2000 only for its size, rather than demonstration capabilities. He suggested there may not be the need for the Physics 2000 capabilities in this new building.
   - The Consultant Team will tour Physics 2000
   - Physics 2000 has 293 seats
   - Physics 2000 has fixed tables
   - Physics 2000 is a good example of the prep space required

4. Pros and cons of fixed tables versus tablet arm desks in demonstration classrooms:
   - Tables:
     - Pros: Provides more table space for laptops, books, etc.
     - Cons: Takes up more floor space, reducing the number of seats that can reasonably fit on a sloped floor in the room.
     - Increase students distance from instructor.
   - Tablet Arm Desks:
     - Pros: Allows for more seats and space for instructors to walk between the aisles
     - Cons: Not sufficient space for laptops and books.

5. Viewing angles.
   - Tom Payne offered that Physics 2000 is a very steep bowl, so the back row can look down on a demonstration. Most students view the demonstration on the TV monitors.
   - The Classroom Focus Group suggested lessening the slope of the floor by providing more video facilities and having mobile cameras and TV monitors.
   - Having bi-directional and larger than life AV equipment may provide "live theater" aspect.

6. The new facilities should have wireless capabilities. More and more students are bring laptops to lectures and information, such as outlines being broadcast wireless during the lectures.

7. Seat Requirements:
   - There is a definite need on campus for a large 300-seat demonstration classroom.
   - Fiske Crowell offered he has not seen a 300-seat fixed table and chair environment, as the room gets too large and inefficient. The more space which is used for the 300-seat classroom, the less there is for other types.

8. University Village Theater
   - Not fully utilitized
   - Faculty doesn't like to teach there
   - Students don't like the location because they have to walk

9. Sloped or stepped floors

10. Office of the President SF guidelines
    The square foot guidelines from the University Office of the President for tablet arm desks is 15 SF/seat, whereas fixed tables are 25 SF/seat. This could be a problem, but may have functional justification (students need more space for laptops)

E. Summary

1. Sam Namminga suggested that the Classroom Focus Group review an inventory with size and types and utilization of current classrooms on campus before the next Focus Group meeting so they can make a more informed decision on what should go into this new building. Luis Carrazana will provide this inventory list to the Classroom Focus Group.

2. It would be beneficial if more faculty attended the next Classroom Focus Group meeting.

3. It was agreed that the 300-seat classroom does not need a rotating table, but does need prep space.

4. With each demonstration classroom, additional breakout and prep space is required.

5. For the purpose of the preliminary cost estimate, the Consultant Team will assume the following breakdown:

   1 @ 300 seat demonstration classroom with tablet arm desks
   2 @ 100-120 seat demonstration classroom with fixed tables built-in with video capability (Allen Zych suggested we look at 2 – 100 seat which could be joined to offer larger table space, rather than one-150 seat classroom). Linking two smaller classrooms is easier than splitting one larger classroom into two.
   4 @ 60 seat
   6 @ 30 seat

6. Key issues to consider:
   - Flexibility
   - Breakout areas
   - What type of technology to be included
   - Look at ways for linking classrooms virtually

7. Luis Carrazana offered that it is a lot easier to renovate existing space on campus into 30-60 seat classrooms, rather than into larger demonstration classrooms with tables fixed and tiered or stepped floors, so the conclusion is that larger classrooms should be built new.

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

FOCUS GROUP – COMPUTATIONAL SCIENCE #2

Project: UCR Materials Science & Engineering

Date: January 21, 2003

Time: 10:15 AM – 11:15 AM

Place: Common Terrace Room D

Present:

Luis Carrazana	UCR-APB-CPP
Tony Cook	UCR-Capital Planning
Chi Kwan Fong	UCR-ODC
Dennis Rice	UCR-COE
Mark Matsumoto	UCR-BCOE
Mart Molle	UCR-COE
Dimitri Morikis	UCR-COE
Gary Zank	IGPP/Physics
Tom Morton	UCR-Chemistry Department
Frank Jacobitz	UCR-COE
Michael Ross	HGA
Loring Wou	HGA
Fiske Crowell	KMW
Rayford Law	KMW
John Weinman	RFD
John Lewis	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Joanne Cate, Nita Bullock, Steve Angle, Satish Tripathi, Yat-Sun Poon, Ashok Mulchandani, Cindy Giorgio, Chris Reed, Harry Tom, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Mihri Ozhan, Carol Lerner, Chris Switzer, Deeing Chu,Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney.

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with a project update. Last week the Consultant Team and Capital Planning met with Gretchen Bolar, Dean Tripathi and Dean Angle to review the MS&E program and budget. It was decided to reallocate the Computational Sciences space to the Materials and Nanotechnology research space category. Therefore, Computational Sciences will not longer be called out as a discrete program element. However, since computational/analytical research is considered integral to Materials and Nano science it is important for the consultant team to understand the space requirements associated with Computational Sciences.

II. Meeting Minutes for Computational Science Focus Group Meeting #1

A. The Focus Group had the following changes to the Meeting Minutes #1
   1. Item II A. 2
      They wanted to clarify that they do not need "fume hoods throughout". They only want to have the ductwork in place, so that fume hoods could be added as needed in any room. CNAS agreed with the Deans approach that the areas with computers should be integral to the experimental lab area.
   2. It was noted that Bob Clare and Chris Reed are both part of the Academic Senate.
   3. It was agreed that there still should be a core facility for the server room

B. Aside from the changes noted above, the meeting minutes from Meeting #1 were accepted.

II. Computational Science

John Weinman presented various examples of laboratory layouts for discussion, highlighting:

A. There are two ways that computers can go into the experimental lab:
   1. Computing facilities in the wet environment. John Weinman showed a typical Bioengineering lab with 2 modules and the computers along the corridor side of the wall.
      a. Mart Molle and Tom Morton offered:
         - The layout John Weinman presented is for normal computer usage.
         - Computational Science works in clusters with high performance computers
         - Clusters consist of 50 – 100 cpus connected in an array, 64b 150
         - Power draw and heat dissipation are a major concern
      b. John Weinman offered that 2,000 SF of the building core facility has been allocated to Bio-engineering which could house central clustering.
   2. Localized clusters. Eg. The Bioengineering building at UCSD - They have a whole area assigned just for computers.

B. John Weinman asked the Focus Group which requirements do they see missing from these two models:
   1. Mart Molle
      - Computers to provide low level detail emulation of the physical world.
      - Theorists versus Experimentalists
      - Large number of computers (clusters) connected down the hall from the labs that everyone can share.
      - Need for some visualization, simulation and emulation with huge displays and walk through modules. Like a CAVE (Computer Aided Visualization Environment). Luis Carrazana offered that 900 SF – 1,000 SF of this type of space is included in Digital Learning.

   2. Flexibility – Convertibility
      - Tom Payne - Need for flexibility-convertibility of one space being separated into two with sufficient power and ductwork.
      - Gary Zank clarified that the clusters cost $300,000. Not everyone has $300,000, so they want to be flexible to accommodate the intermediate users computer needs. They are thinking 30 state-of-the-art machines in a lab.

C. Purchasing Equipment for the Super Cluster in the 2,000 SF of core facility
   - This item is not funded by the construction of the building
   - They would be bought by the faculty and financed by the department.
   - Luis Carrazana clarified that the financing of the equipment for this building needs to come from significant partnering with industry and extramural funds.

D. Utilities

John Weinman offered we recognize electrical and air (exhaust) are the two most important utilities. We will build the facilities with the most flexibility possible. Labs will have 100% through air and other areas will have centralized recirculating air plus booster cooling.

E. Summary
1. The Focus Group agreed that a core facility of 2,000 SF for super cluster of computers is acceptable. Be able to accommodate central and individual needs.
2. Provide enough electrical power, cooling and ample space for the computing facility.

