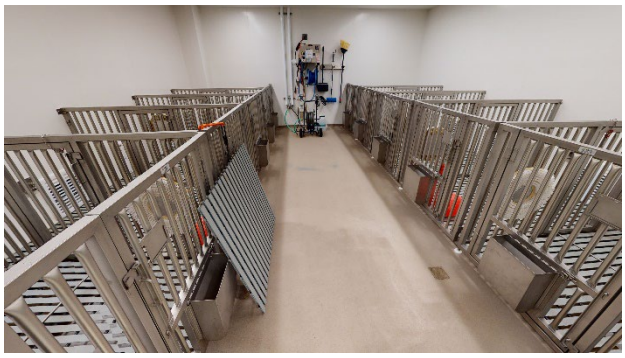
Appendix – Site Visit & Survey Reports







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Site Visits

Index of Photographs

SITE VISIT 1 – Rocky Mountain VAMC, Aurora, CO

SITE VISIT 2 – New Orleans VAMC, New Orleans, LA

Site Visit 1

Aurora, CO – Rocky Mountain Regional VA Medical Center Site Visit Report

Dates of Site Scan:
December 3-4, 2020

Link to Scan:
https://my.matterport.com/show/?m=YRTwzZEBxtL

Dates of Virtual Tours and Discussions:
January 4, 2021
January 7, 2021
January 21, 2021

Facility toured:
Rocky Mountain Regional VA Medical Center
1700 North Wheeling Street
Aurora, CO 80045

Contents

1.1 Facility Overview

- Facility Opening Date: [to be provided]
- Square Footage: 62,000 BGSF
- Number of Stories: 4 (plus a mechanical penthouse)
- VA-Owned or Leased: Owned
- New Construction or Renovation: New Construction
- Number of Research Teams: [to be provided]
- Number of Investigators: [to be provided]
- Conference Space: Small Conference / Multipurpose Rooms on 1st, 2nd, & 3rd Floors
- Animals in Veterinary Medical Unit (VMU): Swine, Mice, Rats
    - Capacity: 16 Swine, 3,000 Rodents
- Access: PIV
- Connection to Medical Center: Connection on 1st floor via a Concourse

1.2 Research and Support Spaces

- Loading Dock (Basement)
- VMU (Basement)
- Biomedical Research Laboratory (1st, 2nd, & 3rd Floors)

1.3 Summary

The virtual site visits occurred in January, 2021. The building was scanned using Matterport (a 3D digitizing technology) and then Attendees "toured" the facility by viewing the scanned images. The purpose of the tour was to collect data and learn from the experience of researchers at the facility. The findings and "lessons learned" are used to determine standards and guidelines for planning future VA Research and Development (R&D) Facilities.

Entry to the R&D facility is protected with badge access. There are two exterior doors. Additionally, the building is accessed from the Medical Center by an at-grade concourse that connects the Research Building to seven other buildings and three parking garages on the campus. The R&D facility is located on the east end of the concourse. There is no Reception Area in this facility (although there is seating by one exterior entrance). Every floor also has doors which are secured via badge access.

The facility was not operating at full capacity at the time of the tour; there were an estimated 12-18 staff members working on each of the 1st, 2nd, and 3rd floors. Each of these floors has the capacity for approximately 50 researchers.

The Biomedical Laboratory Research & Development (BLR&D) Area features an open laboratory, bounded on one side by enclosed support rooms. The Ghost Corridor in the open laboratory houses equipment including sinks, refrigerators, Safety Shower/Eyewash Stations, incubators, and storage. The open laboratory model is an effective laboratory design, promoting sharing of equipment and spaces as well as team collaboration.

Each "island" of lab benches is 10'-6" wide and 12' or 13' long, with one end at a glazed exterior wall. The Bench Units are very flexible with moveable shelves and can be used for multiple types of research. At every other island the benches stop several feet short of the exterior wall, creating an aisle between the windows and two benches.

The sinks in the open laboratory are located on the wall shared with the Support Area. The sink location eliminates the need for plumbing in the center areas of the open laboratory, creating a high degree of flexibility for future bench modifications.

The room is open to the deck above. Cabling for power and data is supplied via utility panels suspended above the benches. This flexibility has been a benefit to the facility.

The Safety Shower / Eyewash Stations in the laboratory do not have nearby floor drains, which is typical at many R&D facilities.

The open laboratory houses multiple chromatography cabinets. Generally, every Principal Investigator is assigned one cabinet, but the cabinets are shared as needed. These cabinets are more cost-effective than Walk-In Refrigerator / Cold Rooms, which are on a different floor in this facility and are not used often by researchers for anything beyond storage.

The BLR&D Support Area consists of two parallel rows of rooms – one row is on the interior portion of the floor, directly accessible from the open laboratory, while the other row is on an

exterior wall and accessed from a corridor. Concern was noted that the amount of Support Area rooms provided for the open laboratory, particularly for tissue culture and fume hoods, may prove insufficient when the facility is fully occupied.

Among the Support Area rooms is one for cytometer and image flow stream, a commonly used service by the researchers at this facility. A multi-use alcove in another area works well to be adapted to the needs of the researchers, with bench space, shelf space, internet access, and numerous data outlets. Several storage areas are located off the laboratories on the second and third floors. The Support Area rooms are approximately 10” x 15” clear (150 sq ft) and appear to be adequate for most uses at this size.

An Isotope Room for radioactive isotopes is located off an open laboratory. At the time of the tour, the facility was not using radioactive materials.

A Microscopy Room is located in the Support Area with direct access from the open laboratory. Blacked-out walls keep the room dark for imaging purposes. In addition to the confocal microscope is a vibration table with another microscope – a public transportation light rail line is located across the major street adjacent to the facility, so the vibration table counteracts that vibration interference. The facility has not had any issues with vibration from the light rail.

One Tissue Culture Room in the Support Area has proven to be too small for its intended three-person capacity. This room does not have adequate accessible electrical outlets or counterspace. Additionally, this room is designed only for processing cultures, as there is no microscope or centrifuge in the room. Transporting samples in and out of the room is not ideal and may present a risk of contamination. Preferably, this room would be designed for two researchers, with only one researcher working at a Biological Safety Cabinet (BSC) at a time, and would include enough bench space for all other equipment, such as microscopes, centrifuges, and water-baths.

Another Tissue Culture Room is designed to be used by one person at a time to do clean tissue culture work, and serves that function well. It was noted that tissue culture of all types is rapidly growing, and at this facility, additional tissue culture space will likely be needed as the number of staff increases.

C02 tanks are brought into rooms to point-of-use locations rather than having a central system. Rooms which require C02 have dedicated spaces to keep the cylinders.

The BLR&D floors each have two fume hoods, a number which has proven inadequate. BSCs are similarly insufficient in number.

Some chemical waste is stored in fume hoods, limiting their use. A satellite accumulation area for chemical waste would be preferable to minimize storage in fume hoods.

Some freezers are housed in rooms which also serve as an entrance into the lab. This is not ideal as open freezers block a path of egress. An Equipment Room housing additional freezers is located between the lab and a General Storage Room.

The 1st, 2nd, and 3rd floor share a single Glassware Washing / Sterilization Room which contains two autoclaves and a dishwasher (the VMU has its own Sterilizer Room). Above the autoclaves are exhaust grilles and soffits to limit vapor movement. Odors from the autoclave sometimes travel up to the 3rd floor. A deionized water system with reverse osmosis in the Penthouse is linked to this room. The Milli Q water connection in this room has plastic components, which tend to leak. The autoclaves are used several times a week, and the dishwasher less often than that. For the capacity at which the facility was running at the time of the tour, this number of autoclaves is adequate. The researchers wash much of their glassware by hand to avoid transporting it to this room.

Each floor contains a Conference / Multipurpose Room that is outfitted with a kitchenette to double as the Staff Breakroom for the floor. Each Conference / Multipurpose Room has teleconferencing capabilities and, during the pandemic, has been outfitted with a workstation to allow social distancing among staff. A larger Conference / Multipurpose Room and more breakroom space is desirable for staff, but the adjacent Building A is available for use for larger meetings and conferences.

Every BLR&D floor includes office space for Principal Investigators. Each PI Office has room for two Principal Investigators, each with his/her own computer and cabinet space, plus larger file cabinets.

The lowest floor of the facility contains the VMU. It was noted that that while VMUs are often located in the basements of facilities, a top floor location is preferable. A top floor location prevents unrelated traffic through the VMU (which happens frequently in the basement), which is highly desirable for a VMU.

This VMU uses swine, mice, and rats. The facility is sized to house 3,000 rodents and 16 swine at once. At the time of the tour, there were around 150 rats and 500 mice at the facility.

One room, designed as an incoming animal Receiving Room and pass-through into a Small Animal Quarantine Holding Room, cannot be used as intended. A few key details of the pass-through hood were modified between the planning and implementation processes – for example, there are controls only on one side of the hood.

A VMU operating suite, consisting of an Operating Room, Gown/Scrub Room, and Surgical Supply Storage Rooms, works well for the facility. The Operating Room contains one surgical table with a utility hookup above it, as well as a second hookup which could service another surgical table if needed (that need has not arisen).

One VMU Large Animal Holding Room can hold up to six swine, while another can hold up to ten. Trench drains are located next to the wall under the cages. Everything in the room is solid and can be cleaned with a pressure sprayer. The cages are removeable for further cleaning.

The Small Animal Holding Rooms are too narrow to allow for proper placement of cages. The individually vented cage systems were designed to be placed across the room, horizontally, but they had to be placed against the wall instead. These rooms are cleaned with a vapor hydrogen peroxide fogging machine, and by wiping the walls.

Most VMU Small Animal Holding Rooms include an attached General Procedure / Treatment Room, which is a sufficient amount of space for procedures (even if the facility were at capacity). However, some of these General Procedure / Treatment Rooms are currently used for imaging, which was not their original intended use. The use of imaging in VMUs has grown substantially since the facility was designed. An suite of rooms to support imaging, with the appropriate closed rooms for imaging modalities, would better support the VMU's current imaging requirements.

Smoking studies on rodents are performed in a suite of two rooms – the front houses the rodents, while the room in which they are exposed to smoke is behind. A special monitoring/surveillance camera was installed for the Investigator to observe the experiment without being physically in the room, to avoid health risks for the Investigator.

The Bedding Storage Room is conveniently located near the corridor, so feed and bedding does not have to be transported a long distance from the Loading Dock.

A small Necropsy Room contains a small animal downdraft table that is single-sided and positioned against the wall. Although the downdraft table works for the VMU's needs, a dual-sided table would be preferred. It does not get used much.

Animal carcasses are stored in a walk-in cold room rather than a Carcass Freezer Room. At the current temperature, the carcasses emit odors that could be avoided at a lower temperature. Additionally, cooling an entire room is inefficient compared to a chest freezer or morgue-style refrigerator.

Animal cages are washed and sterilized in a Cagewash Room, which also includes an automated bedding dispenser. This room has an issue with drainage: the floors do not have a large enough floor drain for the room to work as a "wet room." The floor drains that had once been at the cage wash level were sealed up at the direction of the Corps of Engineers. Most cage washers have a grate in front of / below them, but the engineers could not achieve the necessary airflow for that, so they directed the contractor to close the flow drains to achieve the required airflow in the room. Also, the floors do not slope correctly – any water on the floor flows into the hallway.

The VMU is largely self-sufficient. All housekeeping, daily cleaning/janitorial services, sterilization of tools/equipment and laundry is done within the VMU by the VMU staff. This self-sufficiency mitigates security risks, contamination, and interruptions to animal studies, especially those with light studies.

It was noted that there has been some damage to walls due to a lack of wall and corner guards.

The facility's Loading Dock is primarily used by the VMU. Animals, food, bedding, and (occasionally) larger equipment are delivered via this dock. The interior area of the Loading Dock doubles as storage for the VMU. Some vendors have reported trouble with the steepness of the slope leading to the dock.

The facility is connected to the Medical Center via a concourse. Other than the items listed in the paragraph above, deliveries to the facility come in through the Loading Dock of the Medical Center, which can prove inefficient. Additionally, all staff at this facility must transport their trash to the Medical Center for disposal.

Every floor has an IT and electrical closet, each of which works together to support the whole facility (rather than being dedicated to specific types of research).

The “penthouse” on the top floor of the building contains the air handing units, electrical panels, generators, etc. to service the facility.

1.4 Site Photos

Image A.1 A Lab Bench Unit in the open lab at the Rocky Mountain VAMC R&D Facility includes mobile drawer units and utility drops from the ceiling for adaptability.

Image A.2 The Tissue Culture Room at the Rocky Mountain VAMC R&D Facility has space for multiple researchers. Tissue culture is a rapidly growing area of biomedical research. (Note: Ideally, the tissue culture suite would contain benchtop space for equipment such as microscopes, water baths, and centrifuges.)

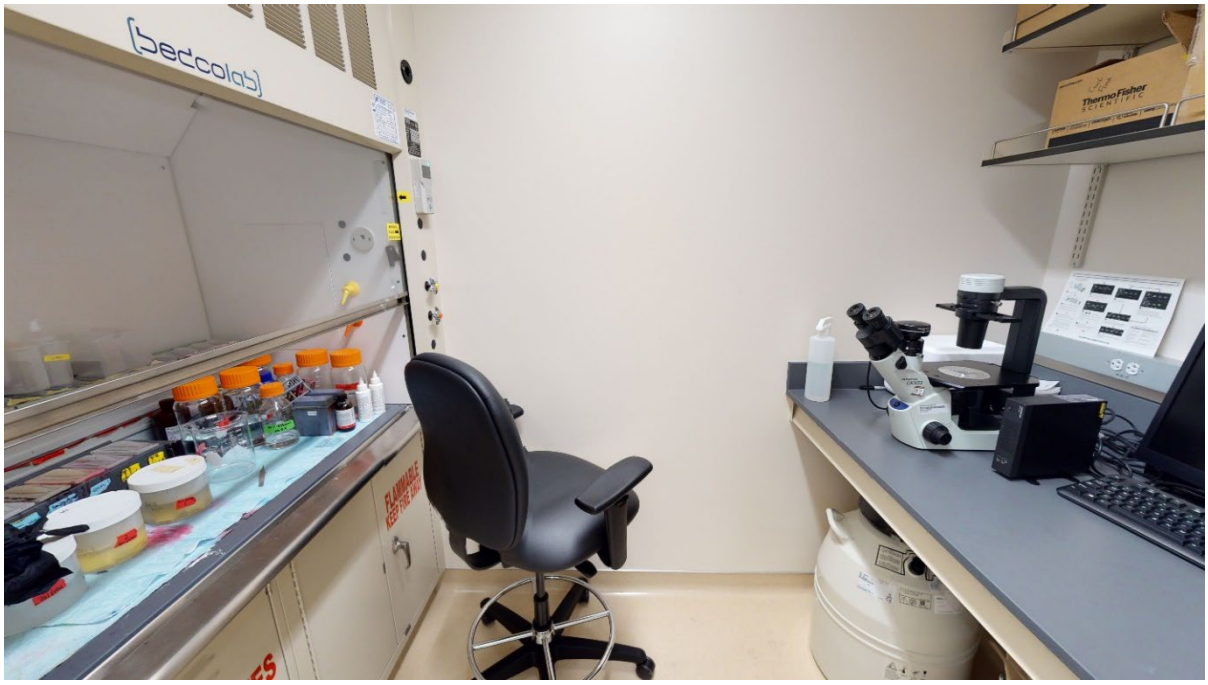


Image A.3 A Fume Hood Room at the Rocky Mountain VAMC R&D Facility provides space for researchers to examine tissue culture cells. This microscope should be in the tissue culture suite to minimize movement and potential cross-contamination.

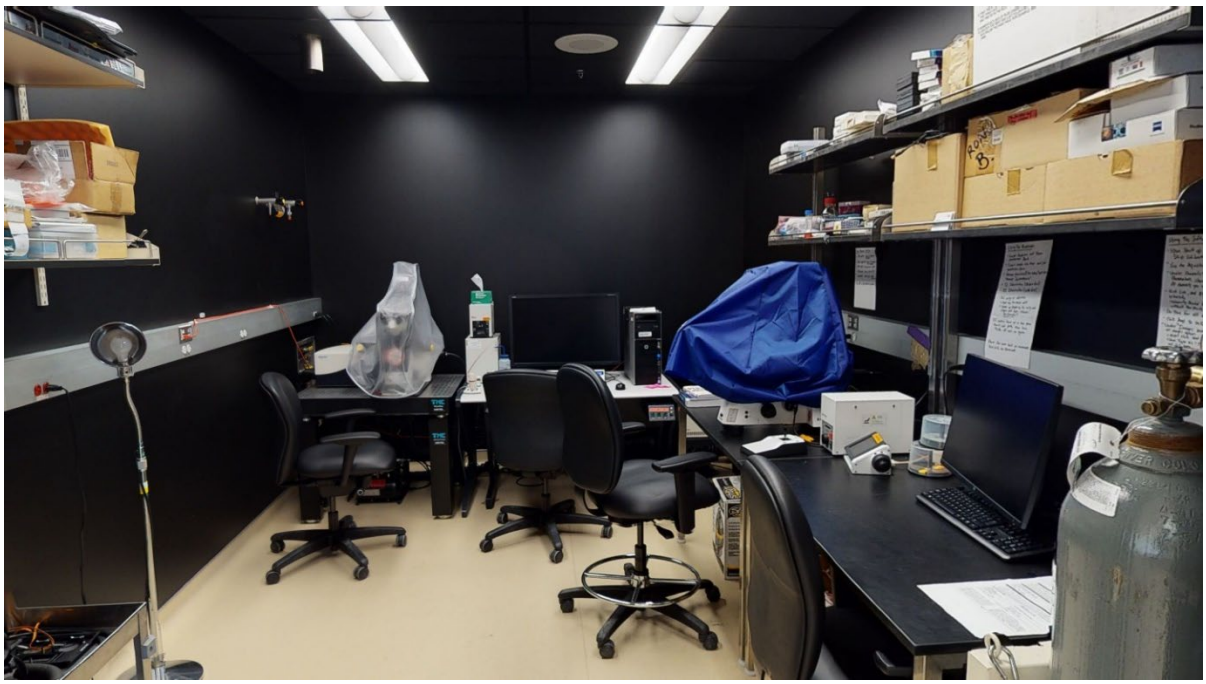


Image A.4 The Microscopy Room at the Rocky Mountain VAMC R&D Facility provides a dark environment with no windows and black walls.