FOCUS GROUP – INTERACTIVE ENGINEERING DESIGN #2 (*FORMERLY DIGITAL LEARNING*)

Project:	UCR Materials Science & Engineering	
Date:	January 21, 2003	
Time:	11:30 AM – 12:30 PM	
Place:	Common Terrace Room D	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Satish Tripathi	UCR-COE
	Mark Matsumoto	UCR-BCOE
	Victor Zordan	UCR-CSE
	C.V. Ravishankar	UCR-CSE
	Tom H. Payne	UCR-CSE
	Dennis Rice	UCR-COE
	Michael Ross	HGA
	Loring Wou	HGA
	Fiske Crowell	KMW
	Rayford Law	KMW
	John Weinman	RFD
	John Lewis	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Joanne Cate, Nita Bullock, Steve Angle, Cindy Giorgio, Yat-Sun Poon, Ashok Mulchandani, Chris Reed, Harry Tom, Mart Molle, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Mihri Ozhan, Carol Lerner, Shankavi Mahalingam, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the acceptance of last meeting's minutes. John Weinman recapped last meeting, highlighting:

A. Last meeting the Digital Learning Focus Group expressed a need to interlace computers in the broadest sense with engineering, like the MIT Media Lab. They expressed a need for space so flexible that people could come in and work as individual or as street theater in the same space.

II. Program

A. John Weinman presented various examples of laboratory layouts for discussion, highlighting:
   1. 3 modules of 1,000 SF, 33 x 33. The room is primarily free of fixed furniture and casework.
   2. Utilities are important – electrical, data connection

B. Issues

1. Utilities
   - The building must provide a backbone – transport structure for utilities
   - Flexibility of lighting
   - Electrical flexibility - service available anywhere in lab
   - Digital Learning area will have recirculating air (preparation with chemicals will be done elsewhere in the building)

2. Space Requirements
   - Collaboration forum space
   - Capability for private carrels - ability to close off space.
   - No exterior windows in Digital Learning space. They need to control lighting.
   - Interior corridor wall should have windows that can be closed off by curtains. Want to invite people walking by to look in.
   - Ability to have flexible placement of equipment
   - Needs for motion capture
     - Acoustics: Microphones and speakers
     - Video: Cameras and displays
     - Radio Frequencies: Sensors and Actuators
   - Need clusters and individual labs
   - Cushioned floor for dance. Basic floor material will be carpet.

3. Flexibility of utilities, speakers, camera locations in the media space can be achieved using a 3x3 or 4x4 unistrut grid in the ceiling. Integration of overhead system with the partitions. Consider vibration and structural requirements.

4. Digital Learning includes studying:
   - Human and machine interface and interaction
   - Virtual assembly
   - Electrical devices embedded in humans, such as small sensors for medical devices.

5. Most researchers need flexibility. Concern about EMI from the building when working with body sensors. FCC issues. When studying sensors, don't want EMI interference from the building. Plan for one room with shielding.

6. Anechoic Chamber
   - Dean Tripathi instructed there will not be an anechoic chamber in the project, but they would like the design to consider adding one in the future.
   - An anechoic chamber will require additional headroom and patch panel.

7. The CAVE environment will be shared, provide double doors.

8. Tom Morton offered the Digital Learning lab is different from a typical lab. It is more advanced, a showcase for technology, theater and high tech theater. Completely different focus from research labs.

9. Written Narrative
   Dean Tripathi agreed that his department will prepare a written narrative summarizing the needs for Digital Learning.
   - Differentiate between the faculty labs and demonstration labs which they have requested.
   - Provide specifications on specific needs (ie. Vibration constraints).

IV. Summary

1. Digital Learning is:
   - More than digital demonstration, experimental, interactive space
   - Include a design review room
   - Interdisciplinary, collaborative in nature – needs common central space

2. Better term than "digital learning" - Research, learning, interaction, display, transfer

3. Digital Learning will be 3 modules
   - Core will have one room with the option for shielding, and one room for CAVE environment
   - Provide a central meeting space with modules attached. Similar to Media Union at the University of Michigan.

4. Current program area: 6,000 SF + 1,200 SF (demonstration) = 7,200 SF
   - Use 3-module labs @ 1,000 SF/lab
   - Lab Breakdown:
     a. six – 3-module labs
     b. one – 1,200 SF demonstration lab

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

FOCUS GROUP – BIO ENGINEERING #2

Project:	UCR Materials Science & Engineering	
Date:	January 21, 2003	
Time:	1:45 PM – 2:45 PM	
Place:	Common Terrace Room D	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Chi Kwan Fong	UCR-Design & Construction
	Mihri Ozhan	UCR-EE & COE
	Dennis Rice	UCR-COE
	Harry Tom	UCR-Physics
	Ashok Mulchandani	UCR-Chem & EE
	Mike Marsella	UCR-Chemistry
	Michael Ross	HGA
	Loring Wou	HGA
	Fiske Crowell	KMW
	Rayford Law	KMW
	John Weinman	RFD
	John Lewis	RFD

Distribution: Those present, Gretchen Bolar, Tim Ralston, Dan Johnson, Ted Chiu, Joanne Cate, Nita Bullock, Steve Angle, Satish Tripathi, Cindy Giorgio, Mark Matsumoto, Chris Reed, Yat-Sun Poon, Mart Molle, Robert Clare, Gavriel Kullman, Liam Corley, Cengiz Ozakan, Carol Lerner, Vladimir Parpura, Allen Mills, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the acceptance of Meeting Minutes from Meeting #1. The purpose of today's meeting is to talk in more detail about the components for Bioengineering.

II. Bioengineering

John Weinman offered, while we don't how large a space is or how it will be assigned, the module of lab space we are looking at is 11' x 30' or 300 SF/module. He presented various examples of graphic diagrams for reference only. The discussion highlighted:

A. Desired features for the lab spaces:
   1. Overhead services. Utilities down the middle of the room, on the wall or above. No utilities in the floor.

2. No centralized tissue culture
3. Connecting doors
4. Fixed desks for computers along the corridor wall for graduate students
5. Labs are "clean room like"
6. Demountable walls like in Physics Building

7. Services Needed:
   - Water – hot & cold
   - Safety showers – either inside or outside lab (Organic chemistry requires them to be inside; bio engineering can be inside or out)
   - Eyewashes in labs
   - Purified Water – Type 1,2,3? Pyrogine elimination, dissolve gasses (John Weinman suggested using Type 2 (2 –4 meg ohms resistivity). For anything more, use water polish
   - Reverse Osmosis Water (RO water will be supplied in building, this is university standard. PI will be responsible for changing filters)
   - DI (deionization) water
   - Cooling water – Bio Engineering said they are not anticipating using a lot of cooling water
   - Lab vacuum: 24" relative
   - Compressed Air – 2 varieties
     - Instrument grade for oil free compressor
     - 15-30 psi inside hood with serrated type nozzle
     - 100 # - 120# pneumatics
   - Nitrogen
     - Provided in Clean room area (Materials & Nano will require nitrogen in labs)
     - Use boil off
     - Provide in hoods and on overhead carriers
   - Compressed Air – higher pressure only (Materials may need different density from Bio Eng)
   - Natural Gas:
     - John Weinman advised they will supply 1 in hood, and 1 on overhead carrier
     - Ashok Mulchandani asked for gas line available for moveable laminar hoods
     - Requested on benches in every lab, John Weinman does not recommend bringing it down everywhere
   - Bunson Burners – one or two on each bench (Ashok Mulchandani)
   - Hoods – one bio hood, one chemical hood
   - Bio Safety Cabinets
   - Power
     - 120 v – 208 v, 3 phase, 5-wire system with potential instrument ground for very sensitive equipment.
     - Getting rid of line noise important
     - Probing system requires high power
     - 480 v - John Weinman advised the building won't run 480v throughout building, but will make it available in an electrical closet. There will be a panel for each room with a set number of circuits.
     - Harry Tom asked for 400 amps in the hallway – 208 v, 3 phase
     - John Weinman advised we will establish what loads are and establish what panel looks like, then determine what best way to feed.
     - Power Usage:
       Bioengineering uses a lot of power. Depending on the PI, some use special microscopes, AFM, E physiology, ACM. John Weinman offered the more PIs are related to cellular or molecular bio, then the more amps they use. If the research is more towards probing and visualization, they have less power requirements, but need the power to be clean.
     - UPS System

The building will not have a UPS system. It becomes less effective with more people on it, as it is an inline system. John Weinman suggested purchasing UPS for individual equipment.

- Emergency Power
  Emergency power will be supplied in the building to environmental rooms some hoods, lights and exhaust in each lab with an 8 – 10 second cross over time.
- Outlets: There will be 1 – 2 outlets/ 3 module

• Data
  - Messenger system
  - Users will provide number of data ports needed in building. Luis Carrazana asked John Weinman to establish a cost/SF and determine an appropriate allowance
  - Allowance for building electronics
  - Include wireless
  - Conduit included in price
  - Cost of electrical will be a separate line item.

• Exhaust
  - John Weinman will assume certain ratio of exhaust for the labs.
  - Luis Carrazana noted that at UCSB there were branches inside the lab to T-off for smaller pieces of equipment
  - Materials Science needs more exhaust than Bioengineering. 1 to 3-4 ratio in Materials

• Animals
  - There will be no vivarium in this building. Will work with animals, but not house them in the building

8. Support Facilities:
   - BSL-3 (2 modules about 660 SF. Requires double doors for containment with a vestibule)
   - Cold Room
   - Equipment rooms – shared with freezers and incubators
   - 2 modules for shared equipment
   - 2 modules for instrumentation
   - Equipment corridor concept. Gross area does not permit using this concept in this building
   - For grant writing shared rooms are very important (Harry Tom)

B. 1,300 SF for NSF Materials research not enough

C. Instructional/Teaching Lab (The Deans requested this type of lab be included – not in general assignment classroom) – to be combined with support lab for bio-engineering.
   - Locate by the clean room
   - Education purposed
   - Some fixed benches
   - 3-4 module labs – 2 island benches, 1 CFH, 1 BSC
   - Some fixed space
   - Fume hoods
   - Bio Safety Cabinet
   - Consolidate common areas

D. Preliminary Cost Estimate
   In order to prepare a preliminary cost estimate, the Consultant Team will make some assumptions about the spaces in the building. John Weinman will show every type of core space, make a certain pro-ration for hoods, show a BSL-3 sample with autoclave, etc.

FOCUS GROUP – NANO TECHNOLOGY & CLEAN ROOM #2

Project:	UCR Materials Science & Engineering	
Date:	January 21, 2003	
Time:	3:00 PM – 5:00 PM	
Place:	Common Terrace Room D	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Chi Kwan Fong	UCR-Design & Construction
	Dennis Rice	UCR-COE
	Mark Matsumoto	UCR-COE
	Cengiz Ozkan	UCR-Mechanical Engineering
	Harry Tom	UCR-Physics
	Robert Haddon	UCR-CNAS/BCOE
	Jianlin Liu	UCR-EE
	Ping Yun Feng	UCR-Chemistry
	Ludwig Bartels	UCR-Chemistry
	Yushan Yan	UCR-Chem/EE
	Roland Kawakami	UCR-Physics
	Ward P. Beyermann	UCR-Physics
	Alex Balandin	UCR-EE
	Michael Ross	HGA
	Loring Wou	HGA
	Fiske Crowell	KMW
	Rayford Law	KMW
	John Weinman	RFD
	John Lewis	RFD

Distribution: Those present, Gretchen Bolar, Timothy Ralston, Dan Johnson, Ted Chiu, Joanne Cate, Nita Bullock, Steve Angle, Satish Tripathi, Cindy Giorgio, Ashok Mulchandani, Yat-Sun Poon, Chris Reed, Mart Molle, Robert Clare, Gavriel Kullman, Liam Corley, Mihri Ozhan, Carol Lerner, Tom Mistretta, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

I. Introduction

The meeting commenced with the circulation of a memo by Harry Tom regarding Clean Rooms (copy attached). The meeting minutes from Focus Group Meeting #1 were accepted. Michael Ross gave an overview of the meeting with the Deans, and the purpose of today's meeting is to discuss the details of what goes into a clean room so the Consultant Team can come up with a costing model.

A. The Deans' Meeting Overview
   1. The clean room at UCR is not intended to duplicate what is at UCLA or UC Berkeley

2. The clean room at MS & E would serve certain functions in addition to the clean room being planned for Bourns Hall
3. It was also suggested that the MS & E clean room would most likely be expanded in the next phase of construction nearby.

II. Nano Technology & Clean Room

At this point in time, we do not know the exact sizes of the labs or how many faculty will be in the building. John Weinman presented samples of Nano and Clean Room modules for discussion, highlighting:

A. Ideal module: 11'x 30' long, 330 SF (put several together for a lab)
- Current Physics Building is 11' x 25' or 10'-0"x 26'
- If the module is wider than 11', there is more space than needed, and since it is a finite area, you lose in length.
- If the module is longer than 30' there is a vibration issue that is difficult to solve.
- If the module is only 26' or 27' the building is stiffer, but too shallow for a lab
- Less than 30' deep modules extends the perimeter and ends up with more corridor that makes for inefficiency in the net to gross. When the net to gross goes down, the building becomes more expensive. The State provides net to gross guidelines to be followed.

B. 4 Module Lab Diagram
- Enter through double doors
- Fixed bench with computers along corridor wall
- Flexible Approach
- All labs can be connected
- Movable benches in the center
- All utilities provided

C. Synthetic Chemistry
- 2 labs will be sized for Synthetic Chemistry
- 2 hoods/module

D. 2 Means of Egress
- If there is a fume hood in the lab, there must be a second means of egress if the space is over 200 SF.
- Both doors can go into the main corridor or one door can go to the main corridor and the other can go to an adjoining lab.

E. 3 Module is minimum number for lab if no interconnectivity with other labs

F. Flexibility to Move Walls
- Existing Physics Building has movable walls. (It was suggested that the Consultant Team visit this building).
- Being able to divide a space up easily is desirable
- HVAC and utility needs must be considered in the flexible design
- Hood positioning is an issue
- No crossovers
- No partitions in the way
- Each module should have own valve set
- Approach should be to have the side walls mobile, which can allow more faculty working in communal groups

- For budget purpose, we will show partitions and walls

G. Faculty Labs @ 1,000 SF (3 modules)
- Concern that this may not be sufficient space for new faculty
- Space is one of the factors which attract faculty

H. Sitting Space for Graduates.
While students can sit anywhere, it was discussed that it would be best if there was a certain zone (place for them to write up notes) in the labs for students. There is a lot of expensive equipment in the lab, and putting them all over is not the best.

I. Storage
Ludwig Bartels requested as much storage space as possible. John Weinman offered we will include as much as we can, but there is only a certain amount which can be included before it gets value engineered out.