Image A.5 The Emergency Shower / Eyewash Station is centrally located in the biomedical laboratory at the Rocky Mountain VAMC R&D Facility.

Image A.6 Chromatography cabinets within the open laboratory at the Rocky Mountain VAMC R&D Facility are a cost-effective alternative to cold rooms.

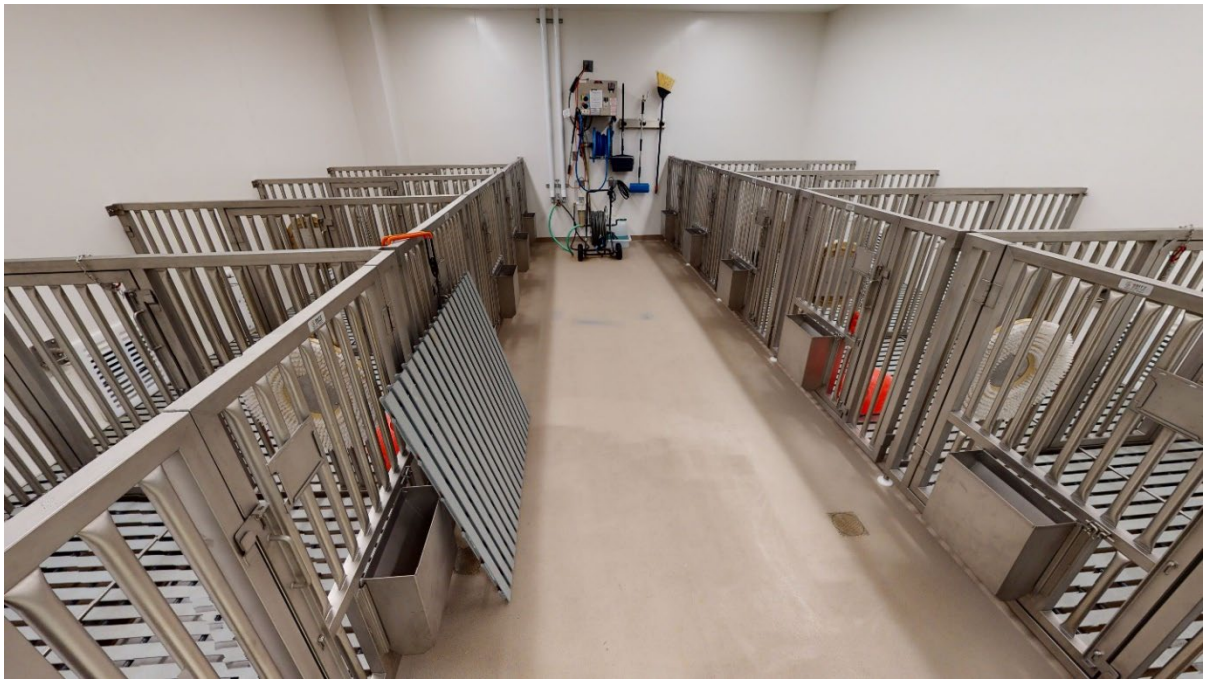


Image A.7 Cages in the Large Animal Holding Room at the Rocky Mountain VAMC R&D Facility include openings for social interactions and open grate flooring for cleaning.

Image A.8 The Cagewash Area at the Rocky Mountain VAMC R&D Facility is separated into a clean side and a soiled side by the cage washer.

Image A.9 This General Procedure / Treatment Room at the Rocky Mountain VAMC R&D Facility is used for non-survival procedures on rodents.

Image A.10 Small animals received at the Rocky Mountain VAMC R&D Facility are examined in this room and then moved through the biological safety cabinet pass-through into quarantine. (Note: Disparities between the plan and execution of this room resulted in it not being used as much as would be preferred.)

Image A.11 The Bedding Storage Room at the Rocky Mountain VAMC R&D Facility is conveniently located next to the corridor leading to the Loading Dock.

Image A.12 Each floor of the Rocky Mountain VAMC R&D Facility contains a Conference / Multipurpose Room with teleconferencing capabilities that includes a kitchenette to double as the Break Room for the floor.

Image A.13 The Loading Dock at the Rocky Mountain VAMC R&D Facility is used for VMU equipment storage. (Note: Ideally, there would be a storage room for equipment not currently in use as equipment needs change with research projects.)

ELEC
CS-111
01-SV-C37-E9

SER ALCOVE
CS-109
01-SV-C39-03

LOAD RM
CS-107
01-SV-C39-02

CORRIDOR
CS-C02
01-SV-C40-01

DATA / TELECOMM
CS-103
01-SV-C11-O

CONDENSATE LIFT / STORM & SAN
CS-101
01-SV-C11-N

02-SV-D1-01 | W04
IN-01.41

02-SV-D1-01 | W01
IN-08.02.01

02-SV-D1-01 | W03
IN-01.19

02-SV-D1-01 | W02
IN-01.22

02-SV-D1-01 | W05
IN-10.05

02-SV-A3-02 | W01
IN-01.22

02-SV-A3-02 | W02
IN-01.41

02-SV-A3-02 | W04
IN-08.09

02-SV-D1-01 | W06
IN-08.09

RECYC WASTE STOR
BS-101
02-SV-A2-01

BIOHAZ WASTE STOR
02-SV-A2-02

GAS CYLINDER STOR
BS-103
02-SV-A2-04

02-SV-A3-02 | W03
IN-10.05

RAD WASTE STOR
02-SV-A2-03

CORRIDOR
BS-C01
02-SV-A2-10

ALCOVE
BS-105
02-SV-A2-05

WALK-IN COLD FOOD STOR
BS-104A
02-SV-A2-08

FEED/BEDDING STOR
BS-104
02-SV-A2-07

WASTE COLD RM
BS-107
02-SV-A2-06

NECROPSY
BS-106
02-SV-A2-09

KITCHEN
BS-112
02-SV-B2-01

CORRIDOR
BS-C02
02-SV-A3-02

CAGE WASH
BS-113A
02-SV-A3-03

CAGE WASH
BS-113B
02-SV-B3-01

UP
STAIR
BS-ST1
02-SV-ST1

ELEC
BS-151
02-SV-B2-E2

ELEV
BE-S01
02-SV-SE12

CORRIDOR
BS-C05
02-SV-D1-01

ELEV VEST
BS-100
02-SV-C2-02

ELEV
BE-S02
02-SV-SE13

SMOKE RM
BS-114A
02-SV-B2-02

SMALL ANIMAL HOLD
BS-114
02-SV-B2-03

MALE SHOWER
02-SV-C2-05

VEST
BS-153
02-SV-E2-08

FEMALE SHOWER
02-SV-D2-05

MALE TLT
BS-118A
02-SV-C2-03

FEMALE TLT
BS-118B
02-SV-D2-02

VEST
BS-118
02-SV-E2-09

STOR
BS-116
02-SV-C2-04

LAUNDRY
BS-120
02-SV-D2-03

02-SV-E2-09 | W01
IN-01.41

CLEAN CAGE STOR
BS-115
02-SV-C3-02

SMALL ANIMAL HOLD
BS-117
02-SV-D3-01

PROC LAB
BS-117A
02-SV-D3-02

PROC LAB
BS-123A
02-SV-D3-03

SMALL ANIMAL HOLD
BS-123
02-SV-E3-01

SMALL ANIMAL HOLD
BS-125
02-SV-E3-02

PROC LAB
BS-125A
02-SV-F3-01

PROC LAB
BS-129A
02-SV-F3-02

SMALL ANIMAL HOLD
BS-129
02-SV-F3-03

SMALL ANIMAL HOLD
BS-131
02-SV-G3-01

PROC LAB
BS-131A
02-SV-G3-02

PROC LAB
BS-135A
02-SV-G3-03

SMALL ANIMAL HOLD
BS-135
02-SV-H3-01

HOLD
BS-137
02-SV-H3-02

LARGE ANIMAL HOLD
BS-139
02-SV-J3-01

LARGE ANIMAL HOLD
BS-C03
02-SV-J3-02

LARGE ANIMAL HOLD
BS-141
02-SV-J3-03

Image A.7
Large Animal Holding Room

Image A.8
Cage Wash

LOUNGE
BS-155
02-SV-E2-03

PROC LAB
BS-126A
02-SV-E2-04

PROC LAB
BS-128A
02-SV-F2-00

DATA / TELECOMM
BS-157
02-SV-F2-T1

ELEC
BS-159
02-SV-G2-E1

UP
STAIR
BS-ST2
02-SV-ST2

WORK
BS-161
02-SV-E2-01

WORK
BS-163
02-SV-J2-01

SMALL ANIMAL HOLD
BS-122
02-SV-D2-04

PROC LAB
BS-124
02-SV-E2-02

SMALL ANIMAL HOLD
BS-126
02-SV-E2-05

SMALL ANIMAL HOLD
BS-128
02-SV-F2-01

SMALL ANIMAL HOLD
BS-130
02-SV-F2-02

PROC LAB
BS-132
02-SV-G2-01

SMALL ANIMAL HOLD
BS-134
02-SV-G2-02

Image A.9
Procedure Room

SURG STOR
BS-150B
02-SV-H2-01

SURG STOR
BS-150A
02-SV-H2-02

SURGICAL SUITE
BS-150
02-SV-J2-02

SCRUB/GOWN
BS-148
02-SV-J2-04

RECOVERY
BS-146
02-SV-J2-05

CORRIDOR
BS-C04
02-SV-K2-04

CORRIDOR
02-SV-C3-01

Image A.10
Animal Receiving

ANIMAL RECEIVING/EXAM
BS-147
02-SV-K2-01

HOLD QUARANTINE
BS-145
02-SV-K2-02

HAC
BS-143
02-SV-K3-01

SUPPLY STOR
BS-149
02-SV-K2-03

02-SV-K2-04 | W01
IN-01.41

02-SV-K2-04 | W02
IN-01.22

02-SV-K2-04 | W03
IN-08.09

02-SV-K2-04 | W03
IN-10.05

VEST
BS-164
02-SV-K1-02

ELEV MACH RM
BS-166
02-SV-K1-V19

ELEV
BE-S03
02-SV-SE19

UP

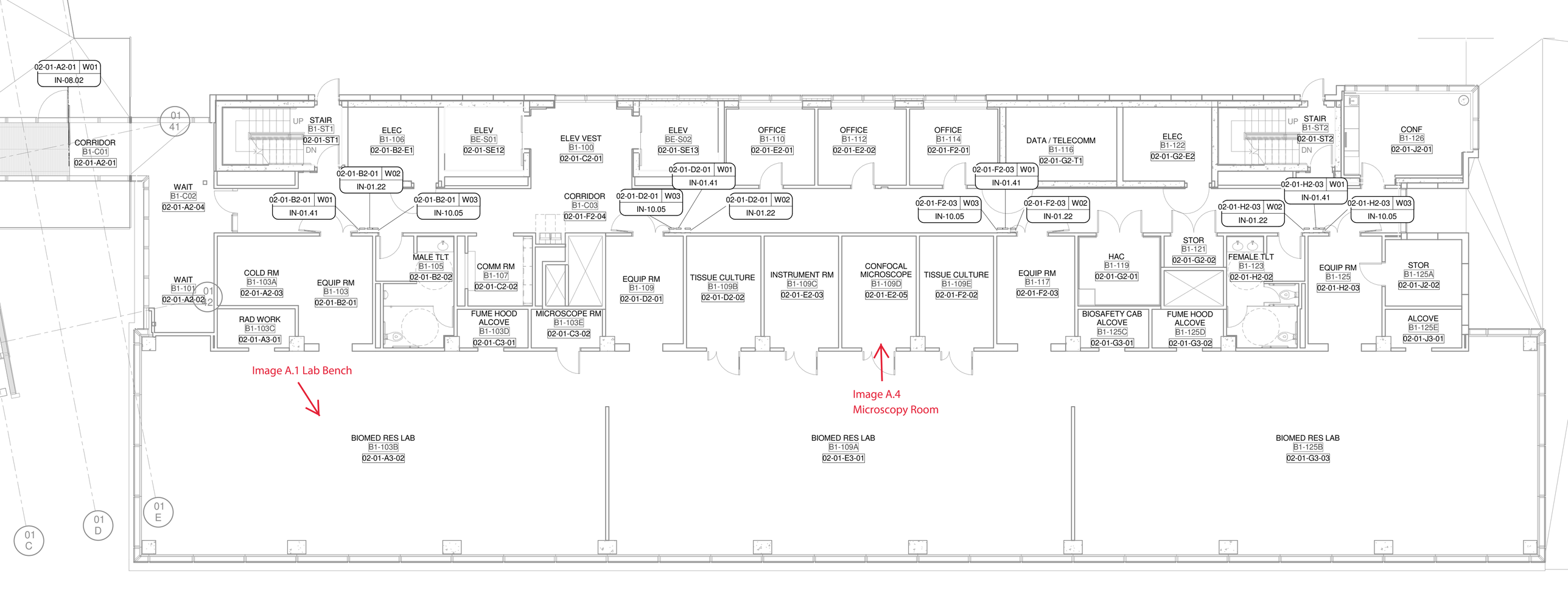
LOADING DOCK
BS-165
02-SV-K1-01

Image A.13
Loading Dock

02-SV-K1-01 | W01
IN-08.02.01

Image A.11 Feed/Bedding Storage

01 38
01 39
01 40
01 B
01 41
01 42
01 E
01 D
01 C
01 B


02-01-A2-01 | W01
IN-08.02
CORRIDOR
B1-C01
02-01-A2-01
01
41
UP
STAIR
B1-ST1
02-01-ST1
DN
ELEC
B1-106
02-01-B2-E1
ELEV
BE-S01
02-01-SE12
ELEV VEST
B1-100
02-01-C2-01
ELEV
BE-S02
02-01-SE13
OFFICE
B1-110
02-01-E2-01
OFFICE
B1-112
02-01-E2-02
OFFICE
B1-114
02-01-F2-01
DATA / TELECOMM
B1-116
02-01-G2-T1
ELEC
B1-122
02-01-G2-E2
UP
STAIR
B1-ST2
02-01-ST2
DN
CONF
B1-126
02-01-J2-01
WAIT
B1-C02
02-01-A2-04
02-01-B2-01 | W01
IN-01.41
02-01-B2-01 | W02
IN-01.22
02-01-B2-01 | W03
IN-10.05
CORRIDOR
B1-C03
02-01-F2-04
02-01-D2-01 | W01
IN-01.41
02-01-D2-01 | W03
IN-10.05
02-01-D2-01 | W02
IN-01.22
02-01-F2-03 | W01
IN-01.41
02-01-F2-03 | W03
IN-10.05
02-01-F2-03 | W02
IN-01.22
02-01-H2-03 | W01
IN-01.41
02-01-H2-03 | W02
IN-01.22
02-01-H2-03 | W03
IN-10.05
WAIT
B1-101
02-01-A2-02
01
42
COLD RM
B1-103A
02-01-A2-03
EQUIP RM
B1-103
02-01-B2-01
MALE TLT
B1-105
02-01-B2-02
COMM RM
B1-107
02-01-C2-02
EQUIP RM
B1-109
02-01-D2-01
TISSUE CULTURE
B1-109B
02-01-D2-02
INSTRUMENT RM
B1-109C
02-01-E2-03
CONFOCAL MICROSCOPE
B1-109D
02-01-E2-05
TISSUE CULTURE
B1-109E
02-01-F2-02
EQUIP RM
B1-117
02-01-F2-03
HAC
B1-119
02-01-G2-01
STOR
B1-121
02-01-G2-02
FEMALE TLT
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EQUIP RM
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02-01-H2-03
STOR
B1-125A
02-01-J2-02
RAD WORK
B1-103C
02-01-A3-01
FUME HOOD ALCOVE
B1-103D
02-01-C3-01
MICROSCOPE RM
B1-103E
02-01-C3-02
BIOSAFETY CAB ALCOVE
B1-125C
02-01-G3-01
FUME HOOD ALCOVE
B1-125D
02-01-G3-02
ALCOVE
B1-125E
02-01-J3-01
Image A.1 Lab Bench
Image A.4
Microscopy Room
BIOMED RES LAB
B1-103B
02-01-A3-02
BIOMED RES LAB
B1-109A
02-01-E3-01
BIOMED RES LAB
B1-125B
02-01-G3-03
01
C
01
D
01
E

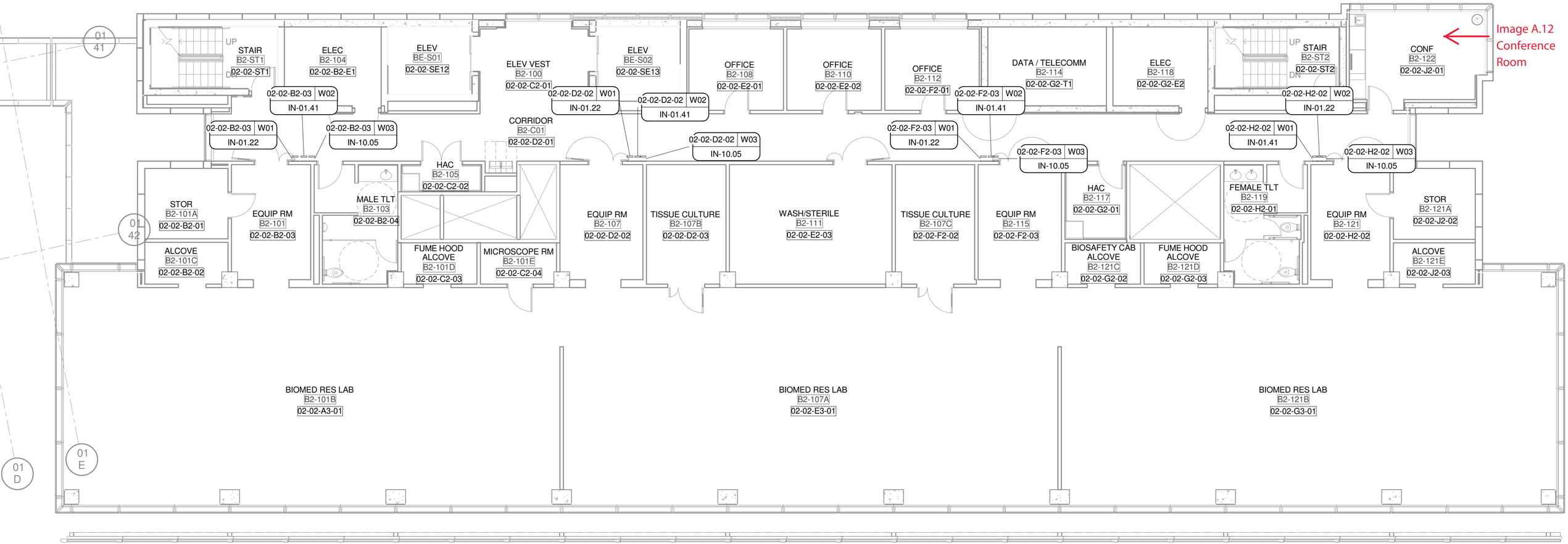
Image A.12
Conference Room
01 41
01 42
01 E
01 D
UP
DN
STAIR B2-ST1 02-02-ST1
ELEC B2-104 02-02-B2-E1
ELEV BE-S01 02-02-SE12
ELEV VEST B2-100 02-02-C2-01
ELEV BE-S02 02-02-SE13
OFFICE B2-108 02-02-E2-01
OFFICE B2-110 02-02-E2-02
OFFICE B2-112 02-02-F2-01
DATA / TELECOMM B2-114 02-02-G2-T1
ELEC B2-118 02-02-G2-E2
STAIR B2-ST2 02-02-ST2
CONF B2-122 02-02-J2-01
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02-02-F2-03 W03 IN-10.05
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02-02-H2-02 W03 IN-10.05
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STOR B2-101A 02-02-B2-01
EQUIP RM B2-101 02-02-B2-03
MALE TLT B2-103 02-02-B2-04
ALCOVE B2-101C 02-02-B2-02
FUME HOOD ALCOVE B2-101D 02-02-C2-03
MICROSCOPE RM B2-101E 02-02-C2-04
EQUIP RM B2-107 02-02-D2-02
TISSUE CULTURE B2-107B 02-02-D2-03
WASH/STERILE B2-111 02-02-E2-03
TISSUE CULTURE B2-107C 02-02-F2-02
EQUIP RM B2-115 02-02-F2-03
HAC B2-117 02-02-G2-01
BIOSAFETY CAB ALCOVE B2-121C 02-02-G2-02
FUME HOOD ALCOVE B2-121D 02-02-G2-03
FEMALE TLT B2-119 02-02-H2-01
EQUIP RM B2-121 02-02-H2-02
STOR B2-121A 02-02-J2-02
ALCOVE B2-121E 02-02-J2-03
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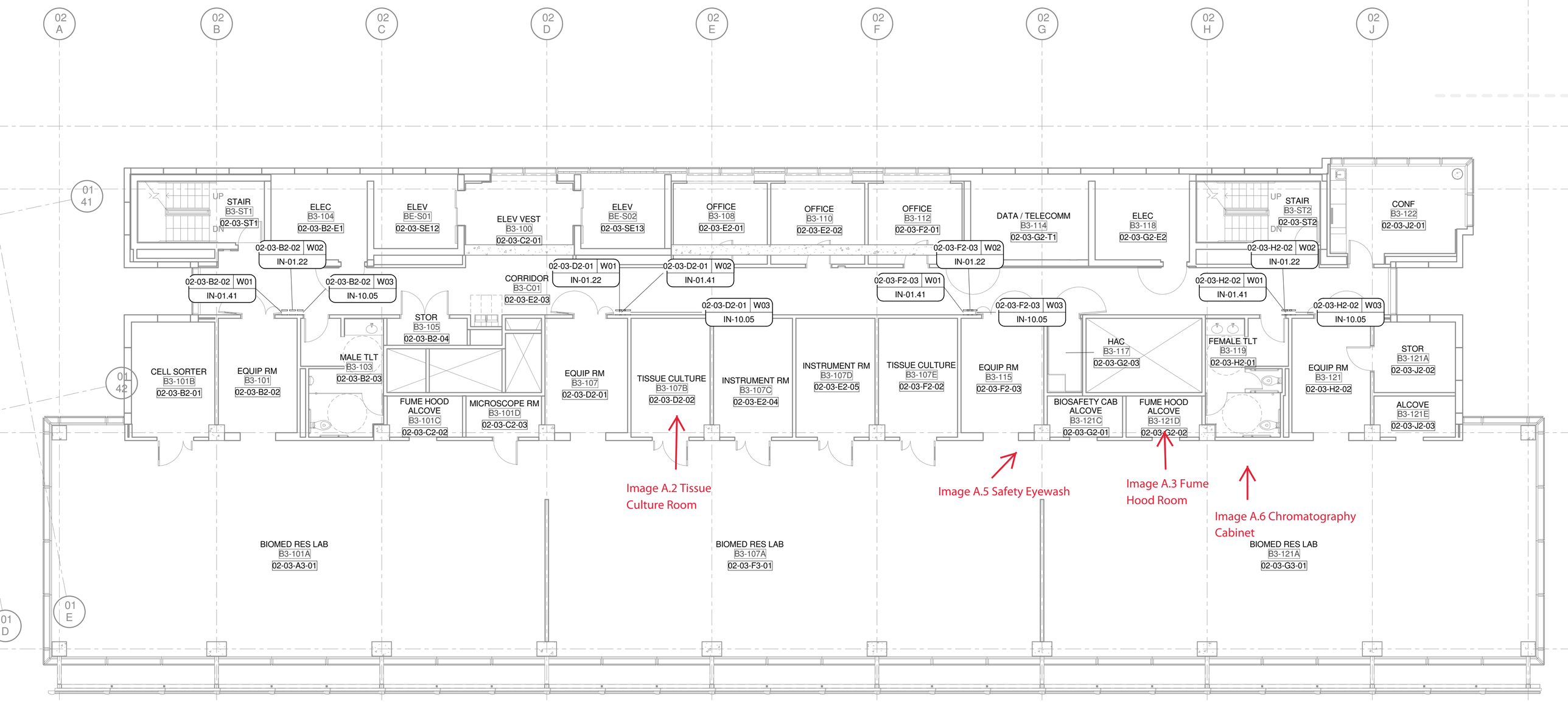
BIOMED RES LAB B2-121B 02-02-G3-01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02 E
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02 G
02 H
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02-03-ST1
ELEC
B3-104
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BE-S01
02-03-SE12
ELEV VEST
B3-100
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ELEV
BE-S02
02-03-SE13
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OFFICE
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B3-118
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02-03-B2-02 W03
IN-10.05
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B3-C01
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02-03-D2-01 W01
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STOR
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FUME HOOD ALCOVE
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MICROSCOPE RM
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INSTRUMENT RM
B3-107C
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INSTRUMENT RM
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TISSUE CULTURE
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EQUIP RM
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HAC
B3-117
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FUME HOOD ALCOVE
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FEMALE TLT
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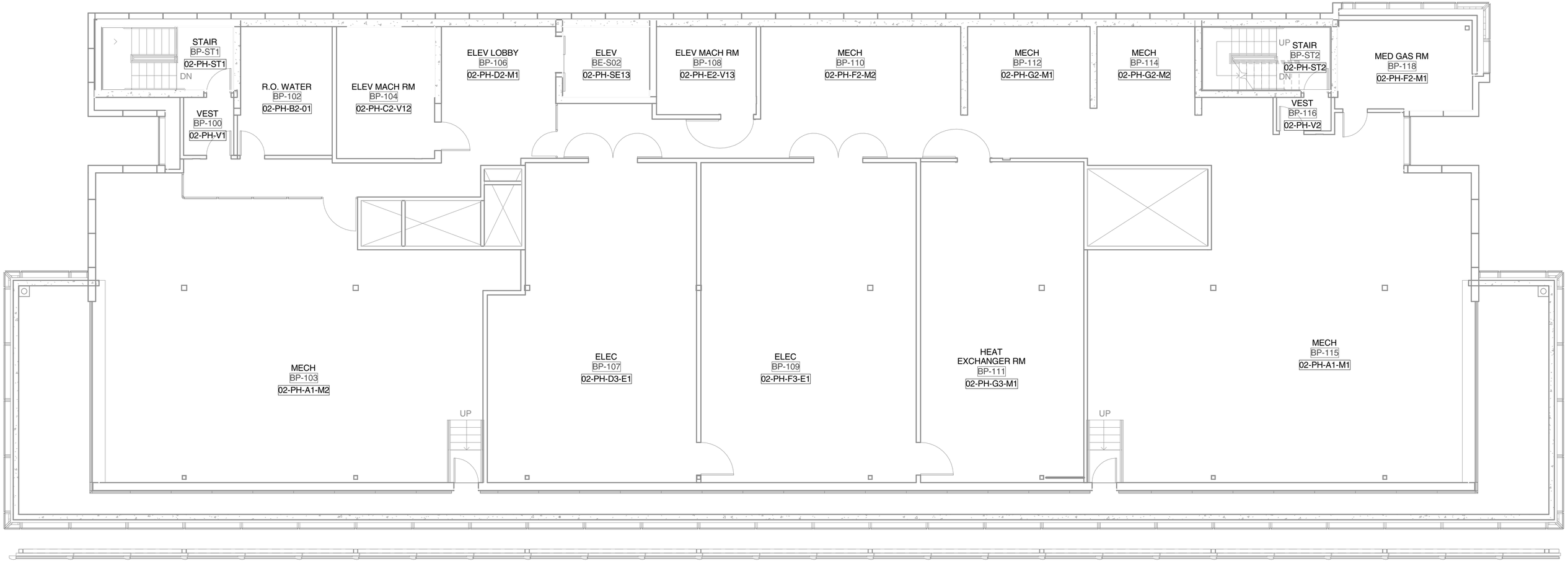
EQUIP RM
B3-121
02-03-H2-02
STOR
B3-121A
02-03-J2-02
ALCOVE
B3-121E
02-03-J2-03
Image A.2 Tissue Culture Room
Image A.5 Safety Eyewash
Image A.3 Fume Hood Room
Image A.6 Chromatography Cabinet
BIOMED RES LAB
B3-101A
02-03-A3-01
BIOMED RES LAB
B3-107A
02-03-F3-01
BIOMED RES LAB
B3-121A
02-03-G3-01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BP-104
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ELEV LOBBY
BP-106
02-PH-D2-M1
ELEV
BE-S02
02-PH-SE13
ELEV MACH RM
BP-108
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MECH
BP-110
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MECH
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MECH
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UP
STAIR
BP-ST2
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DN
VEST
BP-116
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MED GAS RM
BP-118
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MECH
BP-103
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02-PH-D3-E1
ELEC
BP-109
02-PH-F3-E1
HEAT
EXCHANGER RM
BP-111
02-PH-G3-M1
UP
MECH
BP-115
02-PH-A1-M1

Site Visit 2

New Orleans, LA – New Orleans VA Medical Center Site Visit Report

Dates of Site Scan:
January 21-22, 2021

Link to Scan:
https://my.matterport.com/show/?m=WCEkHSmBVRe

Date of Virtual Tour and Discussion:
February 4, 2021

Facility toured:
New Orleans VA Medical Center
119 S Galvez Street
New Orleans, LA 70119

Contents

2.1 Facility Overview

- Facility Opening Date: December 14, 2018 (ribbon cutting ceremony); March 15, 2019 (commissioned laboratories); November 4, 2019 (commissioned VMU)
- Square Footage: 103,000
- Number of Stories: 4 (plus a mechanical penthouse floor and mechanical mezzanine)
- VA-Owned or Leased: Owned
- New Build or Renovation: Combination – renovation of the old Dixie brewery plus an addition
- Number of Research Teams: 14
- Number of Investigators: 16 funded BLRD Investigators
- Number of Studies: 94 (as of April 2021)
- Conference Space: Medium-Sized (12 Chairs) Conference / Multipurpose Rooms on Two Floors
- Animals Held: Mice, Rats
    - Capacity: ~15,000 mice (300 housed at time of tour), 5,000-7,000 rats (100 housed at time of tour)
- Access: PIV
- Adjacency to Medical Center: Next to Main Medical Center

2.2 Research Spaces

- Reception (1st Floor)
- Administrative/Office Space (1st Floor)
- Loading Dock (1st Floor)
- Health Services and Dry Research Space (Floors 2.5, 3.5, and 4.5)
- Laboratory Research Space (2nd and 3rd Floors)
- Veterinary Medical Unit (4th Floor)
- Mechanical Penthouse & Mezzanine (5th Floor)

2.3 Summary

The virtual site visit occurred on February 4, 2021. The building was scanned using Matterport (a 3D digitizing technology) and then Attendees "toured" the facility by viewing the scanned images. The purpose of the site visit was to collect data and learn from the experience of researchers at the facility. The findings and "lessons learned" are used to determine standards and guidelines for planning future VA Research and Development (R&D) Facilities.

The facility recently opened with the completion of both renovations and new construction. It was built around a historical building (formerly a Dixie Brewery). Researchers were still moving into the facility; therefore, the facility was not operating at full capacity at the time of the tour.

The facility performs Biomedical, Veterinary Medical, and Health Services research and development.

The R&D facility is secured with three levels of PIV access. Level 1 grants access to the first floor. Level 2 grants access to the administrative spaces on upper floors. Level 3 grants access to laboratories and the VMU. VA Police assign levels of access after consulting with the ACOS/R on each employee request. Levels 2 and 3 access are granted on a need-only basis.

The 1st floor contains a Reception Area, as well as offices for Logistics, a Community Living Center (administrative, not living quarters), and a Compensated Work Therapy program.

The facility's Loading Dock is used for large items, chemicals, animals, feed, and bedding, but most deliveries go through the adjacent Medical Center. A freight elevator (secured with PIV access) leads from the Loading Dock to the VMU on the 4th Floor.

The newly constructed portion of the facility was built with higher ceilings than the renovated historical portions. The historical portions are designated as "half floors" (2.5, 3.5, and 4.5) due to being offset from the new portions of the building. Personnel elevators serve both the new and existing floors to provide full access to all floors of the building.

Because of the limited ceiling height, the historical portions of the building are used for administrative, office, and conference space. Most of the office space on Floors 2.5, 3.5, and 4.5 is used for dry research (Health Services R&D, Biomedical Research R&D support, and basic science). These research spaces mostly consist of large rooms with cubicle workstations.

There are two medium-sized Conference / Multipurpose Rooms in the historical portion of the building, each with about a dozen seats. These rooms can be booked by any research group in the facility. Researchers have expressed a desire for one large Conference / Multipurpose Room to share for grand rounds presentations.

The 2nd and 3rd floors contain Biomedical laboratories, with six laboratories on each floor. Each floor has one laboratory with five "islands" of lab benches, one lab with three islands, and four labs with two islands. There are two parallel corridors outside the lab. One corridor leads to the support area, and the other, accessed through a short hallway containing refrigerators and freezers, leads to offices.

The lab benches in the laboratories are modular. The cabinetry and shelves of these modular benches are adjustable. Trash cans for disposables are conveniently tucked under the lab benches. Each module consists of two 5'-long benches, with a third bench by the window, a few inches lower than the lab bench, which is 4' long. The staff is satisfied with the amount of counterspace provided. In contrast to the Denver facility, the benches extend to the exterior wall.

The laboratory is not completely open the entire length of the research floor like the Denver lab, but broken up into three, five, or six lab modules as described above. The groups of modules are divided by non-structural drywall partitions with minimal utilities/services which allow for minor renovation demolition, should the facility need to open or modify the existing laboratory space. Sinks and plumbing are located against the interior wall, allowing flexibility to reconfigure the lab benches.

The laboratories have dropped acoustical tile "cloud" ceilings, primarily to mitigate acoustics within the space.

The lab benches include local snorkel exhaust systems – venting ducts running from the ceiling to the countertop. These snorkels provide flexibility at the bench, aiding in work with vibratomes, microtomes, or anything requiring the use of solvents.

Every lab has a flammable storage cabinet.