J. Core Labs
a. Imaging Core – 4 modules, 1,320 SF
   - Large open space
   - Smaller spaces to one side
   - Exhaust capability, exhaust on overhead carriers
   - No Hood
   - Provide a shell with a lot of potential
   - This space is basically the same, and changes depending on the specific instruments being used.
b. Cores can be 3 or 4 module
c. Vibration criteria highest for core. Locate Core on First Floor
d. MOCVD, 2 modules, 840 SF (see Diagram)
   - There are no MOCVDs now, but they want to include one in program
   - Wants to be near clean room functionally, but from an exhaust standpoint, it wants to be close to the roof
   - John Weinman asked for a definition of the MOCVD room from the Focus Group, including quantities and types of gases and chemicals used. This will affect code and classification of building. Alex Blandin and Cengiz Ozkan agreed to provide something by the end of the week. Don't make it more dangerous than it is. Luis Carrazana advised don't just think about what you are using today, plan for the future. If this space is not classified, it can be upstairs.
   - If we decide B2 or H6, this will limit the things we can do. The gases and chemicals will drive the classification
e. Clean Room Core (see Diagram of possible organization)
   - Assume "exterior" doors go into a corridor
   - Service Gallery
     1) There was a discussion whether the service galleries should be long or short. Some wanted it long and continuous. Others thought long bays would be a problem with mixing functions. John Weinman offered, that they do not have to decided now, we will show both types in the DPP
     2) Provide 2 entries
   - Mechanical/Electrical/Plumbing will be designed on a modular system for flexibility.
   - Not using service core as chase
   - Wet Etch – hood on one side. Doesn't need to be between Nano and Diffusion
   - Provide viewing windows from corridor
   - Study gowning location

- Nano Bio and Nano Material are connected to Clean Room Core, but not a clean room.
- 7,500 SF – 7,600 SF size of Clean Room Core
- Keep Litho at one end, so there is less traffic
- 3-bay characterization in Materials
- Should be located on the ground floor
- Soft lithography does not need any special delivery

K. List of Equipment in Clean Room
- John Weinman will make assumptions from his experience and prepare a list of equipment for each space named
- Focus Group needs to take a closer look at what is being proposed, as it is much easier to make changes now, than later in the design process
- Focus Group should be comfortable with the named spaces

L. Harry Tom
- Make space able to easily attract industrial partners
- 3 bays Nano Bio Tech
- 3 bays Nano Materials - Polymer/Soft Lithography
- Functionality of space important
- Critical Mass important
- Wants same functionality as at UCLA

III. Next Step

A. Consultant Team will prepare a preliminary cost estimate. The first pass will be based on our experience and assumptions for a space program.
B. Consultant Team will prepare specific Room Data Sheets

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

FOCUS GROUP – CLASSROOMS #2

Project:	UCR Materials Science & Engineering	
Date:	February 4, 2003	
Time:	3:15 PM – 4:15 PM	
Place:	Bourns A171	
Present:	Luis Carrazana	UCR-Capital Planning
	Tony Cook	UCR-Capital Planning
	Chi Kwan Fong	UCR-ODC
	Elizabeth Bennett	UCR-Registrar's Office
	Mart Molle	UCR-CSE
	Tom Payne	UCR-CSE
	Larry McGrath	UCR-Computing & Communications
	Sam Namminga	UCR-APB
	Allen Zych	UCR-Physics
	Gary Scott	UCR-Chemistry
	Robert Heath	UCR-Center for UG Studies
	Michael Ross	HGA
	Rayford Law	KMW
	John Lewis	RFD
Distribution:	Those present, Sharon Salinger, Mary Gauvain, Gretchen Bolar, Tim Ralston, Nita Bullock, Joanne Cate, Ted Chiu, Satish Tripathi, Steve Angle, Yat-Sun Poon, Ashok Mulchandani, Chuck Rowley, Loring Wou, John Weinman	
NOTE:	If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.	

I. Introduction

II. Changes to Classroom Focus Group Meeting #1

A. Item II. D. 1. Revise second bullet to read:

- Fiske Crowell stated we need a guideline for how many SF/seat should be used. The design team is currently using 17 SF/seat for the large 300-seat classroom. Luis Carrazana noted the University has been planning auditorium spaces at 14-15 ASF per seat. At the end of the meeting, the design team agreed to reduce the allowance to 16 ASF per seat for the auditorium space.
- For the 120-seat classroom arrangement, Fiske Crowell confirmed a planning unit of 28 ASF per seat. For the 30 and 60-seat classrooms, this was raised to 30 ASF per seat. It was also stated that UCOP has restrictions on asf/station and that anything over 25 asf / station will be challenged by the Office of the President and the State.

III. Program Review

A. Sam Namminga distributed General Assignment Classroom utilization schedule.

1. One @ 300
   2 @ 120 - Demonstration Type, 1 @ 60 seats, 5 @ 30 seats, or 2 @ 60 seats and 3 @ 30 seats
2. It was noted that University Lecture Hall rows are too close, and that the proctor cannot walk down the row during exams
3. Physics 2000 works for lectures & exams and has 42" row to row, with 14" fixed tables and rotating stools. Physics 2000 is 7.5 SF per student. 26" wide x 42" deep
4. It was suggested that each row have no more than 6 seats from the aisle or 12 total.
5. Bourns 118 is very tight – new facility needs to have more room.

B. In summary, the preference is to have fixed table of 18"-24" with room for proctors to fit behind the students.

C. A complete demonstration classroom has fume hood exhaust and special electrical capability, but UCR already has Physics 2000, so the new Demonstration Classroom does not need a fume hood.

1. Preferred media for teaching is computer with projection screen rear & front with white board.
2. Fixed tables at the 120-seat classroom where recommended. It was stated that these rooms will be particularly useful for testing.

D. In conclusion, the preference is for fixed table in a 300-seat demo room and in the 120-seat if budget allows. The demonstration type classrooms will not include any "wet lab" infrastructure (i.e. fume hoods, piped utilities, etc.). The consensus was that Physics 2000 could continue to meet special demonstration requirements for Physics and Chemistry, particularly if CHASS and other courses not requiring the Physics 2000 infrastructure could be scheduled in other large lecture Halls.

E. All classrooms should be provided with the electrical / data infrastructure to support multi-media instruction.

F. Prefer another 60-seat classroom and drop two 30-seat classrooms.

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

DPP MEETING #4

Project:	UCR Materials Science & Engineering	
Date:	February 13. 2003	
Time:	2:00 PM – 5:00 PM	
Place:	Bannockburn F101	
Present:	Tim Ralston	UCR-APB-CPP
	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Nita Bullock	UCR-APB-CPP
	Ted Chiu	UCR-ODC
	Chi Kwan Fong	UCR-ODC
	Dennis Rice	UCR-BCOE
	Carol Lerner	UCR-CNAS
	Mark Matsumoto	UCR-BCOE
	Yat-Sun Poon	UCR-CNAS
	Ashok Mulchandani	UCR-Chemical & Environmental Engineering
	Chris Reed	UCR-Chemistry-CNAS
	Robert Clare	UCR-Academic Senate
	Ward Beyermann	UCR- Physics
	Scott D. Corrin	UCR-EH&S
	Russ Lewis	UCR-Materials Management
	Doug Lindberg	UCR-Communications Services
	Pat Simone	UCR-Physical Plant
	Earl LeVoss	UCR-Physical Plant
	Michael Ross	HGA
	Loring Wou	HGA
	Rayford Law	KMW
	Tim Rhoads	KMW
	John Weinman	RFD
	Clay Calhoun	BR+A

Distribution: Those present, Gretchen Bolar, Dan Johnson, Joanne Cate, Satish Tripathi, Steve Angle, Harry Tom, Cindy Giorgio, Mart Molle, Gavriel Kullman, Beverly McNeil, Liam Corley, Cengiz Ozkan, Mihri Ozkan, Fiske Crowell, Thomas Mistretta, Lynda Jensen, Theodore Athanas, Saiful Islam, YK Low, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

HGA / KMW *Architects*

Hammel, Green and Abrahamson Architects
Kallmann McKinnell & Wood Architects

DPP BUILDING COMMITTEE MEETING #5

Project:	UCR Materials Science & Engineering	
Date:	March 11, 2003	
Time:	1:30 PM – 3:00 PM	
Place:	Bourns College of Engineering, Room A171	
Present:	Luis Carrazana	UCR-APB-CPP
	Tony Cook	UCR-Capital Planning
	Joanne Cate	UCR-APB-CPP
	Dan Johnson	UCR-ODC
	Ted Chiu	UCR-ODC
	Dennis Rice	UCR-BCOE
	Harry Tom	UCR-BCOE
	Mark Matsumoto	UCR-BCOE
	Yat-Sun Poon	UCR-CNAS
	Ashok Mulchandani	UCR-Chemical & Environmental Engineering
	Chris Reed	UCR-Chemistry-CNAS
	Robert Clare	UCR-Academic Senate
	Mart Molle	UCR-BCOE
	Jerry Keith	UCR-C&C
	John Colladay	UCR-EH&S
	Russell Vernon	UCR-EH&S
	Pat Simone	UCR-Physical Plant
	Earl LeVoss	UCR-Physical Plant
	Michael Ross	HGA
	Rayford Law	KMW

Distribution: Those present, Gretchen Bolar, Tim Ralston, ChiKwan Fong, Nita Bullock, , Satish Tripathi, Steve Angle, Cindy Giorgio, Carol Lerner, Gavriel Kullman, Beverly McNeil, Liam Corley, Cengiz Ozkan, Mihri Ozkan, Ward Beyermann, Scott D. Corrin, Russ Lewis, Doug Lindberg, Loring Wou, Fiske Crowell, Timothy Rhoads, John Weinman, John Lewis, Lynda Jensen, Theodore Athanas, Clay Calhoun, Saiful Islam, Katie Spitz, Rick Lloyd, Paul Abernathy, David Elwell, Julie DeLaney

NOTE: If there are any inconsistencies or errors, please contact this office; otherwise, It is assumed that the following represents a correct record by all present.

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1. Luis Carrazana presented the Draft DPP to be distributed later this week.

2. Michael Ross summarized meeting with the Chancellor. Luis informed the Committee that the site in S/E corner of the Athletic Fields was approved by the Chancellor and the Deans.

3. Michael Ross explained that during the meeting, both Deans presented the logic and rationale for this site.

4. Rayford Law presented the overview of the building, using the Program as a diagram. The open space preserved by this building and potential subsequent buildings was shown as similar in size and shape to Stanford University, Washington University/St. Louis and University of Virginia

5. The logic of the 4-story relates to existing campus staying below 75-ft. high rise fire code requirement

6. The logic of what goes on the ground floor, is based on vibration sensitivity and pedestrian access

7. Number of floors was discussed: 3 vs. 4 vs. 5 stories.
   - It was felt that 3-story took up too much site area, and 5-story would be in the high rise code, which costs more, therefore it was agreed to be a 4-story building.

8. The DPP shall allow for some flexibility in site location, but should be toward the eastern edge of the Athletic Fields. It could move somewhat to the west, but not a great deal.

9. Faculty Offices are for Materials Science.

10. MFR & Luis presented the cost estimate. The target is $43 Million for the building however, we are currently at $47.5 Million. Upper threshold is $306/SF now at $336/SF so, we need to look at $30/SF savings. Luis directed the design team to restudy the cost estimate, revise and resubmit.

11. Luis – Clean Room issue needs to be resolved.
   - PPG needs to be submitted in June
   - Air Conditioning at UCR is greater than other campuses, so be sure DPP reflects that.
   - Luis: Requested tabs be provided and Draft DPP be submitted by Friday. HGA/KMW agreed to deliver the Draft by Friday, March 14th.

Appendix III

Cost Plan

DAVIS LANGDON ADAMSON

DETAILED PROJECT PROGRAM COST PLAN

for

Materials Science & Engineering Building
University of California, Riverside
Riverside, California

April 3, 2003

April 3, 2003

Michael Ross
HGA
1880 Century Park East
Suite 608
Los Angeles, California 90067

Materials Science & Engineering Building
University of California, Riverside
Riverside, California

Dear Michael:

In accordance with your instructions, we enclose our revised Detailed Project Program Cost Plan for the project referenced above.

We would be pleased to discuss these costs further with you at your convenience.

Sincerely,

Rick Lloyd

RL/ac

DLA 0168-6914

Enclosures

DETAILED PROJECT PROGRAM COST PLAN

for

Materials Science & Engineering Building
University of California, Riverside
Riverside, California

HGA
1880 Century Park East
Suite 608
Los Angeles, California 90067

Tel: (310) 557-7600
Fax: (310) 553-1668

April 3, 2003

CONTENTS

BASIS OF COST PLAN

Cost Plan Prepared From	Dated	Received
Drawings issued for		
Architectural		
Option 1C Floor Plans and Building Sections	Undated	02/28/03
Program Listing	02/10/03	02/25/03
Room Data Sheets	02/20/03	02/27/03
Structural Narrative	Undated	03/04/03
Plumbing, HVAC, Electrical Narrative	Undated	03/04/03
Landscape Narrative	Undated	03/04/03
Discussions with the Project Architect and Engineers		

Conditions of Construction

The pricing is based on the following general conditions of construction

A start date of January 2006

A construction period of 24 months

The general contract will be competitively bid with qualified general and main subcontractors

There will not be small business set aside requirements

The contractor will be required to pay prevailing wages

There are no phasing requirements

The general contractor will have full access to the site at regular construction hours

INCLUSIONS

The project consists of a new four story laboratory building of approximately 133,000 gross square feet, together with associated sitework covering an approximate area of 148,000 gross square feet. The program includes wet and dry laboratories and support space, a clean room core, faculty and student offices, and general administrative support functions.

The Cost Plan includes the following assumptions for building systems:

Foundations include drilled piles, pile caps and grade beams, elevator pits and subsurface drainage.

The building structure includes reinforced concrete retaining walls and shear walls, reinforced concrete columns, reinforced concrete suspended floor and roof decks, and allowances for mechanical equipment pads and miscellaneous metals and support framing.

Exterior cladding includes steel stud framing, exterior sheathing and insulation, brick veneer, interior painted gypsum board lining, aluminum framed insulated windows and curtain wall with low-e finish, aluminum glazed entry doors, hollow metal exit doors and cement plaster soffits. An allowance is also included for miscellaneous architectural trim and sun shading treatment.

Roofing and waterproofing includes waterproofing to elevator pits and retaining walls, rigid insulation under built-up roofing, roof flashings and miscellaneous sheetmetal work, and an allowance for caulking and sealants.

Interior partitions include metal stud framing, batt insulation and painted gypsum board lining, wood doors in hollow metal frames, and interior glazing. At the clean room core a modular wall system is included.

Interior finishes include carpet, vinyl composition tile and sealed concrete floors to general areas, and ceramic tile at restrooms. Allowances are included for bases and acoustic wall panels, with ceramic wall tile at restrooms. Ceiling finishes include suspended acoustic tile and painted gypsum board, bulkheads and fascias.

Function equipment includes general fixed building equipment such as toilet room accessories, signage, window blinds, fire extinguishers and cabinets, projection screens, markerboards and tackboards. Allowances are included for storage shelving and millwork, and non-laboratory cabinets and countertops. Also included is laboratory cabinets and countertops, laboratory equipment including fume hoods, laminair flow hoods autoclaves, controlled temperature room and general laboratory accessories.

INCLUSIONS

Vertical transportation includes interior stair flights and (3) hydraulic elevators. Roof access is provided by one elevator and one stair.

Plumbing includes sanitary fixtures, institutional fixtures (install and hook-up only), floor drains and sinks, hose bibbs, waste, vent and domestic service pipe work, condensate drainage, water heating equipment, sewage ejector and sump pump, laboratory/cleanroom process generation equipment, manifolds and pipe work systems, laboratory/cleanroom waste, roof drainage, fuel oil storage and natural gas.

HVAC includes 25 ton cleanroom chiller, process chilled water exchanger, clean steam generator, heat exchangers, expansion tanks/air separators, circulation pumps, hydronic pipe work systems, air handling units, cleanroom systems, fan-coil units, HEPA filters, humidifiers, VAV boxes with heat, sound attenuation, air distribution and return, including specialty exhaust systems, building management and laboratory controls and unit exhaust ventilation.

Electrical includes main power, emergency, machine, equipment and user convenience power, lighting, telephone/data, MATV and audio/visual (conduit only), public address, fire alarm and security.

Fire protection includes combined standpipe/automatic wet sprinkler system. Allowance for cleanroom FM-200.

Site preparation includes an allowance for general site clearing and rough grading.

Site development includes allowances for hard and soft landscaping.