C02 tanks are brought into rooms at this facility, rather than being connected via piping from outside the room. Rooms which require C02 have dedicated spaces to keep the cylinders. A cylinder Storage Room on the 2nd floor is vented and contains both C02 and liquid nitrogen tanks.

A 270 sq ft Core Room for histology is located off the laboratory and contains a cryostat, PCR machine, fume hood, freezers, tank harnesses, and a small work area for processing tissue samples. The alcove is divided by a partition wall. On the other side of the wall is a double-glass-door refrigerator, a fume hood, storage for corrosives, an oven, a scale, a microscope, and tables with a good amount of counterspace for a work area. The fume hood is next to the corrosive storage, allowing the latter to be ducted.

There is one Safety Eyewash / Shower Station in each laboratory, and two in the hallway on each floor, outside the laboratory. In the largest laboratory, there are two Safety Eyewash / Shower Stations. One Safety Eyewash / Shower Station is embedded in the 3rd floor histology room. There are eyewash stations at each sink in addition to the Safety Eyewash / Shower Station.

Each laboratory, as well as the Glassware Washing / Sterilization Room, contains a point-of-use reverse osmosis purified water system with UV light (there is not a whole-building system).

A room on the 3rd floor which was designed for mass spectrometry was repurposed when the facility did not receive a mass spectrometer. The room is designed for vibration sensitivity with a 6' by 10' gel pad embedded into the concrete floor slab.

A Tissue Culture Room on the 3rd floor consists of a front and back room. In the front room is a Biological Safety Cabinet (BSC), a microscope, and room for a centrifuge. In the back room is a confocal microscope, among other furniture and equipment. The two-room configuration allows for easier maintenance of negative air pressure. The BSC in this room is ducted, which could pose a problem if the HVAC system imbalances the cabinet and causes the cabinet to lose containment or product protection.

A Corrosive Storage Room and Flammable Storage Room are located on the 3rd floor. Both rooms have dedicated exhaust.

A 2nd floor Microscope Room, which was still in the process of being unpacked, has a double-door entry and light-colored walls, so will need a curtain installed to block light. A connected back room contains a confocal microscope unit.

A Glassware Washing / Sterilization Room on the 2nd floor contains two glass washers, a drying unit, an ice maker, an autoclave, and a sink with a water filtration system. A ground fault interrupter above the sink is protected on the circuit. The autoclave is used to sterilize water, instruments, and yeast broth. There are exhaust diffusers but no capture hood or soffit above the autoclave.

The facility has two large autoclaves, one each on the 3rd and 4th floor, and several autoclaves used mostly for instruments. Most researchers use disposable glassware, with the exception of a few who reuse glassware.

A freezer farm on the 2nd floor contains -80°F freezers which are individually locked and each assigned to one researcher. The facility was in the process of obtaining computers to organize and catalogue the samples in the freezers.

120 sq ft PI Offices on the lab floors contain a desk, shelves, cabinets, and a window.

The VMU on the 4th floor uses mice and rats. Rats are mostly used for behavioral studies such as rotarod and conditioned place preference, as well as jugular and cranial implants. Mice are used more for studying high blood pressure and insulin, and other studies of that nature. There are currently about 300 mice and 100 rats. The facility can accommodate 5,000 to 7,000 rats and 15,000 mice.

At full capacity, the VMU would have at least five full-time equivalent (FTE) staff. Two FTE researcher positions are currently filled.

Two Small Animal Quarantine Holding Room are located next to the freight elevators, where animals are brought in from the Loading Dock.

Several rooms in the VMU, including a Carcass Freezer Room and a Procedure Room for exposure experiments, were repurposed to be used for behavioral studies. To make more room for behavioral studies, imaging equipment was moved to the 3rd floor, requiring researchers to transport animals from the VMU to the 3rd floor and back for IVIS and PET-CT scanning. Despite this relocation and the repurposing of rooms, behaviorists still have less space than would be ideal. They assemble and disassemble behavioral study units as needed, to work with the space available.

The VMU includes a hallway with a well-sized Staff Breakroom, two Offices (one for the VMU supervisor and one for the veterinarian), and separate Locker Rooms with Showers for both genders. There is a scrub dispenser which dispenses clean sets of scrubs and receives soiled sets. Laundry is handled by outsourcing the service.

A diagnostic laboratory contains an incubator, dissecting microscope, tabletop autoclave, sink, computer, and other supplies. It works well for the VMU staff.

The Soiled Cage Room includes two dump stations, a bottle washer, a cage washer, a pass-through autoclave, and a rack to assist with washing bottles. The Clean Cage Room includes the clean side of the pass-through autoclave and cage washer, and a processing area with a bottle filler and bedding dispenser. The room is cleaned with cold sterilization, using a hose or the deep sink with a high-pressure sprayer.

The necropsy table in the Necropsy Room is downdraft and two-sided, allowing two people to work simultaneously. The room is versatile, with two oxygen tanks that could be used to set up an isoflurane unit if needed.

Animal carcasses are stored in a walk-in Carcass Freezer Room, but a chest freezer would have been adequate.

Place preference studies are conducted in a repurposed space that was originally designed to hold a cistern which was ultimately not added. The concrete floors were sealed.

The VMU walls are protected with fiberglass panel wainscoting. There is an integral cove base where the floor and wall meet.

One Small Animal Holding Room contains an alcohol exposure chamber which is extremely well sealed with double chambers, and ventilation on the outer chamber. A hose on the back of the chamber connects to an exhaust duct to vent the vapors. This sealing and venting allow the chamber to be located in the room without disturbing the animals. The Small Animal Holding Rooms have adjustable light cycles and red lights.

Another Small Animal Holding Room contains both single-sided and double-sided ventilated cage racks, which can be placed against a wall or freestanding in the middle of the room, respectively. The cage-changing station in the room is double-sided and height-adjustable. Exhaust connections provide required air changes for the room.

The Surgery Area is designed for procedures on larger species such as rabbits, which the VMU has the capability to house. Oxygen and compressed air are piped into the Operating Room.

One Surgical Preparation Room contains drawers in the cabinetry under the sink which are each locked separately. Each researcher is assigned a drawer and a unique key to store their drugs. Additionally, the cabinets are secured by a second layer of locks.

The VMU has four General Procedure / Treatment Rooms which can be used for rodent surgery. Researchers often perform several surgeries at once, so they may have three isoflurane units set up in one room, which would be crowded in this room. Active scavenging systems in these treatment rooms would be appreciated. The staff would also prefer casework with knee-space underneath to make it easier to perform deskwork.

The fifth floor is the mechanical penthouse and houses the air handling units, electrical panels, pumps, etc. There is a mechanical mezzanine in the penthouse. There are no interstitial mechanical floors at this facility.

Due to the facility's location, there was some concern about humidity, but the systems have been balanced and commissioned so that it is not an issue.

2.4 Site Photos

Image A.14 The adaptability of the Lab Bench Units at the New Orleans VAMC R&D Facility is enhanced with snorkel exhaust systems.

Image A.15 The two-room configuration of the Tissue Culture Room at the New Orleans VAMC R&D Facility facilitates maintenance of negative air pressure.

Image A.16 A fume hood at the New Orleans VAMC R&D Facility is located next to a corrosive storage cabinet, and share ventilation.

Image A.17 A Microscopy Room at the New Orleans VAMC R&D Facility, still in the process of being unpacked, has a room in the back where a confocal microscope resides.

Image A.18 Every sink in the New Orleans VAMC R&D Facility laboratory includes a Safety Eyewash Station.

Image A.19 A Small Animal Holding Room at the New Orleans VAMC R&D Facility contains height adjustable ventilated cage racks, both single-sided and double-sided, which can be placed against a wall or freestanding in the middle of the room, respectively. The room also has exhaust vent pipes to evacuate dander and other particles.

Image A.20 The Soiled Cage Room at the New Orleans VAMC R&D Facility contains dump stations, a bottle washer, a pass-through autoclave, a cage washer, and a rack which can be used to wash bottles and other equipment in the cage washer if the bottle washer is inoperable.

Image A.21 A VMU General Procedure / Treatment Room at the New Orleans VAMC R&D Facility contains stainless steel cabinetry, a biological safety cabinet, and a fume hood.

Image A.22 A General Procedure / Treatment Room at the New Orleans VAMC R&D Facility is used for behavioral research and contains metabolic chambers, an arm maze, a catwalk, and various other behavioral equipment pieces.

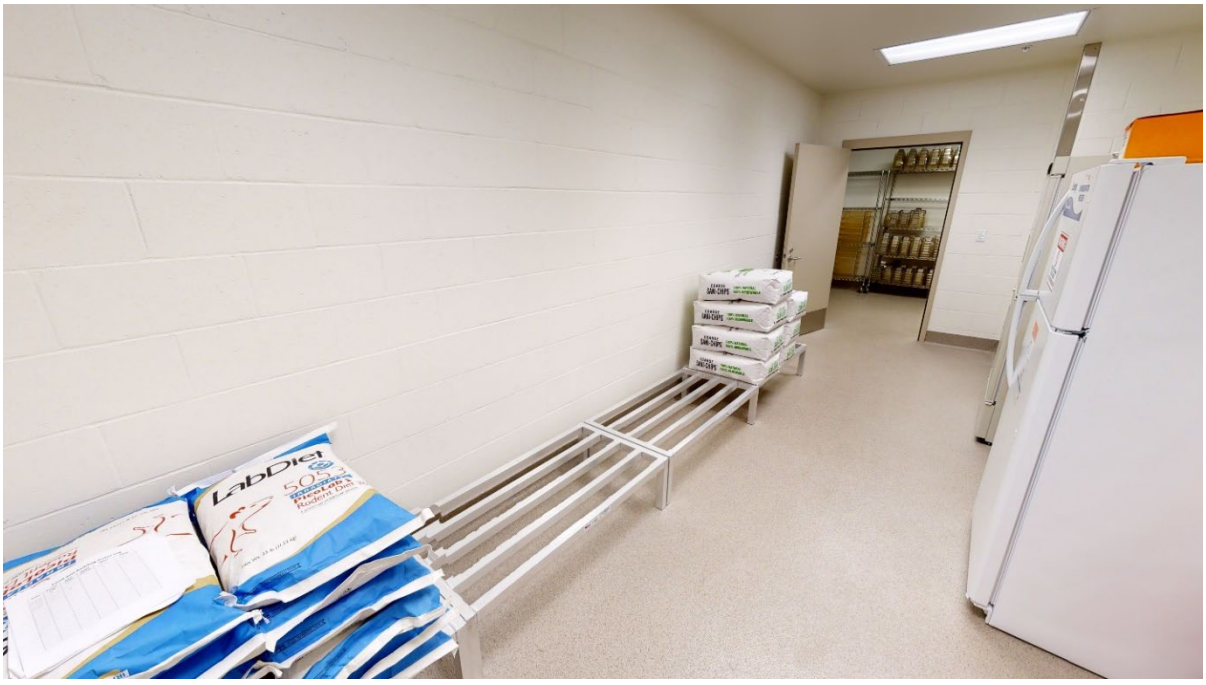

Image A.23 The Bedding Storage Room at the New Orleans VAMC R&D Facility is located next to the Clean Cage Room. Bedding and dry food are stored on raised racks.

Image A.24 The New Orleans VAMC R&D Facility utilizes the historical portions of the building for office space such as Health Services and other dry research focusing on data analytics.

Image A 25 The New Orleans VAMC R&D Facility includes Conference / Multipurpose Rooms, which can be booked by any research team.

Image A.26 The Reception Area at the New Orleans VAMC R&D Facility is shared with the VA Community Living Center administrative offices and the VAMC's Logistics Service. It is secured with PIV entry and visitor check-in requirements.

Image A.27 Animals and research supplies are received through the Loading Dock at the New Orleans VAMC R&D Facility, which connects to the 4th Floor VMU via a freight elevator.

EXAM	ROOM NAME
#Z###	NEW ROOM #
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

DIXIE RESEARCH LEVEL 1

LAB 1
2P186A
677 S.F
2P138

LAB 2
2P180A
669 S.F
2P142

LAB 3
2P174A
668 S.F
2P148

LAB 4
& 5
2P168B
1349 S.F
2P152

LAB 6
2P158A
668 S.F
2P162

LAB 7
& 8
2P150B
898 S.F
2P168

2P142 2P148 2P152.1 2P152.2 2P162

LAB 1
ENTRY
2P186
94 S.F
2P138A

LAB 1
FUME
HOOD
2P186B
273 S.F
2P138B

LAB 2
ENTRY
2P180
95 S.F
2P142A

LAB 2
HOODS
2P180B
273 S.F
2P142B

LAB 3
ENTRY
2P174
96 S.F
2P148A

LAB 3
HOODS
2P174B
273 S.F
2P148B

LAB 4
& 5
HOODS
2P168A
134 S.F
2P152B

LAB 4
& 5
ENTRY
2P168
94 S.F
2P152A

LAB 4
& 5
HOODS
2P168E
134 S.F
2P152C

LAB 4
& 5
HOODS
2P168D
136 S.F
2P152D

LAB 4
& 5
HOODS
2P168C
272 S.F
2P152E

LAB 6
ENTRY
2P158
94 S.F
2P162A

LAB 6
HOODS
2P158B
272 S.F
2P162B

LAB 7
& 8
HOODS
2P150A
272 S.F
2P168B

LAB 7
& 8
ENTRY
2P150
95 S.F
2P168A

LAB 7
& 8
HOODS
2P150C
100 S.F
2P168C

2P168E 2P142A 2P142C 2P152B 2P162A 2P168B

SHAFT

CORR
2PC04.1
465 S.F

Image A.17
Microscopy Room

CORR
2PC04.1A
467 S.F

2P-C04.1

CORR
2PC04.2
353 S.F

CORR
2PC04.2A
425 S.F

CR

TC
2P185
104 S.F
2P139

TC
2P181
102 S.F
2P141

TC
2P177
101 S.F
2P145

TC
2P175
102 S.F
2P147

ELEC
MIC
2P171
277 S.F
2P150

TC
2P169
102 S.F
2P151

TC
2P165
102 S.F
2P155

TC
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101 S.F
2P157

HK
2P159
102 S.F
2P161

ELEC
2P151
170 S.F
2P169

2P139.1 2P141 2P143 2P145 2P147 2P150.1 2P151 2P155 2P157.1 2P159 2P161 2P163.2 2P163.1 2P165 2P167 2P169

MIC D
2P185A
122 S.F
2P139A

LER
2P183
274 S.F
2P135

MIC D
2P183A
100 S.F
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FRZ
UL
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2P143

FZ-20
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101 S.F
2P149B

LER
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2P149

ELEC MIC
EQUIP
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137 S.F
2P150A

CELL
S
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101 S.F
2P153D

LER
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274 S.F
2P153

MIC D
2P167A
101 S.F
2P153A

MIC D
2P163A
101 S.F
2P157A

IM
HIST
2P161
207 S.F
2P159

TR
2P120A
132 S.F
2P100C

EQUIP
RM
2P157B
200 S.F
2P163A

GLASS
WASH
2P157A
201 S.F
2P163

CELL
BANK
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198 S.F
2P165

CYL
2P153
139 S.F
2P167

2P139.2 2P135A 2P149D 2P150.2 2P153D 2P153A 2P157.2 2P110C

ELEV
PS-01

ELEV
PS-02

SHAFT

CORR
2PC01E
123 S.F

2P-C01A

ELEC
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MIC D
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TC
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103 S.F
2P153C