Site utilities include 50' connection to existing chilled water and steam systems, 200' connection to domestic and fire water, sewer, gas, HV electrical power and telecommunications/signals.

INCLUSIONS

BIDDING PROCESS - MARKET CONDITIONS

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area. All unit rates relevant to subcontractor work include the subcontractors overhead and profit unless otherwise stated. The mark-ups cover the costs of field overhead, home office overhead and profit and range from 15% to 25% of the cost for a particular item of work.

Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors and general contractors, with a minimum of 4 bidders for all items of subcontracted work and 6-7 general contractor bids. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Davis Langdon Adamson has no control over the cost of labor, material, equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions at the time of bid, the statement of probable construction cost is based on industry practice, professional experience and qualifications, and represents Davis Langdon Adamson's best judgment as professional construction consultant familiar with the construction industry. However, Davis Langdon Adamson cannot and does not guarantee that the proposals, bids, or the construction cost will not vary from opinions of probable cost prepared by them.

EXCLUSIONS

Design, testing, inspection or construction management fees

Architectural and design fees

Scope change and post contract contingencies

Assessments, taxes, finance, legal and development charges

Environmental impact mitigation

Builder's risk, project wrap-up and other owner provided insurance program

Land and easement acquisition

Cost escalation beyond a construction midpoint of January 2007

Owner supplied and installed furniture, fixtures and equipment

Loose furniture and equipment except as specifically identified

Seating to small and medium classrooms

Security CCTV surveillance cameras and monitoring.

Audio visual equipment and cabling

Hazardous material handling, disposal and abatement

Compression of schedule, premium or shift work, and restrictions on the contractor's working hours

Owner provided UPS

Atrium smoke management systems

Cleanroom H-6 occupancy

Cleanroom tool hook-ups (specialty piping, exhaust, cooling water, electrical etc.)

Exhaust scrubbers

Owner sponsored mechanical and electrical commissioning

Detailed Project Program Cost Plan

OVERALL SUMMARY

	Gross Floor Area	$ / SF	$x1,000
Building	134,000 SF	317.49	42,544
Sitework	148,000 SF	15.28	2,262
TOTAL Building & Sitework Construction	***January 2007***		***44,806***

Owner sponsored mechanical and electrical commissioning	250
Building electronics (telecom hubs and routers)	160

Please refer to the Inclusions and Exclusions sections of this report

BUILDING AREAS & CONTROL QUANTITIES

Areas

	SF	SF	SF
Enclosed Areas			
Building	134,000		
SUBTOTAL, Enclosed Area		134,000	
Covered area			
SUBTOTAL, Covered Area @ ½ Value			
TOTAL GROSS FLOOR AREA			134,000

Control Quantities

				Ratio to Gross Area
Number of stories (x1,000) (Including Penthouse)		5	EA	0.037
Gross Area		134,000	SF	1.000
Enclosed Area		134,000	SF	1.000
Footprint Area		32,000	SF	0.239
Volume		2,234,000	CF	16.672
Gross Wall Area		86,500	SF	0.646
Retaining Wall Area		12,000	SF	0.090
Finished Wall Area		74,500	SF	0.556
Windows or Glazing Area	21.53%	18,625	SF	0.139
Roof Area - Flat		35,000	SF	0.261
Finished Area		134,000	SF	1.000
Elevators (x10,000)		3	EA	0.224
Plumbing Fixtures (x 1,000)		120	EA	0.896
HVAC		230,000	CFM	1.716
Electrical Load (x 1,000)		3,200	KW	23.881
Total Site Area		148,000	SF	1.104
Finished Site Area		116,000	SF	0.866

Detailed Project Program Cost Plan

BUILDING COMPONENT SUMMARY

Gross Area: 134,000 SF

		$/SF	$x1,000
1. Foundations		8.01	1,074
2. Vertical Structure		10.26	1,375
3. Floor & Roof Structures		26.58	3,562
4. Exterior Cladding		26.33	3,528
5. Roofing & Waterproofing		2.53	340
Shell (1-5)		73.72	9,878
6. Interior Partitions, Doors & Glazing		14.16	1,897
7. Floor, Wall & Ceiling Finishes		9.12	1,222
Interiors (6-7)		23.28	3,119
8. Function Equipment & Specialties		20.87	2,796
9. Stairs & Vertical Transportation		4.51	605
Equipment & Vertical Transportation (8-9)		25.38	3,401
10. Plumbing Systems		18.33	2,456
11. Heating, Ventilating & Air Conditioning		51.55	6,907
12. Electric Lighting, Power & Communications		34.03	4,560
13. Fire Protection Systems		3.16	424
Mechanical & Electrical (10-13)		107.07	14,347
Total Building Construction (1-13)		**229.44**	**30,745**
14. Site Preparation & Demolition		0.00	0
15. Site Paving, Structures & Landscaping		0.00	0
16. Utilities on Site		0.00	0
Total Site Construction (14-16)		**0.00**	**0**
TOTAL BUILDING & SITE (1-16)		**229.44**	**30,745**
General Conditions	8.00%	18.36	2,460
Contractor's Overhead & Profit or Fee	4.00%	9.91	1,328
PLANNED CONSTRUCTION COST	***April 2003***	**257.71**	**34,533**
Contingency for Design Development	10.00%	25.77	3,453
Allowance for Rising Costs @ 3.0% PA	12.00%	34.01	4,558
RECOMMENDED BUDGET	***January 2007***	**317.49**	**42,544**

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
1. Foundations				
Piling				
Drilled piles, pile caps and grade beams	35,000	SF	30.00	1,050,000
Reinforced concrete including excavation				
Elevator pits	3	EA	5,000.00	15,000
Subsurface drainage				
Perforated drain pipe	600	LF	15.00	9,000
				1,074,000
2. Vertical Structure				
Columns and pilasters				
Reinforced concrete columns	134,000	SF	2.75	368,500
Retaining walls				
Reinforced concrete, 12" thick	12,000	SF	28.00	336,000
Shear bracing				
Reinforced concrete shear walls	134,000	SF	5.00	670,000
				1,374,500
3. Floor and Roof Structure				
Floor at lowest level				
Reinforced concrete structural slab	35,000	SF	15.00	525,000
Suspended floors				
Reinforced concrete slab and beams	99,000	SF	21.50	2,128,500
Premium for sloped/stepped floors	12,300	SF	10.00	123,000
Flat roofs				
Reinforced concrete slab and beams	29,000	SF	19.00	551,000
Lightweight steel joists, metal deck with lightweight concrete topping	6,000	SF	15.00	90,000

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Miscellaneous				
Mechanical equipment pads	1	LS	10,000.00	10,000
Miscellaneous metals and support framing	134,000	SF	1.00	134,000
				3,561,500

4. Exterior Cladding

Wall framing, furring and insulation				
Steel stud framing, exterior sheathing, batt insulation	55,875	SF	7.25	405,094
Firesafing	1	LS	15,000.00	15,000
Applied exterior finish				
Brick veneer, UCR blend, including galvanized anchoring system	55,875	SF	25.00	1,396,875
Sealer to brick veneer	55,875	SF	0.50	27,938
Cement plaster to back of parapet walls	3,600	SF	7.50	27,000
Interior finish to exterior wall				
Gypsum board, painted	55,875	SF	1.85	103,369
Furring to concrete retaining walls	12,000	SF	4.35	52,200
Windows, glazing and louvers				
Aluminum framed insulated window, low-e finish	12,106	SF	45.00	544,770
Aluminum framed insulated curtainwall, low-e finish	6,519	SF	60.00	391,140
Metal louver panels	1	LS	25,000.00	25,000
Exterior doors, frames and hardware				
Aluminum glazed entrances and frames	1	LS	25,000.00	25,000
Hollow metal exit doors and frames	1	LS	5,000.00	5,000
Fascias, bands, screens and trim				
Sunscreens, canopies and miscellaneous architectural trim	1	LS	500,000.00	500,000
Soffits				
Cement plaster	1	LS	10,000.00	10,000
				3,528,385