HPLC
2P167C
104 S.F
2P153B

LVSR
2P120
94 S.F
2P100A

WORK/COLAB
2P100
400 S.F
2P100B

CR

CR

2P-C01

CORR
2PC01D
170 S.F

STAIR
2STP1
STP-1

2P-STP-1

2P135.1 2P135.2 2P153C 2P153B 2P100A

2P137 2P135 2P149 2P153

FEC FEC FEC

CORR
2PC02
351 S.F

CORR
2PC02A
346 S.F

CORR
2PC01A
171 S.F

CORR
2PC01
315 S.F

STAIR
2STP2
STP-2

CR

DN

UP

2P-STP-2

PRINCIPAL
INVESTIGATOR
OFFICE
2P141
122 S.F
2P134

PRINCIPAL
INVESTIGATOR
OFFICE
2P139
122 S.F
2P132

PRINCIPAL
INVESTIGATOR
OFFICE
2P137
123 S.F
2P130

PRINCIPAL
INVESTIGATOR
OFFICE
2P135
121 S.F
2P128

PRINCIPAL
INVESTIGATOR
OFFICE
2P133
123 S.F
2P126

PRINCIPAL
INVESTIGATOR
OFFICE
2P131
123 S.F
2P124

PRINCIPAL
INVESTIGATOR
OFFICE
2P129
123 S.F
2P122

CONFERENCE
ROOM
2P127
282 S.F
2P120

2P134 2P132 2P130 2P128 2P126 2P124 2P122 2P120

TL
2P123
261 S.F
2P116

CORR
2PC01C
51 S.F

TL
2P121
249 S.F
2P115

2P116 2P115

AISLE
2PC01B
207 S.F

WORK/
COLAB
2P119
439 S.F
2P100

FEC

EXPANSION JOINT
AND CURBS

CORR
2PC03A
420 S.F

PRINCIPAL
INVESTIGATOR
EQ
2P108
259 S.F
2P113

2P113

PRINCIPAL
INVESTIGATOR
OFFICE
2P104
125 S.F
2P110

2P110

2P111

HEALTH STUDIES
OFFICE
2P106
125 S.F
2P111

CORR
2PC03B
343 S.F

SIM

FEC

HEALTH STUDIES
WKSTNS
2P101
849 S.F
2P104

2P104A

COPY/
STG
2P101A
92 S.F
2P104A

2P104B

HEALTH STUDIES
OFFICE
2P101B
134 S.F
2P104B

HEALTH STUDIES
OFFICE
2P101C
118 S.F
2P104C

2P104C

2P103.1 2P103.2 2P103.4 2P103.3 2P103.5 2P103.6 2P103.8 2P103.7

HEALTH STUDIES
WKSTNS
2P103
832 S.F
2P105

2P101.1 2P101.2 2P101.4 2P101.3 2P101.6 2P101.5

2P107.3 2P107.2 2P107.1

HEALTH STUDIES
WKSTNS
2P107
1560 S.F
2P106

2P107.17 2P107.16 2P107.15

2P107.4 2P107.5 2P107.6 2P107.7 2P107.8 2P107.9 2P107.10 2P107.11 2P107.12 2P107.13 2P107.14

EXAM	ROOM NAME
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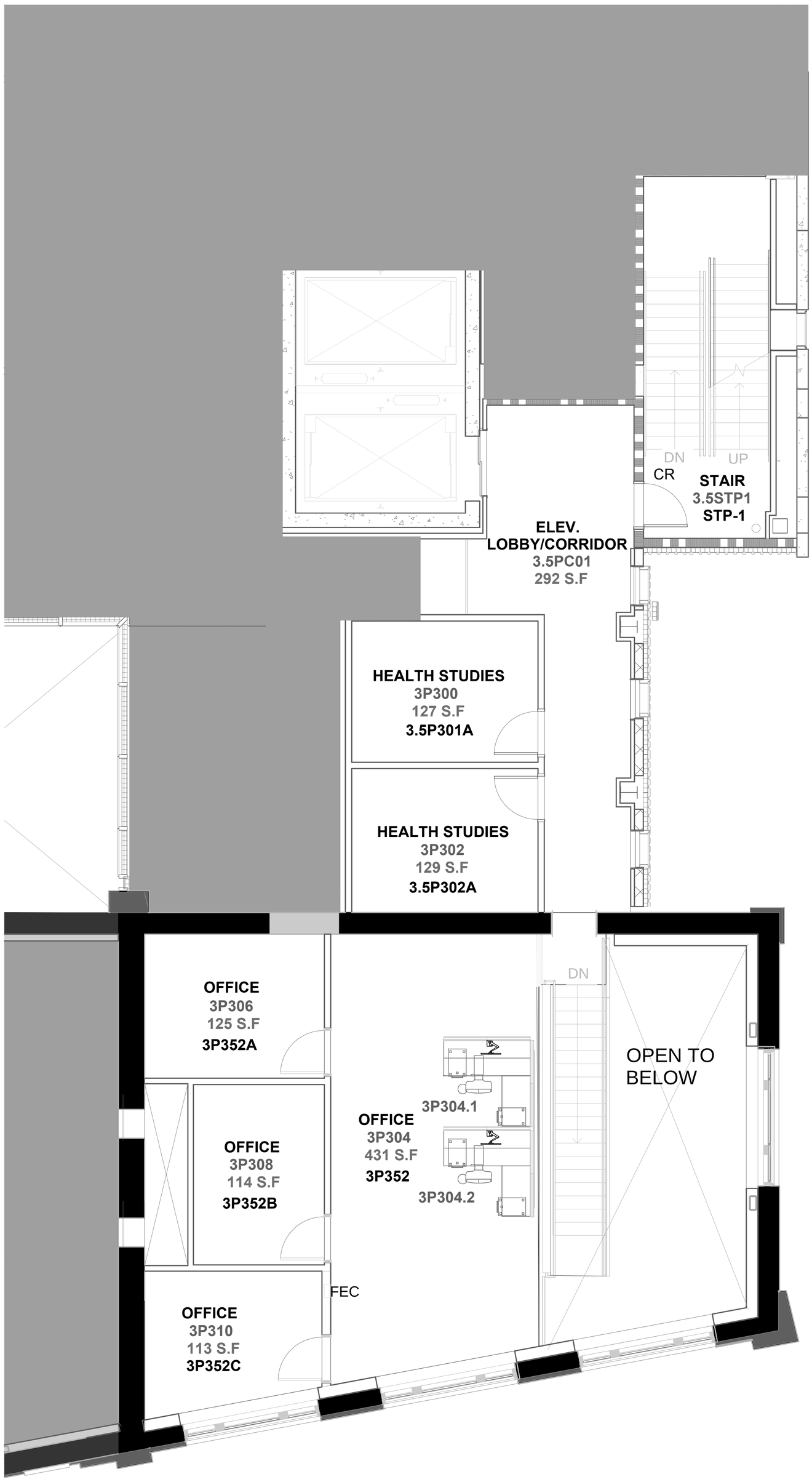
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

1 DIXIE RESEARCH LEVEL 2

PLAN
NORTH



EXAM	ROOM NAME
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### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

1 DIXIE RESEARCH LEVEL 3.5

LAB 9
3P188A
670 S.F
3P138

LAB 10
3P180A
667S.F
3P142

LAB 11
3P176A
667 S.F
3P148

Image A.18
Safety Eyewash

Image A.14
Lab Bench Unit

LABS 12 & 13
3P170B
1333 S.F
3P152

LAB 14
3P158A
665 S.F
3P162

LAB 15
3P150B
884 S.F
3P168

LAB 9 ENTRY
3P188
93 S.F
3P138A

LAB 9 HOODS
3P188B
269 S.F
3P138B

LAB 10 ENTRY
3P180
93 S.F
3P142A

LAB 10 HOODS
3P180B
270 S.F
3P142B

LAB 11 ENTRY
3P176
93 S.F
3P148A

LAB 11 HOODS
3P176B
269 S.F
3P148B

Image A.16
Fume Hood

LABS 12 & 13 HOODS
3P170A
133 S.F
3P152B

LABS 12 & 13 ENTRY
3P170
104 S.F
3P152A

LABS 12 & 13 HOODS
3P170E
143 S.F
3P152C

LABS 12 & 13 HOODS
3P170D
143 S.F
3P152D

LABS 12 & 13 HOODS
3P170C
271 S.F
3P152E

LAB 14 ENTRY
3P158
93 S.F
3P162A

LAB 14 HOODS
3P158B
270 S.F
3P162B

LAB 15 HOODS
3P150A
269 S.F
3P168B

LAB 15 ENTRY
3P150
104 S.F
3P168A

LAB 15 HOODS
3P150C
98 S.F
3P168C

CORR
3PC04.1
460 S.F

CORR
3PC04.1A
464 S.F

Image A.15
Tissue Culture Room

CORR
3PC04.2
356 S.F

CORR
3PC04.2A
355 S.F

TISSUE CULTURE
3P187
103 S.F
3P139

TISSUE CULTURE
3P183
101 S.F
3P141

TISSUE CULTURE
3P179
101 S.F
3P145

TISSUE CULTURE
3P177
101 S.F
3P147

MASS SP
3P173
422 S.F
3P151

TISSUE CULTURE
3P171
101 S.F
3P153

TISSUE CULTURE
3P167
101 S.F
3P157

CON FOC
3P165
101 S.F
3P159

HK
3P161
101 S.F
3P163

RAD LAB
3P169
198 S.F
3P165

TISSUE CULTURE
3P157
198 S.F
3P167

CORR
3PC04.2B
51 S.F

FLAM STOR
3P153
110 S.F
3P171

ELEC
3P151
162 S.F
3P173

MICROSCOPE D
3P187A
119 S.F
3P139A

LER
3P185
277 S.F
3P135

MICROSCOPE D
3P185A
98 S.F
3P135A

FREZER ULTRA LOW
3P181
206 S.F
3P143

MICROSCOPE D
3P175A
101 S.F
3P149B

LER
3P175
310 S.F
3P149

MICROSCOPE D
3P171A
101 S.F
3P153A

LER
3P169
276 S.F
3P155

EQ ROOM
3P169A
205 S.F
3P155A

IM HIST
3P163
207 S.F
3P161

TELECOM RM.
3P102A
126 S.F
3P100C

ACID STOR
3P155
152 S.F
3P169

CORR
3PC04A
177 S.F

ELEC
3P138
87 S.F
3P137

TISSUE CULTURE
3P185B
103 S.F
3P135B

MICROSCOPE D
3P185C
102 S.F
3P135BB

COLD
3P175B
281 S.F
3P149A

TISSUE CULTURE
3P169C
102 S.F
3P155C

TISSUE CULTURE
3P169B
103 S.F
3P155B

LVSR
3P102
94 S.F
3P100A

WORK/ COLAB
3P100
393 S.F
3P100

ELEV PS-01

ELEV PS-02

STAIR
3STP1
STP-1

FEC

CORR
3PC02
351 S.F

CORR
3PC02A
346 S.F

Image A.25
Conference Room

CORR
3PC01
207 S.F

CORR
3PC01A
197 S.F

CORR
3PC20
344 S.F

STAIR
3STP2
STP-2

PRINCIPAL INVESTIGATOR
3P135
122 S.F
3P134

PRINCIPAL INVESTIGATOR
3P133
122 S.F
3P132

PRINCIPAL INVESTIGATOR
3P131
122 S.F
3P130

PRINCIPAL INVESTIGATOR
3P129
121 S.F
3P128

PRINCIPAL INVESTIGATOR
3P127
122 S.F
3P126

PRINCIPAL INVESTIGATOR
3P125
122 S.F
3P124

PRINCIPAL INVESTIGATOR
3P123
122 S.F
3P122

CONFERENCE ROOM
3P121
282 S.F
3P120

TL
3P105
259 S.F
3P105

CORR
3PC01B
51 S.F

TL
3P103
249 S.F
3P103

LOUNGE
3P101
230 S.F
3P100B

HEALTH STUDIES OFFICE
3P200
131 S.F
3P200

HEALTH STUDIES OFFICE
3P202
133 S.F
3P201

CORR
3PC03A
419 S.F

CORR
3PC03B
349 S.F

3P114.1

OFF
3P114
264 S.F
3P107

3P114.2

SERV
3P110
252 S.F
3P102

HEALTH STUDIES WKSTNS
3P111
495 S.F
3P101

3P111.1

3P111.2

3P111.3

3P111.4

CONF STAFF
3P206
72 S.F
3P202A

HEALTH STUDIES OFFICE
3P208
125 S.F
3P202B

HEALTH STUDIES OFFICE
3P210
122 S.F
3P202C

3P204.1

3P204.2

HEALTH STUDIES WKSTNS
3P204
490 S.F
3P202

COLLABORATION
3P204A
261 S.F

CONFERENCE ROOM
3P111A
337 S.F
3P101A

3P112.3

3P112.2

3P112.1

HEALTH STUDIES WKSTNS
3P112
1560 S.F
3P104

Image A.24
Health Services Workstations

3P112.17

3P112.16

3P112.15

3P112.4

3P112.5

3P112.6

3P112.7

3P112.8

3P112.9

3P112.10

3P112.11

3P112.12

3P112.13

3P112.14

EXAM	ROOM NAME
#Z###	NEW ROOM #
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

DIXIE RESEARCH LEVEL 3

PLAN NORTH

HOLD
4P189
456 S.F
4P327

TREAT
4P187
217 S.F
4P329

TREAT
4P185
218 S.F
4P333

HOLD
RABBIT
4P183
210 S.F
4P331

HOLD
RABBIT
4P181
208 S.F
4P335

ELEC
4P123A
96 S.F
4P115B

VESTIBULE
4P123
115 S.F
4P115A

CORR
4PC06
568 S.F

VESTIBULE
4PC03C
66 S.F

HOLD
4P190
432 S.F
4P324

TREAT
4P188
206 S.F
4P322

FEC-W

X RAY
4P176
212 S.F
4P318A

Image A.22
Behavioral
Exam

ISO
HOLDING
4P180A
205 S.F
4P320B

OR
SUP
4P178
99 S.F
4P318D

ISO
HOLDING
ANTE-ROOM
4P180
97 S.F
4P320A

CORR
4PC05A
105 S.F

CORR
4P-C03B
212 S.F

GOWN
PREP
4P174
215 S.F
4P318B

OR
4P174A
198 S.F
4P318C

HOLD
4P172
205 S.F
4P316

FEC-W

CLEAN
CAGE
4P170
412 S.F
4P314A

FEED
& BED
STOR
4P168
205 S.F
4P314B

CLEAN
CAGE
WASH
4P170A
700 S.F
4P314

SOIL
CAGE
WASH
4P166
1017 S.F
4P304

HOLD
4P160
218 S.F
4P302A

QUAR
HOLD
4P162
109 S.F
4P302B

DIAG
HOLD
4P164
108 S.F
4P302C

CORR
4PC04A
231 S.F

MEN
LOCKER
4P156
126 S.F
4P300C

T/S
4P156A
66 S.F
4P300D

T/S
4P158A
66 S.F
4P300E

WOMEN
LOCKER
4P158
127 S.F
4P300F

FEC

CORR
4PC03A
187 S.F

VET
OFF
4P154
123 S.F
4P300B

OFF
4P152
119 S.F
4P300A

LOUNGE
4P150
110 S.F
4P300

Image A.21
Procedure
Room

Image A.19
Small Animal Holding

CORR
4PC05
880 S.F

Image A.23
Feed/Bedding Storage

CORR
4PC04
923 S.F

Image A.20
Soiled Cage Wash

HOLD
4P175
404 S.F
4P323

TREAT
4P173
197 S.F
4P321

HK
4P171
66 S.F
4P319

CORR
4PC05B
139 S.F

HOLD
4P169
418 S.F
4P317

UNASSIGNED
4P167
1268 S.F
4P315

WATER
SYS
4P165
199 S.F
4P311

ENV
HOLD
4P163
95 S.F
4P313

ENVIRO
PROC
4P163A
95 S.F
4P313A

CARC
HOLD
4P161
197 S.F
4P309

NECRO
4P159
197 S.F
4P307

CORR
4PC04C
122 S.F

CARC
WASTE
STOR
4P155
101 S.F
4P305

HAZ
WASTE
STOR
4P153
112 S.F
4P303

ELEC
4P151
146 S.F
4P301

EQUIP
4P157
219 S.F
4P305A

ELEV
PS-01

ELEV
PS-02

CORR
4PC04B
219 S.F

UP DN

HK
4P121
107 S.F
4P113
REF:1P104

FEC

CORR
4PC02
372 S.F

CORR
4PC02A
289 S.F

TELECOM RM.
4P104
145 S.F
4P103

LVSR
4P102
67 S.F
4P103B

VESTIBULE
4P-C01D
63 S.F

CORR
4PC01
308 S.F

RECPT
4P100
349 S.F
4P100

ELEV.
LOBBY/CORRIDOR
4.5PC20
350 S.F

STAIR
4.5STP1
STP-1

UP

STAIR
4STP2
STP-2

UNASSIGNED
4P117
593 S.F
4P100A

HEALTH STUDIES
4P115
115 S.F
4P101A

HEALTH STUDIES
4P113
115 S.F
4P102A

HEALTH STUDIES
4P111
115 S.F
4P103A

HEALTH STUDIES
4P109
115 S.F
4P105A

UNAS
4P107
101 S.F
4P106A

TL
4P105
252 S.F
4P104

CORR
4PC01A
46 S.F

TL
4P103
241 S.F
4P102

FEC

CORR
4PCO1B
242 S.F

REC +
W
4P101
237 S.F
4P101

RCO
4P200
128 S.F
4P200

AO
4P202
134 S.F
4P201

OFFICE
4P204.1
4P202C

OFFICE
4P204.2
4P202D

OFFICE
4P204.4
4P202E

OFFICE
4P204.3
4P202E

ACOS
OFFICE
4P204A
172 S.F
4P202A

OFFICE
4P204.5
4P202B

FILE/COPY
4P208
326 S.F
4P203

CORR
4PC01C
153 S.F
4P-CO1

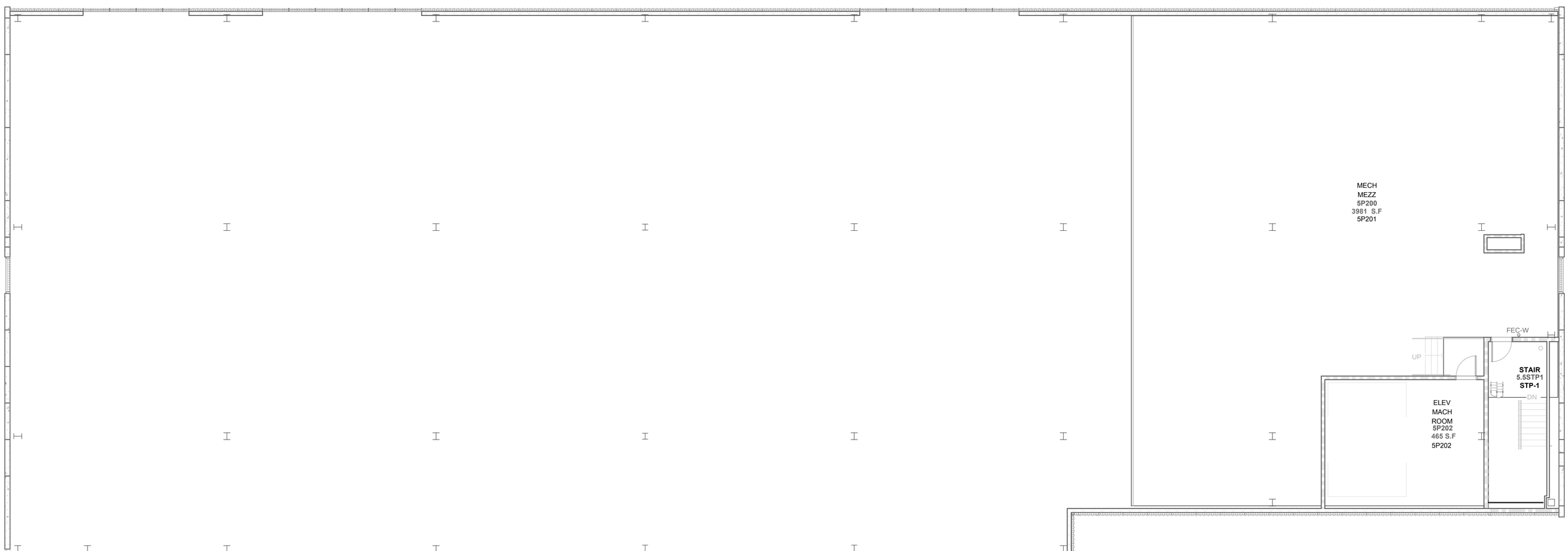
CUB
SPACE
4P204
1080 S.F
4P202

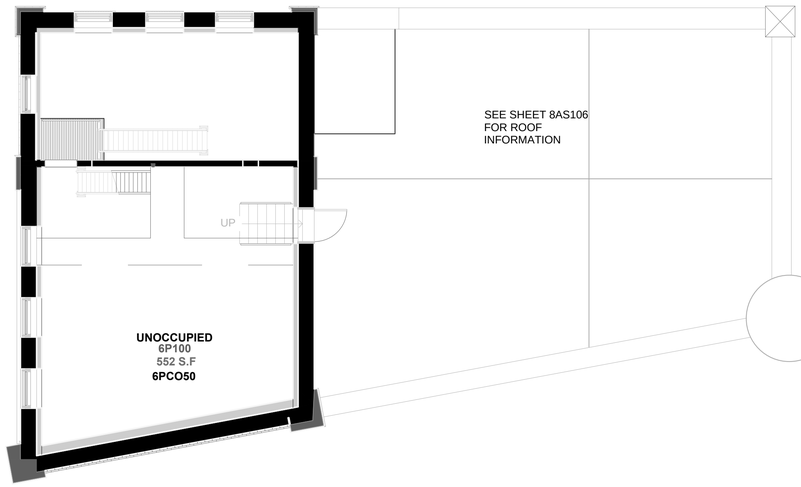
CONFERENCE
ROOM
4P206
276 S.F
4P204

EXAM	ROOM NAME
#Z###	NEW ROOM #
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

DIXIE RESEARCH LEVEL 4

PLAN
NORTH

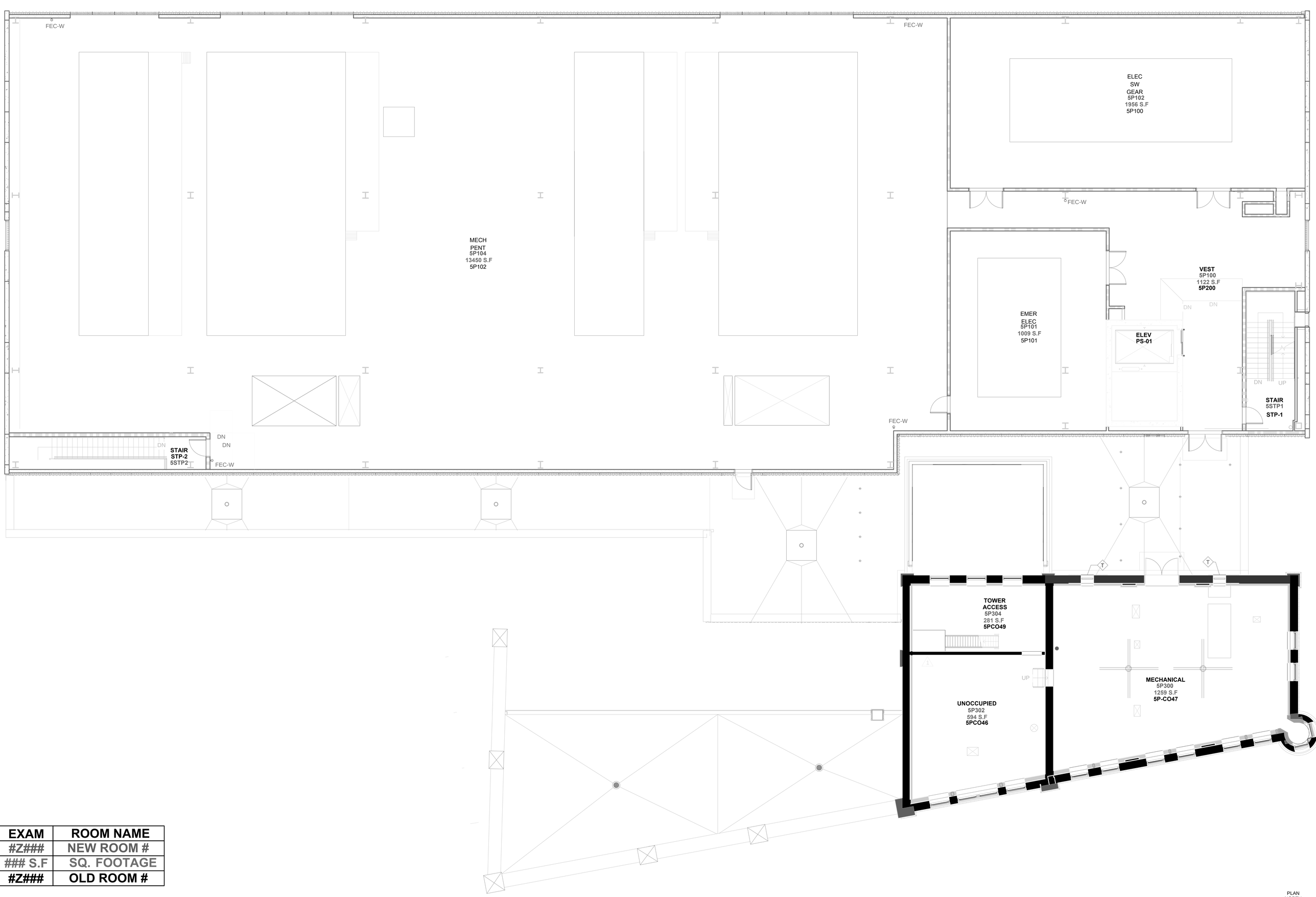




EXAM	ROOM NAME
#Z###	NEW ROOM #
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

DIXIE RESEARCH LEVEL 5.5

PLAN
NORT



EXAM	ROOM NAME
#Z###	NEW ROOM #
### S.F	SQ. FOOTAGE
#Z###	OLD ROOM #

DIXIE RESEARCH LEVEL 5

PLAN NORTH

3 Armchair Tour – Non-VA Facilities Site Visit Report

Contents

3.1 Overview

On March 4, 2021, the design team presented an “armchair tour” of non-VA research facilities, as well as trends and design considerations gleaned from examining these institutions. The purpose of the tour was to augment the site visits performed at the Rocky Mountain Regional VAMC and New Orleans VAMC research facilities with other configurations to consider.

Design features and attributes to consider in planning a research facility:

- Research Labs
- Core Facilities
- Building Organization
- Functional Capabilities
- Connectivity (Building, Campus, Vertical)
- Accessibility
- Visibility

3.2 Workplace Considerations

Drivers that influence employee success and shape workplace design, beyond the physical setting:

- Wellness and wellbeing
- Employee engagement
- Variety of settings (dry, wet, VMU, rehab, etc.)
- Owned and shared, high-tech and low-tech tools

Types of workplace models:

- Traditional: Assigned workspaces, mostly closed work areas, and limited collaborative space.
- Contemporary: Assigned workspaces, mostly open office environment, and more collaborative space.
- Progressive: Limited assigned workspaces, open office environment, plenty of collaborative space.

Planning principles in workplace design:

- Having a choice of spaces to work alone or together
- Finding the right mix of formal and informal spaces
- Offering a variety of room capacities
- Planned proximities to quiet and public zones
- Tools to support local and distant collaboration

The design team recommends giving weight to flexible spaces that can serve multiple functions.

3.3 Biomedical Research Trends

- Theme- and team-based and shared-space science is trending up, leading to integrated research environments (in the lab, in the dry workplace, and between the two) to support knowledge transfer.
  - This trend also results in integration between floors in a building, or between buildings.
  - This trend is particularly strong in translational-focused research that is focused on creating new patient treatments (which applies to most, if not all, VA research).
- Hazardous material usage is trending down, leading to a reduced need for fume hoods and changes in risk-based zoning.
  - Reduced chemical usage means fume hoods are shared more often, and often moved out of the laboratory into alcoves or separate rooms.
  - Reduced isotope use is leading to one shared isotope area in some labs.
  - Biological risks are changing due to a move away from working with whole organisms toward working with less-hazardous pieces of organisms (nucleic acids, proteins, etc.).
  - New zoning can lead to optimizing system design and cost. Rather than a one-size-fits-all approach to HVAC systems and other systems supporting safety, risk-based zoning allows a lab to create zones of different risk levels.
- Data science, automation, AI, etc. are trending up, leading to increased flexibility between wet and dry work environments.
  - This increase has been rapid.
  - There is more automation and tools within the lab, and researchers are learning more data analytics tools, which shifts their time towards dry workspaces.

3.4 Rehabilitation Research Trends

- While in biomedical research, the trend is toward simplification, rehab research (outside of benchwork) technology is exploding in complexity and variety.
- Integration is increasing.
  - Science is being integrated with engineering and technology
  - Research environments are becoming more supportive of knowledge transfer
- Technology trials are increasing.
  - New technologies for patients/subjects are rapidly being introduced.
  - This increase is driving a greater need for offstage/onstage research support in clinical spaces.
- Data science is increasing.
  - Virtual and augmented reality, informatics, and machine learning technology growing.
  - Research environments are rapidly changing.

3.5 Examples

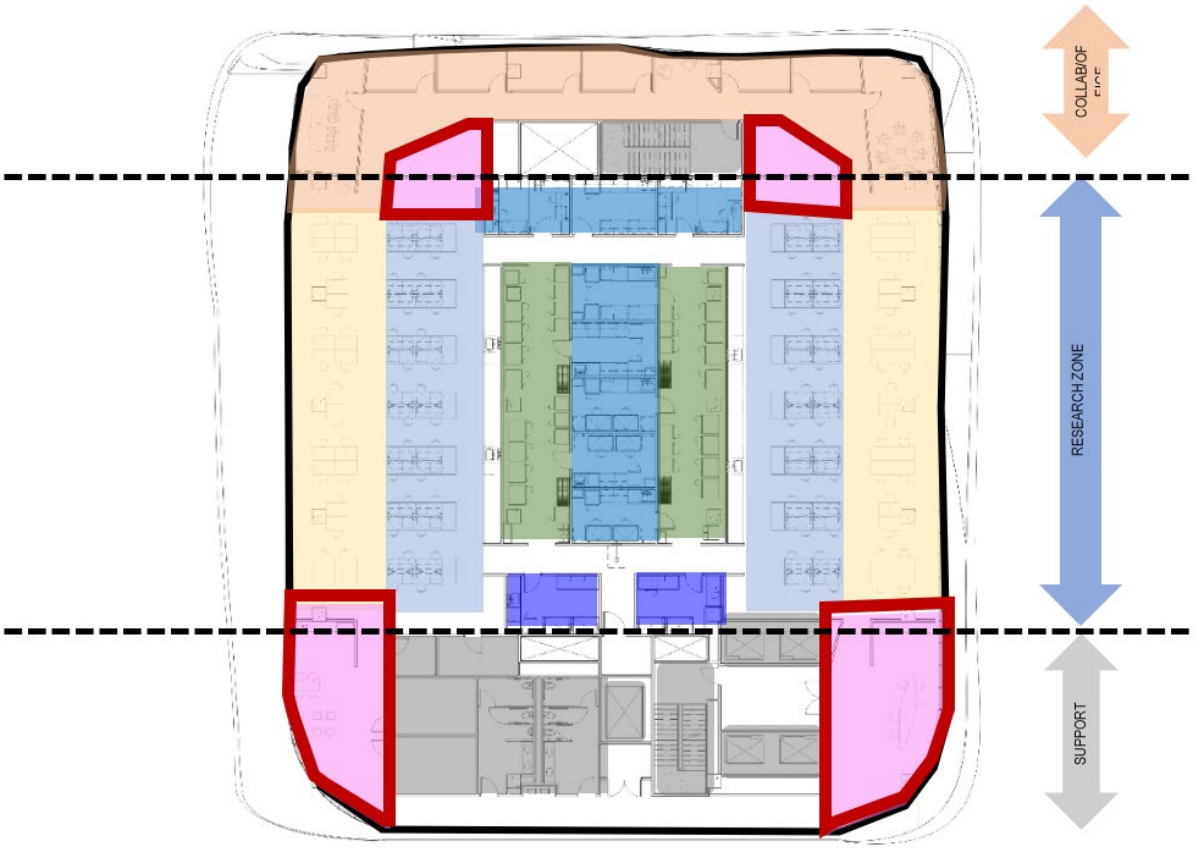
3.5.1 Biomedical Research

Mayo Clinic Kellen Research Building

To be completed in 2023, the Kellen Research Building in Rochester, MN is being designed as a 128,000 sq ft facility focused on translational research, with biomedical research and office space.

Guiding principles for the design were ascertained through a vision session. The client desired a game-changing, progressive facility and was willing to take risks with rigorous research. A visible and transparent design increases awareness of all the research in the facility, to act as a symbol of hope and showcase the Mayo Clinic's transformative research. An agile design, including consideration for a "Third Place" outside the research building, supports a flexible work environment. Finally, the client desired a focus on translational research, focusing on computational and wet research teams' collaboration with clinical teams.

Groups of Investigators are collocated based on similar interest or research needs, which drives collaboration and shared space. These groups then collaborate with other groups.



A typical research floor has enclosed lab support spaces in the center, which are higher hazard areas. Lab benches are located outside of the enclosed support spaces. Computational (dry) research space and offices are on the perimeter. The zones are arranged with the highest hazard area in the center and progressively less hazardous areas arranged concentrically toward the perimeter. Every occupant has visual access to daylight from his/her lab bench, office, etc. (the lab support space in the center is enclosed, in part because of IBC requirements for two-hour fire-rated walls in that space). Each research floor has collaboration space in the perimeter zone. Quiet offices are located at one end of the perimeter zone and collaborative space at the other end for noise control.

The service elevator is located very close to the fume hoods, which limits chemical and chemical waste travel thus allowing for effective risk-based zoning.

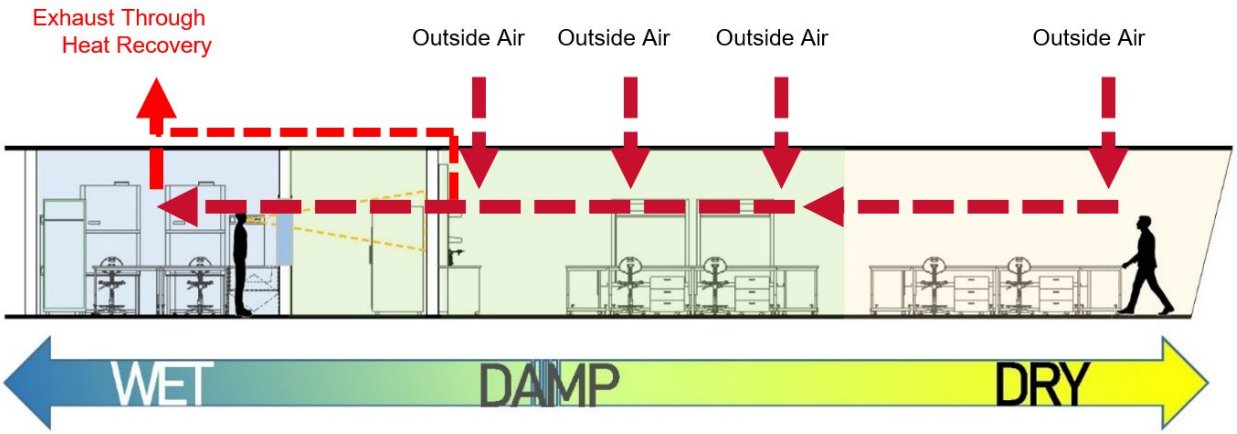
Tissue culture work is accomplished in the central lab support space, in a series of rooms that could be reworked for microscopy, flow cytometry, etc. as needed.

The area between the central lab support space and the open lab bench space can be used for freezers and other equipment space.

The open lab bench space is similar to the layout at the Rocky Mountain VAMC research facility.

Dry research space is moved out of the lab and into an office environment in the perimeter. There is no physical barrier between these two spaces.

Because of the flow from wet to dry spaces, the HVAC system is energy-efficient. There is one air change of outside air provided to the dry area. That provides makeup air to the “damp” (open lab) space, which has four air changes (a low number due to the enhanced chemical management). The wet area (where the fume hoods and Biological Safety Cabinets [BSCs] are) has a higher air change and exhaust.