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
5. Roofing, Waterproofing & Skylights				
Waterproofing				
Elevator pits	3	EA	750.00	2,250
Retaining walls	12,000	SF	4.00	48,000
Insulation				
Rigid insulation under roofing	35,000	SF	2.75	96,250
Roofing				
Built-up membrane	35,000	SF	3.25	113,750
Roof or deck traffic surfaces				
Walkway pads	1	LS	10,000.00	10,000
Roofing upstands and sheetmetal				
Membrane flashing	1,500	LF	7.50	11,250
Metal parapet cap	1,200	LF	15.00	18,000
Miscellaneous sheetmetal work	1	LS	15,000.00	15,000
Caulking and sealants				
Miscellaneous caulking and sealants	1	LS	25,000.00	25,000
				339,500
6. Interior Partitions, Doors & Glazing				
Partitions and doors				
Metal stud framing, batt insulation, painted gypsum board lining, wood doors in hollow metal frames, metal balustrades, interior glazing	126,310	SF	13.50	1,705,185
Modular wall system at cleanrooms	7,690	SF	25.00	192,250
				1,897,435
7. Floor, Wall & Ceiling Finishes				
Floors				
Ceramic tile, carpet, vinyl composition tile, sealed concrete	134,000	SF	3.50	469,000

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Bases				
Ceramic tile, resilient rubber	134,000	SF	0.50	67,000
Walls				
Ceramic tile, acoustic panels, epoxy paint	134,000	SF	1.00	134,000
Ceilings				
Suspended acoustic tile, painted gypsum board, bulkheads and fascias	129,850	SF	4.25	551,863
				1,221,863

8. Function Equipment & Specialties

General building equipment				
Toilet partitions and accessories, code and room identification signage, fire extinguishers and cabinets, markerboards and tackboards, window blinds, projection screens	134,000	SF	2.00	268,000
Shelving and millwork				
Storage shelving, janitors shelving and mop racks, miscellaneous architectural millwork	1	LS	35,000.00	35,000
Cabinets and countertops				
Laboratory space				
Base cabinets	1,457	LF	200.00	291,400
Wall mounted cabinets / shelving	1,114	LF	175.00	194,950
Full height storage cabinets	112	LF	350.00	39,200
Work table	139	EA	1,000.00	139,000
Technical carrel	50	EA	750.00	37,500
Countertop	1,714	LF	100.00	171,400
Administration space	32,740	SF	5.00	163,700
Special use equipment				
Laboratory space				
Chemical fume hood, 6'-0"	42	EA	7,500.00	315,000
Laminair flow hood, 6'-0"	2	EA	10,000.00	20,000
Cleanroom wet bench	4	EA	20,000.00	80,000
Biological safety cabinet	3	EA	15,000.00	45,000
Chemical storage cabinet	29	EA	1,000.00	29,000

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Autoclave	2	EA	100,000.00	200,000
Environmental room	165	SF	275.00	45,375
Miscellaneous laboratory equipment including gas outlets, snorkels, sinks, emergency eyewashes/showers	38,875	SF	7.50	291,563
Auditorium seating	600	EA	300.00	180,000
Auditorium workcounter	900	LF	150.00	135,000
Loading dock leveler and bumper guards	1	LS	15,000.00	15,000
Miscellaneous equipment	1	LS	100,000.00	100,000
				2,796,088

9. Stairs & Vertical Transportation

Staircase flights, floor to floor				
Fire exit stair with painted metal railings	14	FLT	12,500.00	175,000
Ladders and fire escapes				
Elevator pit and access ladders	1	LS	5,000.00	5,000
Elevators				
Hydraulic				
Passenger, 4-stop	2	EA	125,000.00	250,000
Freight, 5-stop	1	EA	175,000.00	175,000
				605,000

10. Plumbing Systems

Sanitary fixtures and local connection piping	120	EA	1,200.00	144,000
Institutional fixtures - installation and local connection	1	LS	100,000.00	100,000
Sanitary waste, vent and service pipework				
Floor drains and sinks, < = 6", including connection pipework	75	EA	1,500.00	112,500
Hose bibbs, 3/4", connection pipework	1	LS	7,500.00	7,500
Rough-in sanitary fixtures	120	EA	2,000.00	240,000
Pressure reduction stations, backflow prevention	1	LS	15,500.00	15,500
Mechanical make-up systems	1	LS	7,500.00	7,500

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Sump pump, duplex	1	EA	12,500.00	12,500
Sewage ejector, duplex	1	EA	12,500.00	12,500
Water treatment, storage and circulation				
Steam-water, semi-instantaneous water heaters	2	EA	22,500.00	45,000
Circulatory pumps, 1/4 hp	2	EA	1,250.00	2,500
Laboratory service equipment				
Vacuum pump, triplex, receiver, valves, muffler and controls, 15 HP	1	EA	75,000.00	75,000
Air compressor, dryer, controls, triplex, compressed dry air	1	EA	97,500.00	97,500
Reverse osmosis and deionized water generation system, Cap type II	1	LS	100,000.00	100,000
Laboratory and cleanroom service piping, valves and insulation				
Including vacuum, deionized water, laboratory gas, industrial hot and cold water, potable water, air, special gases, process chilled water, fume hood connections, accessories, monitors, valves, filters and specialties	38,875	SF	25.00	971,875
House cleaning vacuum	1	LS	20,000.00	20,000
Laboratory and cleanroom acid waste and vent, including neutralization/sampling	38,875	SF	7.50	291,563
Fuel oil storage				
Underground fuel oil tank, leak detection, monitoring, double contanment pipework, alarms and monitoring,	1	LS	35,000.00	35,000
Natural gas	1	LS	35,000.00	35,000
Surface water drainage				
Roof and overflow drains, 6"	32	EA	2,500.00	80,000
Test purge and sterilize	600	HR	85.00	51,000
				2,456,438

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
11. Heating, Ventilation & Air Conditioning				
Heat generation and chilling equipment				
Chilling				
Low temperature chiller and associated pumps re cleanroom make-up air, 35 ton	1	LS	45,000.00	45,000
Process chilled water heat exchanger, plate and frame	1	EA	15,000.00	15,000
Heated hot water				
Heat exchangers				
Steam - hot water, 225 gpm	2	EA	15,500.00	31,000
Clean steam generator	1	EA	35,000.00	35,000
Chemical water treatment	1	LS	10,000.00	10,000
Thermal expansion compensation and circulation				
Expansion tanks/air seperators	1	LS	15,000.00	15,000
Pumps				
Chilled water, 1450 gpm, 40 hp	2	EA	13,500.00	27,000
Process chilled water, 300 gpm, 15 hp	2	EA	7,500.00	15,000
Heated hot water, 210 gpm, 7.5 hp	2	EA	5,500.00	11,000
Condensate return, (2) @ 3 hp	1	LS	10,000.00	10,000
Variable speed drives	125	Hp	450.00	56,250
Vibration isolation	1	LS	7,500.00	7,500
Piping, fittings, valves and insulation				
Chilled, heated hot water, steam/condensate, process chilled water, condensate drainage systems	134,000	SF	6.00	804,000
Air handling equipment				
Air handling units, (2) supply fans, dual return, cooling and heating, air filters, variable speed control, economizers, variable volume	230,000	CFM	4.00	920,000
Air handling units, supply fans, cooling and heating, variable speed control, custom built, humidification, HEPA filters, vibration isolation, 100% outside air, variable volume	30,000	CFM	5.50	165,000
Cleanroom ceiling recirculation fans	120,000	CFM	2.00	240,000
Clean room systems ceiling filtration to classification spaces only	4,150	SF	75.00	311,250
Fan-coil units, 24 hour service	1	LS	30,000.00	30,000
HEPA filters	1	LS	50,000.00	50,000