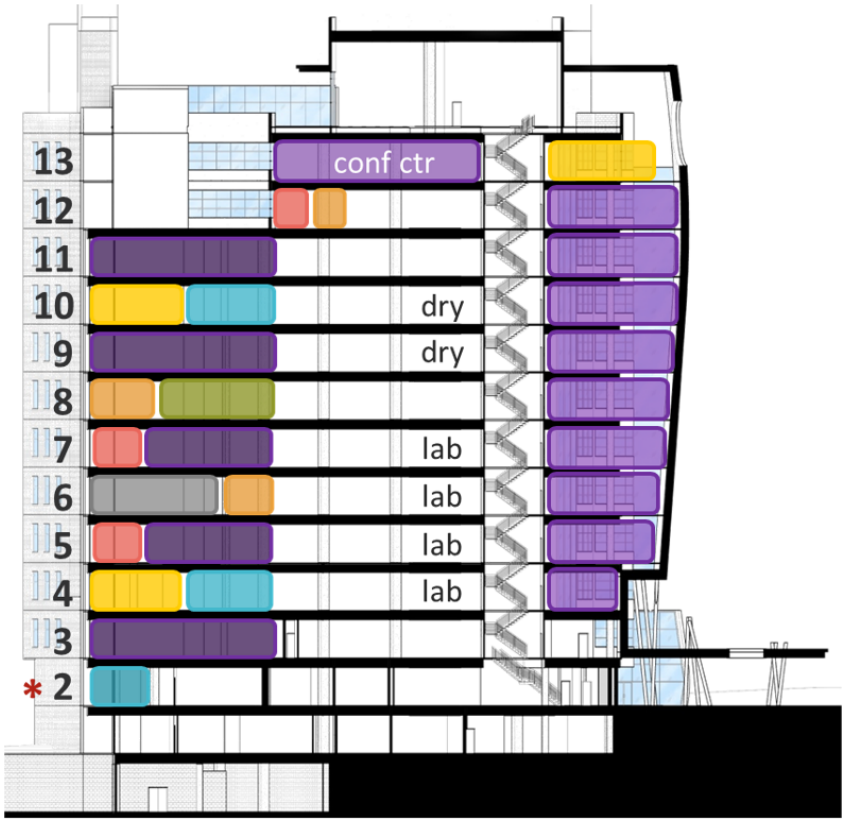
Cincinnati Children's Hospital Clinical Science Pavilion

Completed in 2016, the Clinical Science Pavilion at the Cincinnati Children's Hospital is a 435,000 sq ft facility focused on clinical science and translational research, with a full-floor research clinic as well as outpatient, imaging, office, and interaction space.

The client desired vertical integration of research. Volunteer research subjects are treated in the same building. The subjects are children, so space for families was incorporated as well. The goal was to make the research as convenient as possible for the volunteers. Wet labs, dry research, computational research, informatics, imaging, research clinic, conference centers, robust food service, and a lounge are all in the building.

Other goals of the project were to increase awareness of research capabilities, and to Increase collaboration between groups (on and between floors and across campus).

The design incorporated a "Vertical Main Street" with different amenities and destinations located on different floors to drive movement. Food service and a conference center are located on the top floor.



VERTICAL MAIN STREET

DEPOTS

- **Front Porch:** conference, pantry
- **Back Porch**: team, coffee, huddle, admin

DESTINATIONS

- **Cincinnati Eats**:
  - Chili & Soup Bar
  - Sweets, Snacks & Ice Cream
  - General Store with Food Carts
  - Findlay Market: fresh fruit, veggies,
- **Chill-out Lounge**: Library, Quiet Study, Learning, Reference
- **Piazza Square**: town halls, large break space, Science Faire, Employee Art Shows
- **City Workshop**: Kinkos-type high volume print copy assembly mail supply
- **Cyber Café**: better coffee &tea, touch down
- Team Zone: alt workplace, touch down

The building was designed with a high amount of dry research in mind. Every floor could potentially function as a wet or dry research floor.

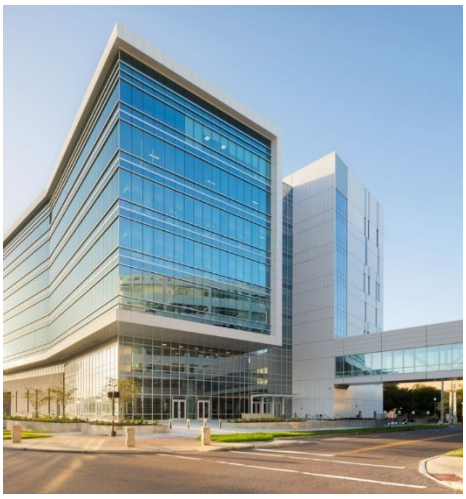
A typical dry research floor (see image below) is zoned according to the circulation of researchers and visitors. One side is for quiet, individual work, while the other side is for teamwork. A “Front Porch” by the stairs/elevators includes a café and conference room. The research space is modular and can accommodate four to six research teams. Shared conference space is consolidated near the circulation areas. Every person has visual access to daylight from his/her workstation.

In a typical laboratory floor, laboratory support is in the middle. Open labs are on either side of the lab support area. Additional lab support space is on either side of the open labs. Dry lab space is on the perimeter, lessening the amount of space that need laboratory airflow while maintaining visibility into the wet/damp lab areas with glass partitions (this separation has been received well by the researchers). Fume hoods are in alcoves in the lab support space.

The VMU is in an adjacent building that is physically attached to this building.

Johns Hopkins All Children's Research and Education Facility

Completed in 2018, the Johns Hopkins All Children's Research and Education Facility in Saint Petersburg, FL is a 225,000 sq ft facility focused on biomedical and medical research with labs, offices, teaching labs, VMU, collaboration space, classrooms, and a lecture hall.



A typical floor contains offices and workstations on one side, laboratory (benches and lab support) on the other side (no dry work is performed in the lab), and collaboration space in the middle. Types of research were grouped on a floor (with wet and dry space supporting the same research).

Collaborations zones are “themed” on different floors (refresh, assemble, socialize, etc.).

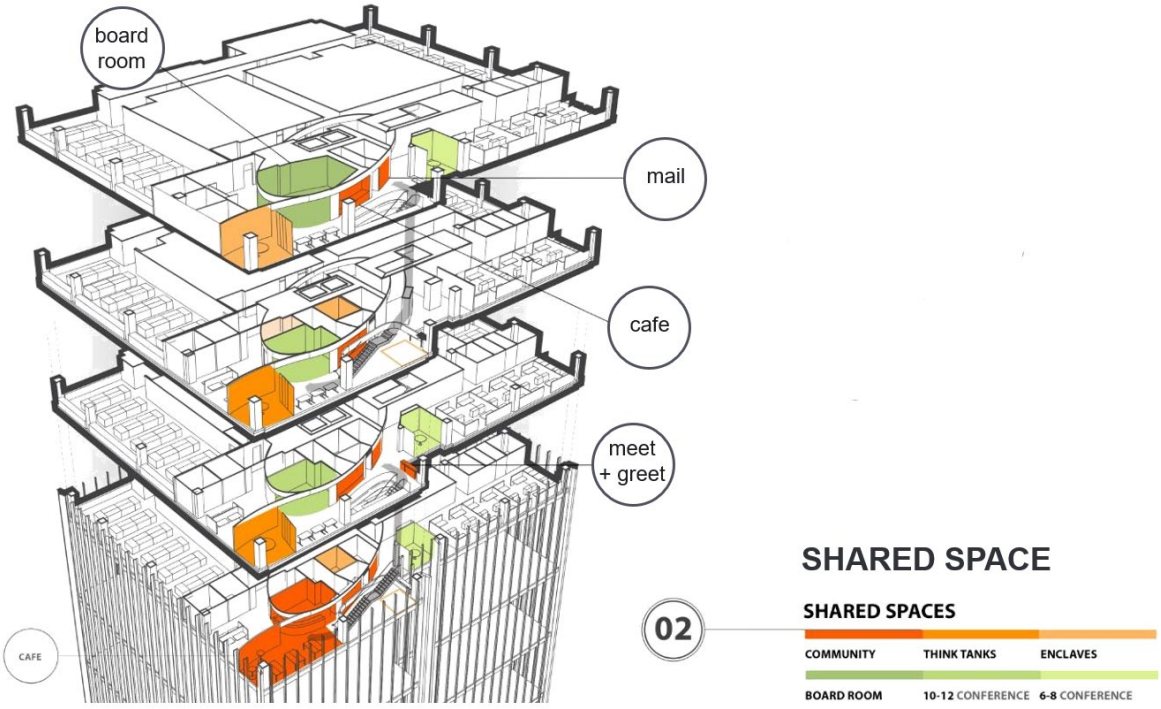
The VMU is on the top floor.

ImClone Systems Research Headquarters

Completed in 2009, the ImClone Systems Research Headquarters at the Alexandria Center for Life Sciences in New York, NY is a 90,000 sq ft R&D facility with labs, offices, and collaboration space.

Given the limited real estate factor that a New York City location presents, space efficiency and vertical collaboration were important. Ultra-efficient designs such as this raise the question of whether all facilities should follow high-efficiency models.

Shared collaborative spaces were placed next to vertical circulation paths, and are different on each floor.



University of Texas MD Anderson Cancer Center Sheikh Zayed Bin Sultan Al Nahyan Building for Personalized Cancer Care

Completed in 2014, the University of Texas MD Anderson Cancer Center Sheikh Zayed Bin Sultan Al Nahyan Building for Personalized Cancer Care in Houston, TX is a 610,000 sq ft facility focused on translational research with office, research, and collaboration space.

Different collaborative and social spaces on every floor drive movement. The building footprint is an X-shape, with four wings meeting in the middle.

A typical floor contains a collaboration hub in the center, where removeable wall partitions can accommodate up to 150 people in a room. Two opposite wings are used for offices. The other two opposite (larger) wings contain labs and lab support. Labs have benches on one side, and lab support space on the other.

Francis Crick Institute

Completed in 2016, the Francis Crick Institute in London, England is a 1,000,000 sq ft facility focused on biomedical research with lab, office, research core, collaboration, lecture, and exhibition hall space.

A typical floor contains office space adjacent to laboratories. Lab benches are surrounded by lab support space. Principle Investigators' offices are purposefully small to drive them to move around the lab.

Collaborative spaces are large, but collaboration is somewhat hindered by the sheer size of the building, which inhibits movement. Intra-team collaboration worked well, however.

Novartis Institutes for Biomedical Research

Completed in 2015, the new research complex at the Novartis Institutes for Biomedical Research in Cambridge, MA is two interconnected buildings totaling 840,000 sq ft, focused on biomedical research with lab, office, VMU, collaboration, and auditorium space.

The facility has a hard separation of public and private space. The research is heavy on chemistry science.

A typical lab floor has large, open labs, with the line between wet and dry lab space blurred. Glass partitions separate high and low hazard spaces. Dropped ceilings in the labs lower HVAC requirements (by reducing the amount of space needing to be vented), but may inhibit flexibility.

3.5.2 Rehabilitation Research

Spaulding Rehabilitation Hospital

Completed in 2013, the Spaulding Rehabilitation Hospital in Boston, MA is a 262,000 sq ft facility with rehabilitation beds, therapy, office, and collaboration space. Biomedical research is performed in another building.

The project integrated technology-driven rehab space into the hospital.

Hospital space (beds) are on upper floors. The therapy gym, ADL, and research space are on the 2nd floor. The pool, lobby, and café are on the 1st floor.

At the time of the facility's opening, the therapy gym, while innovative, contained a notable lack of technology-driven rehabilitation equipment when compared to what is seen in new gyms. This disparity speaks to the rapid development of technology in rehabilitation trends.

Shirley Ryan AbilityLab

Completed in 2017, the Shirley Ryan AbilityLab in Chicago, IL contains 1,200,000 sq ft facility focused on translational research with rehabilitation, therapy, imaging, and administrative space.

A goal of the design was for the facility to have both clinical care and research space.

Wet labs are on the top floor. Dry lab collaboratory space (engineering, technology, bionics) is on the ground floor. The dry space includes specialized rooms for bionics and prosthetics (including thought-controlled prosthetics). The middle floors are patient therapy and research space (brain, spinal cord, nerve, limbs, etc.). The facility includes a high-tech neurobionics lab. The facility also has typical wet lab features, as well as a rehab gym with a lot of technology (such as gait track therapy).

Exoskeleton research is exploding in rehabilitation research across the world and can be applied to many different kinds of injuries. High-tech research is also increasing exponentially.

University of Miami / Jackson Health Christine Lynn Rehabilitation Hospital

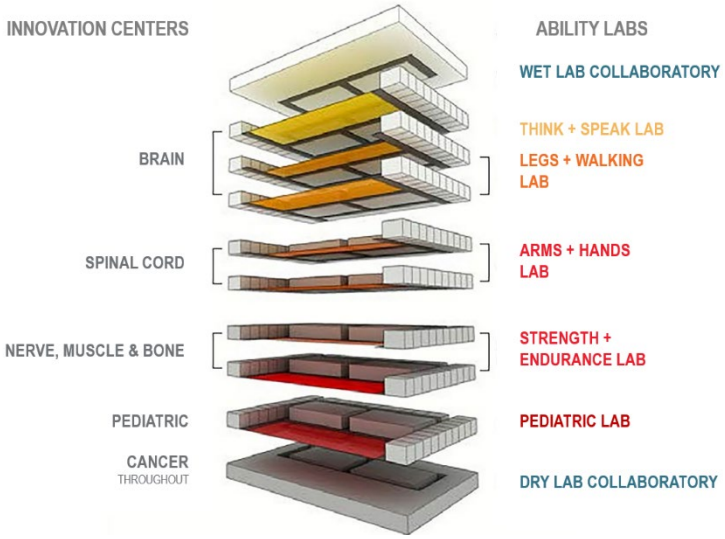
Completed in 2020, the University of Miami / Jackson Health Christine Lynn Rehabilitation Hospital is a 270,000 sq ft rehabilitation hospital with beds, clinics, research, diagnostic treatment, office, inpatient care, and outpatient space. Wet lab space is in another building.

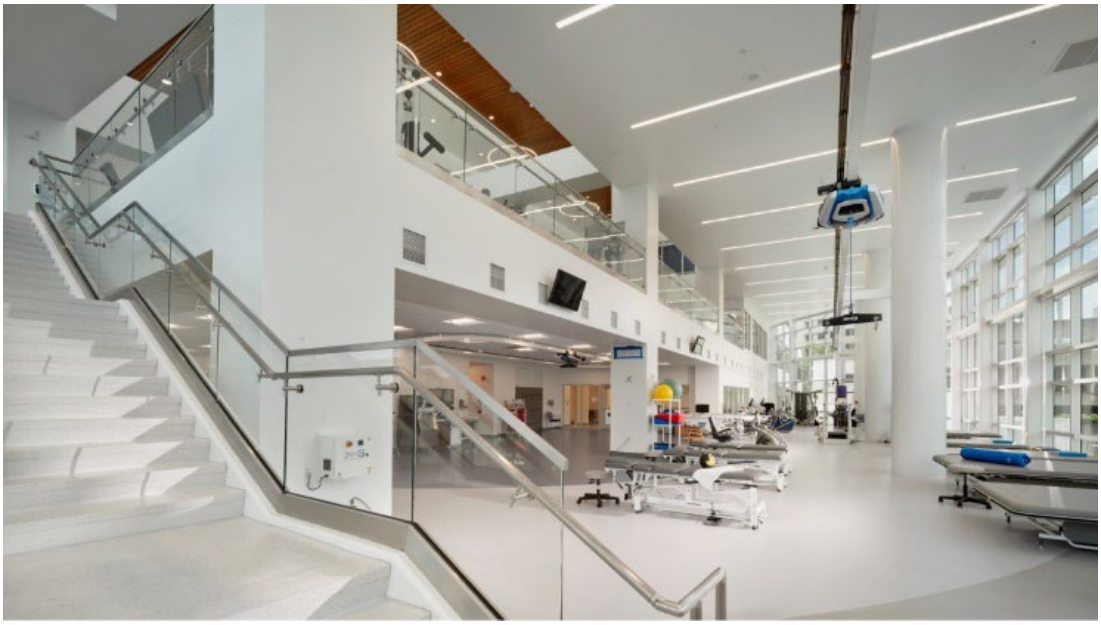
The upper floors contain bed space. The 2nd, 3rd, and 4th floors are therapy, research, and clinical space.

There is a large amount of clinical trial space on the same floor as the outpatient gym, which is the focus of much of the research.

The facility also performs a large amount of motion analysis (located next to the inpatient gym), and requires much more space than what would have been considered adequate only a few years ago. On this floor is also a lot of space for speech therapy, which doubles as research space.

Another floor contains a fitness center for sports injury research.





University of Utah Craig Neilson Rehabilitation Hospital

The University of Utah Craig Neilson Rehabilitation Hospital has a lot of space for digital innovation for high-tech bionics such as wireless thought-controlled technology. There is also an "innovation garage" for retrofitting sport and travel equipment like motorcycles and kayaks, where therapy also takes place.

Wet lab research also occurs primarily in other buildings.

3.5.3 Health Services Research

NYU Population Health

Completed in 2020, the NYU Population Health facility in New York City, New York is a 100,000 sq ft facility focused on interdisciplinary and dry biomedical research, with office, workstation, individual and group collaboration, and branding/knowledge sharing space.

The research at this facility was growing rapidly even as the design was taking place. The design had to account for fluctuations in population. Modularity and flexibility were key, as were spaces for quiet work.

The NYC location demands efficient use of vertical space.

A typical floor contains collaborative / Main Street space on one side, next to elevators and toilets, designed with the intent to disturb quiet workplaces as little as possible. Workstations are on the other side, flanked by offices on the perimeter. The offices can be single or double occupancy. Workstations can be grouped up to six people, to accommodate seasonal and guest researchers and students.

The ceiling is exposed, and daylight is provided where possible, to make up for the small footprint.