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Humidification	1	LS	50,000.00	50,000
Terminal boxes, with reheat	200	EA	850.00	170,000
Air distribution and return				
Galvanized sheetmetal ductwork	175,000	LB	5.50	962,500
Specialty fumehood exhaust ductwork, type 316 - fumehood to point of dilution only	35,000	LB	13.50	472,500
Exhaust stacks, 15'	1	LS	75,000.00	75,000
Flexible ductwork	5,000	LF	8.50	42,500
Dampers, volume	1,000	EA	65.00	65,000
Dampers, smoke/fire	1	LS	75,000.00	75,000
Insulation	113,750	SF	2.00	227,500
Sound attenuation	1	LS	55,000.00	55,000
Diffusers, registers and grilles	134,000	SF	1.00	134,000
Controls and instrumentation				
Direct digital energy management system	134,000	SF	4.00	536,000
Laboratory controls, variable air volume	38,875	SF	25.00	971,875
Test and balance system	1,200	HR	85.00	102,000
Clean room precommissioning certification	1	LS	25,000.00	25,000
Unit ventilation				
Laboratory exhaust, variable speed drives	83,800	CFM	1.25	104,750
General exhaust fans, mechanical and restrooms	24,000	CFM	0.65	15,600
Sound attenuation	1	LS	25,000.00	25,000
				6,907,225

<u>12. Electrical Lighting, Power & Communication</u>

Main service and distribution				
SF-6 sectionalizing witch, 15 Kv	1	EA	35,000.00	35,000
Unit substations - 480 V/227 V	4,000	KVA	50.00	200,000
Secondary switchgear, 480 V	6,000	AM	35.00	210,000
Tie Breaker, 3,000 A	1	EA	25,000.00	25,000
Distribution switchboards, 480 V	4,800	AM	22.00	105,600
Transformers, 480-120/208 V	500	KVA	75.00	37,500
Motor control centers, 480 V	3,000	AM	65.00	195,000
Distribution switchboards, 208 V	5,000	AM	26.50	132,500
Feeder conduit, cable and busway	1	LS	150,000.00	150,000

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
Emergency power				
Generator, diesel driven	1,000	KW	220.00	220,000
Emergency distribution switchboard, 480 V	1,600	AM	25.00	40,000
Automatic transfer switches, 480 V	1,800	AM	55.00	99,000
Transformers, 480-120/208 V	500	KVA	75.00	37,500
Distribution switchboards, 208 V	2,000	AM	26.50	53,000
Feeder conduit and cable	1	LS	75,000.00	75,000
Machine and equipment power				
Connections and switches, including conduit and cable	134,000	SF	1.00	134,000
750 KVA transformer and distribution for cleanroom tools	1	LS	50,000.00	50,000
User convenience power	134,000	SF	5.50	737,000
Lighting	134,000	SF	6.75	904,500
Lighting and power specialties				
Grounding	1	LS	35,000.00	35,000
Lighting control panels	1	LS	55,000.00	55,000
Cable tray	1,500	LF	45.00	67,500
Telephone and communications				
Telephone/data conduit and cable	134,000	SF	3.25	435,500
Master antenna TV/audio-visual, conduit only	1	LS	75,000.00	75,000
Public address speakers, including conduit and cable	120	EA	550.00	66,000
Alarm and security				
Fire alarm systems	134,000	SF	2.50	335,000
Security, perimeter intrusion detection only	1	LS	50,000.00	50,000
				4,559,600

<u>13. Fire Protection Systems</u>

Combined standpipe/automatic wet sprinkler system - complete	134,000	SF	2.75	368,500
FM - 200	1	LS	55,000.00	55,000
				423,500

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
14. Site Preparation & Building Demolition				
				0
15. Site Paving, Structures & Landscaping				
				0
16. Utilities on Site				
				0

Detailed Project Program Cost Plan

SITEWORK COMPONENT SUMMARY

Gross Area: 148,000 SF

			$/SF	$x1,000
1.	Foundations		0.00	0
2.	Vertical Structure		0.00	0
3.	Floor & Roof Structures		0.00	0
4.	Exterior Cladding		0.00	0
5.	Roofing & Waterproofing		0.00	0
Shell (1-5)			0.00	0
6.	Interior Partitions, Doors & Glazing		0.00	0
7.	Floor, Wall & Ceiling Finishes		0.00	0
Interiors (6-7)			0.00	0
8.	Function Equipment & Specialties		0.00	0
9.	Stairs & Vertical Transportation		0.00	0
Equipment & Vertical Transportation (8-9)			0.00	0
10.	Plumbing Systems		0.00	0
11.	Heating, Ventilating & Air Conditioning		0.00	0
12.	Electric Lighting, Power & Communications		0.00	0
13.	Fire Protection Systems		0.00	0
Mechanical & Electrical (10-13)			0.00	0
Total Building Construction (1-13)			**0.00**	**0**
14.	Site Preparation & Demolition		1.25	186
15.	Site Paving, Structures & Landscaping		7.66	1,133
16.	Utilities on Site		2.13	315
Total Site Construction (14-16)			**11.04**	**1,634**
TOTAL BUILDING & SITE (1-16)			**11.04**	**1,634**
	General Conditions	8.00%	0.89	131
	Contractor's Overhead & Profit or Fee	4.00%	0.48	71
PLANNED CONSTRUCTION COST		***April 2003***	**12.40**	**1,836**
	Contingency for Design Development	10.00%	1.24	184
	Allowance for Rising Costs @ 3.0% PA	12.00%	1.64	242
RECOMMENDED BUDGET		***January 2007***	**15.28**	**2,262**

COMPONENT BUDGETS	*Quantity*	*Unit*	*Rate*	*Total*
14. Site Preparation & Building Demolition				
Site clearing and rough grading				
Imported fill (assume provided from adjacent site on Campus)	7,500	CY	5.00	37,500
General site clearing and grading	148,000	SF	1.00	148,000
				185,500
15. Site Paving, Structures & Landscaping				
Site improvements				
Hardscape				
Vehicular and pedestrian paving, storm drainage, site lighting	19,800	SF	20.00	396,000
Service road including paving, curbs, storm drainage, site lighting	15,000	SF	10.00	150,000
Reroute existing storm drainage pipe	1	LS	100,000.00	100,000
Softscape				
Landscaping including soil amendment, shrubs and groundcover, trees, irrigation, site furniture and signage	81,200	SF	6.00	487,200
				1,133,200
16. Utilities on Site				
Mechanical				
Central heating and chilling mains - allowance to POC				
Chilled water, pre-insulated				
12"	100	LF	250.00	25,000
Valves and specialties	1	LS	15,000.00	15,000
Connections to existing	1	LS	15,000.00	15,000
Steam/condensate return, pre-insulated				
6"	50	LF	120.00	6,000
2"	50	LF	75.00	3,750
Valves and specialties	1	LS	7,500.00	7,500
Connections to existing	1	LS	12,500.00	12,500

COMPONENT BUDGETS	***Quantity***	***Unit***	***Rate***	***Total***
Domestic and fire water				
Underground pipework, fittings				
8"	400	LF	52.50	21,000
Valves and specialties	1	LS	25,000.00	25,000
Metering	1	LS	7,500.00	7,500
Connection to existing	1	LS	12,500.00	12,500
Sewer				
Underground pipework, fittings				
8"	400	LF	38.50	15,400
Connection to existing	1	LS	15,000.00	15,000
Natural gas, including metering				
Underground pipework, fittings				
6"	200	LF	38.50	7,700
Metering	1	EA	5,500.00	5,500
Valves and specialties	1	LS	7,500.00	7,500
Connection to existing	1	LS	5,500.00	5,500
Electrical				
Break into existing Manhole and connect	1	EA	7,500.00	7,500
HV feeds, including conduit and cable, 15 KV	200	LF	250.00	50,000
Telecommunications/signals, concrete encased conduit only, (4) 4"	200	LF	75.00	15,000
Pullboxes, per UCLA standard	4	EA	2,500.00	10,000
Trade demolition, relocation and protection of existing services	1	LS	25,000.00	25,000
				314,850