Some work performed at the facility is confidential, so workstations were designed so that screens are not visible from hallways. Small huddle rooms and phone booths were included.

A large multi-function room could be arranged as a break room, training room, or overflow workroom for seasonal employees/students.

4 Key Survey Findings

Contents

4.1 Study Overview

This evaluation was conducted as part of the development of the system-wide planning and design Standards for the VA Research & Development (R&D) facilities.

The survey-based study used a combination of validated measures and developed items to collect data related to respondents' daily work activities, laboratory work space requirements, and needs for dry work areas.

Data were collected from February 23 - March 12, 2021. Employees from selected VA R&D stations across the United States were invited to participate in an online questionnaire developed by the VA Office of Research & Development management in partnership with design teams.

Employees were invited to participate via an email sent by station leadership. A total of total of 1,621 respondents completed the survey.

4.2 Key Findings: Laboratory Work Spaces

4.2.1 Implications for Laboratory Space

Findings from the survey indicated that there is a growing need for specialized wet laboratory research space. Many of the findings are in line with observations from similar institutions around the country.

Results indicate fume hood use is low with less than 25% of respondents requiring use daily or multiple times per day, while approximately 75% of respondents indicate they never use fume hoods or use them up to a few times per week. This usage supports the creation of shared fume hood space, with appropriate design to deal with proper chemical and reagent storage and waste storage.

The survey indicated that radioisotope use is very low. This suggests that a dedicated, shared space may be sufficient to serve all researchers within an R&D building. A Fume Hood Room with a locking door could serve as a designated isotope room.

The requirement for conventional darkroom space is low, indicating occasional continued use of film process (similar to a Kodak X-OMAT developer) for x-ray films for techniques like western blots employing commonly used isotopes and chemiluminescence.

The survey indicated a strong demand for tissue culture space with approximately half of respondents using tissue culture once per day and over 25% using tissue culture multiple times per day. This strong use of tissue culture suggests an increasing need for Tissue Culture Rooms in laboratories. In addition, tissue culture work creates a strong space demand for ultra-low temperature freezers, media storage (refrigerators and freezers), and supplies storage.

- The predominant tissue culture method in use is clean cell culture. Culture suite designs should minimize cross-contamination.

- There is a lesser, but significant, demand for viral vector tissue culture requiring BSL-2 or BSL2+ space.
- There is a strong demand for infectious disease culture at BSL-2 that would be driven by research program needs.
- There is a lesser demand for BSL-3 infectious disease space; however, it was indicated there would be more use if BSL-3 facilities were available.

The survey indicated a lower demand for specialized closed room functions such as microscopy, histology, procedure space, and electrophysiology. For these and other program-dependent spaces, flexibility to transform rooms for different purposes with minimal assembly should be considered in the laboratory layout.

A need for medicinal (drug) chemistry and gene therapy was indicated within Biomedical Laboratory Research and Development (BLR&D). Almost 10% of respondents reported the use of virtual reality imaging, supporting the need for a visualization lab.

Affiliated medical centers provided access for a significant amount of the R&D facility needs. For example, approximately half of all animal imaging is performed at an affiliated site. Prioritizing procedure spaces and imaging facilities with necessary equipment (e.g., through the addition of imaging suites) may encourage researcher recruitment and retention.

Individual use of bench space is high. This finding supports assignment of individual bench work spaces. The need for bench space is lower for clinical researchers.

Many respondents indicated that key adjacencies between their assigned work space and laboratory areas and/or clinical spaces are critical for supporting their research work. Important adjacencies mentioned included those between collaborators, wet lab support space areas, clinical research spaces, the VMU, and core laboratory facilities. Respondents suggested that close proximity substantially improves their work efficiency.

Respondents working in clinical research indicated that storage space for paper study records is at a premium in clinical research areas. One solution could be to locate a centralized, secured storage space near the clinical research labs.

4.2.2 Implications for Clinical Science Research & Development

The survey supported the Clinical Science Research & Development (CSR&D) room list.

The survey indicated that paper records (for clinical protocols) are in high use in CSR&D as they are in all clinical research centers. Binder storage and lockable file areas are an important part of workplace design.

Respondents indicated there is a need for spaces to interact with Veterans as patients and study participants. Several CSR&D-affiliated respondents suggested that they would benefit from the availability of a shared, centrally located clinical research core outfitted with inviting spaces for participants to wait, private interview rooms, and research spaces equipped for psychometric testing, electrophysiology, physical exams, and video capture. Many

respondents indicated that they need access to phlebotomy laboratory services for sample processing.

The use of space for dedicated overnight stays was fairly low. In comments on the survey, several respondents indicated this is a current need in their research program and/or a research space they anticipate needing in the future.

Respondents indicated access to core facilities for computing, qualitative data collection, and tissue and biospecimen banking is important for their research work.

4.2.3 Implications for Rehabilitation Research & Development

Survey findings supported the need for patient spaces and engineering laboratories, machine shop spaces, and maker spaces for Rehabilitation Research and Development (RR&D).

The survey indicated a need for access to clinical imaging facilities in the patient – subject research programs.

The survey indicated a significant use of exoskeletons within RR&D.

Patterns of work space use varied widely across RR&D affiliated researchers. Those working as research engineers reported much lower rates of use of behavioral and physical research rooms and procedure rooms and higher rates of use of areas including gait labs, imaging facilities, and engineering and fabrication areas.

4.2.4 Implications for Veterinary Medical Units

The survey found that a wide range of animal imaging modalities are important to VA research teams.

The survey confirms the need for both small animals (rats and mice) and large (USDA regulated) animals (pigs, sheep, rabbits). The survey indicated a strong demand for rodents and a lesser demand for other species, with some requiring specialized facilities for animals such as zebrafish.

The survey indicated a wide variety of housing models in use, including both high-density housing (conventional and barrier rodents) and low-density housing / high-procedure use (biocontainment ABSL-2 and to a lesser extent ABSL-3, behavioral, special studies such as sleep) that have significant impact on VMU efficiency and flexibility.

The survey indicated a need for germ-free (gnotobiotic) space which is highly specialized in design and operations. The need for germ-free space is consistent with other institutions.

The most commonly reported animal imaging modalities were bioluminescence, micro-CT, and MRI.

4.2.5 Implications for Dry Work Space

Across research groups, the strongest ties between groups were with the BLR&D VA research group. This group also comprised the largest proportion of respondents to the survey.

Respondents reported approximately 19.7 hours per week engaged in scheduled, impromptu, or virtual meetings with the largest proportion of that time currently reported to be engaged in virtual meetings. However, this is highly variable across both job role and research category. Administrators, principal investigators, and those affiliated with CSR&D and Health Services Research and Development (HSR&D) generally reported more time spent in these activities.

Respondents reported currently spending significant amounts of time in virtual meetings. In the future, as social distancing measures ease, many of these meetings may translate into face-to-face interactions at the facility. One recommended space that can flexibly accommodate both in-person and virtual work in the future are small, two to four-person work spaces which are acoustically isolated and equipped for teleconferencing.

In comments on the survey, respondents reported that lack of quiet work spaces at the facility complicates their focused research work. Respondents affiliated with HSR&D and CSR&D reported that open, cubicle style workstations complicate their phone calls with patients and participants, which require acoustic privacy. Responses suggested that there is a need for quiet work space at the facility where they can connect to monitors and have access to a phone for private and/or conference calls.

Respondents to the survey indicated a limited ability to work remotely. Overall, just over half (51.7%), indicated that their work activities could be performed remotely more than half of the time. Respondent's ability to work remotely varied widely across job roles. Research analysts/informaticists are estimated to have the highest capacity for remote work while lab managers are estimated to have the lowest.

The respondents who reported spending the most time in laboratory facilities, including laboratory technologists, managers, veterinarians and animal care staff, and research engineers are estimated to have the lowest capacity for remote work. Across research categories, respondents affiliated with HSR&D and CSR&D were the groups most likely to indicate they are able to complete 50% or more of their work activities remotely.

Principal investigators overwhelmingly reported they expect their employees to work in-person more than 75% of the time. This expectation was lower for principal investigators affiliated with HSR&D and CSR&D.

4.3 Future Research Needs

4.3.1 Needs for Future Research

Biomedical Laboratory Research & Development

Laboratory facilities: Space for research laboratories will be necessary to meet demands of next-generation, high throughput methods and current and future equipment needs. Support for computational analysis, microscopy, flow cytometry, metabolomics, sequencing, specialized behavioral testing, and additional biosafety containment facilities were all mentioned.

Conference rooms & meeting spaces: The need for additional conference room and lecture hall space was frequently mentioned. Several respondents in the principal investigator job category indicated they need more private office space for conducting meetings and interacting with staff.

Laboratory equipment: Access to space limits equipment purchases, additional need for shared equipment space (e.g., freezers, chemical storage, glass washing).

Clinical Science Research & Development

Clinical research space: Additional clinical research space is needed. Specific spaces indicated included office space for clinical research staff and small conference rooms/meeting spaces which are acoustically isolated for consenting Veterans and conducting research. Several respondents indicated the need for space to draw blood from Veterans. Integrating clinical spaces with research is challenging and several respondents indicated they spend a lot of time traveling to clinical areas to see participants.

Laboratory equipment: Respondents indicated that space for new equipment is at a premium. Specific equipment needs included a research-dedicated MRI, additional exercise and physiology equipment, and more space for storage.

Health Science Research & Development

Conference rooms & meeting spaces: Respondents indicated that there is a need for additional conference room space to conduct laboratory meetings and teleconferencing calls. Those using shared office spaces also require private rooms from which to conduct consultations and discussions with research participants. Respondents indicated that teleconferencing equipment should be simple, standardized, and easily accessible from all meeting areas. Additionally, respondents indicated they require publicly accessible (not secured) conference rooms and meeting spaces to conduct focus groups and studies with members of the public.

Laboratory equipment: Reliable access to data hospital and/or clinical database and reporting systems is required, especially when working remotely.

Rehabilitation Research & Development

Laboratory equipment: Several respondents mentioned computational research needs. Several respondents suggested the creation of a dedicated rehabilitation research core, housing a sleep lab, research gym, and equipment for clinical trials. Space for motion analysis testing and training, including an indoor walking track, gait analysis labs, and spaces tall enough to accommodate treadmills were mentioned. Several respondents indicated that appropriate space for some highly sensitive equipment is limited (e.g., vibration isolated areas).

Conference rooms & meeting spaces: Additional meeting rooms and conference spaces, equipped for teleconferencing, were mentioned by several respondents. Additionally, several respondents indicated they need publicly accessible, acoustically isolated rooms located near research areas where they can meet with Veterans.

Veterinary Medical Unit

Laboratory equipment: Many respondents indicated that storage space is limited in the VMU and that more bench space is needed. The most commonly mentioned future research needs included additional imaging technologies and techniques. Respondents also indicated a need for additional housing space and more housing options in the VMU, either currently or in the near future. Isolated housing options (e.g. BSL2) would allow researchers to access different animal strains and expand their research opportunities. Along with adding more housing options, respondents also emphasized the need to consider key adjacencies to prevent cross-contamination (e.g., BSL-2 housing options located adjacent to behavioral testing areas to prevent transport through shared hallways). Several researchers indicated that their current VMU does not have adequate space for working with large animals, which limits the variety of animal model species available for work.

4.4 Research Spaces

4.4.1 Research Spaces & Barriers to Conducting Research

Biomedical Laboratory Research & Development

Lack of space: Many respondents indicated that they need more wet laboratory bench space and/or office space to accommodate new laboratory equipment and research staff. Several respondents indicated they are currently sharing necessary lab spaces (e.g., fume hood, sinks) with other researchers due to low availability, and that this situation affects their productivity. A few respondents indicated that lack of space led them to spread lab space across multiple floors, which affects lab culture and collaboration.

Access to equipment or core facilities: Respondents indicated that access to specific cores that are not available at their research station can slow the progress of their research. The cores that were most commonly mentioned were proteomics, genomics, and biostatistics/bioinformatics. Several respondents indicated that coordinating with core facilities can be challenging, and that access to expertise and training on how to run or use core equipment should be a priority. Access to this training draws researchers to affiliates for research.

Outdated infrastructure: Many respondents indicated that their physical lab space is out-of-date or otherwise not well-suited to their current research, including access to wireless networks, access to adequate power supplies and uninterrupted power supplies, and access to gases and water in needed spaces. Some respondents indicated that the physical condition of their lab space is deteriorated, which has affected research work and equipment. Some respondents indicated that this affects recruitment.

Clinical Science Research & Development

Lack of space: Many respondents affiliated with CSR&D indicated there is not adequate space to meet with research participants. Several suggested that they would benefit from the availability of a centrally located clinical research core outfitted with inviting spaces for

participants to wait, private interview rooms, and research spaces equipped for psychometric testing, electrophysiology, physical exams, and video capture.

Access to equipment or core facilities: Respondents indicated that lack of access to specific cores slows their research progress. Specific cores listed included tissue/biospecimen banking, bioinformatics/biostatistics and molecular biology.

Health Science Research & Development

Access to technology: Many respondents indicated that access to computing infrastructure is under resourced for the analyses they conduct as part of their work. Technical limitations within medical and case management software systems and firewall access complicated the transition to remote work. Many indicated they would prefer to be able to access internal VA networks over wireless, rather than having to connect through wired connections. Several respondents indicated that access to internal resources was complicated when changing to remote work.

Lack of space and adequacy: Many respondents indicated their labs are quickly outgrowing their allocated space. HSR&D affiliated respondents indicated they often work in open-office work spaces, which can be difficult due to the nature of their work. Respondents indicated they often need privacy for their work and interactions. Many also mentioned there are not adequate spaces to meet with participants.

Rehabilitation Research & Development

Lack of space: Many respondents indicated that their teams are growing without adequate space to accommodate new members. Those who indicated their labs are discontinuous or spread across multiple locations indicate this situation is inconvenient. Space to visit with patients is necessary for RR&D researchers and often in short supply.

Access to technology: Many researchers indicated that IT regulations and local IT and ISSO implementation complicates research work involving access to electronic records. Using third party software is complicated by policies and procedures.

Veterinary Medical Unit

Outdated infrastructure: Many respondents indicated that their VMU is out of date for current needs, which complicates maintaining compliance.

Lack of space: Many respondents indicated that they need more space in the VMU, including additional bench space and room for maintaining animal colonies. Respondents also indicated a lack of space to accommodate specialized housing models.

Access to core facilities: Respondents affiliated with the VMU indicated that coordinating work with core facilities is complicated, especially when coordinating with off-site cores.

4.4.2 Research Spaces & Support for Research Work

Biomedical Laboratory Research & Development

Proximity & adjacency: Proximity and adjacency to key resources was a main theme. Specifically, respondents mentioned appreciating close proximity of private or semi-private dry office space to wet lab work areas. Respondents also mentioned that working in close proximity to shared equipment and laboratory core facilities is convenient, as it facilitates cooperative use of these resources. Respondents who work at a VA station with an on-site VMU mentioned that this adjacency is key for maintaining animal colonies and conducting research. Several respondents who indicated they collaborate with an off-site affiliate lab mentioned that close proximity to the affiliate is important for their research.

Clinical Science Research & Development

Dry lab space: Respondents affiliated with CSR&D indicated that private, small group rooms for consultation are important for research. Several respondents commented positively about the spaces available at their research station, reporting satisfaction with video conferencing equipment, screens, and acoustic privacy.

Proximity and adjacency: Proximity and adjacency to key resources was a key theme that emerged among CSR&D affiliated researchers. Respondents indicated that proximity to shared equipment (most notably within the VMU) facilitates collaboration and knowledge sharing. Proximity to colleagues also emerged as an important theme. Respondents indicated that common work areas and shared labs promote informal, generative discussion with other researchers, while proximity to administrative staff helps to promote compliance and robust day-to-day operations.

Health Science Research & Development

Proximity and adjacency: Close proximity to VA colleagues and staff was a key theme among HSR&D affiliated respondents. Respondents indicated that common work areas, printers, scanners, labs, and shared equipment promote collaboration and discussion between researchers. Proximity to administrative staff was another key theme, respondents indicated that cooperation with Clinical Research Center staff, physicians, and/or ACOS staff is critical for research involving VA patient participants. Several respondents indicated that their station's location on a medical campus simplifies work with VA patient participants.

Remote network access/remote work access: Respondents also indicated that their transition to working remotely was not difficult. Robust systems and VPN access to the VA network and VINCI have allowed HSR&D affiliated researchers to adapt to remote work under challenging circumstances.

Dry lab space: HSR&D affiliated respondents indicated that small, acoustically isolated conference rooms for consultation are important for their research. Several respondents commented positively about the meeting spaces available at their research station, reporting satisfaction with network speeds, video conferencing equipment, and privacy.

Several respondents indicated that the ergonomics of their workstation are good, and support a healthy work environment. Many indicated they appreciate their quiet, private workspace.

Rehabilitation Research & Development

Proximity and adjacency: Several core facilities were key for researchers affiliated with RR&D (e.g., microscopy, behavioral core, VMU). Many also reported that adjacency to affiliate researchers is a key support for their work allowing them access to equipment and technology that is not available at their home VA station. Likewise, proximity to clinics supports collaboration with physicians and recruitment of patients. Many respondents also noted that proximity to their colleagues promotes a collegial work environment.

Dry lab space: Respondents affiliated with RR&D indicated that private or semi-private workstations with dual monitors and appropriate ergonomic supports encourage productivity.

Veterinary Medical Unit

Proximity and adjacency: Several respondents noted that their VMU is fully contained on a single unit, which supports productivity and collaboration while minimizing transport of research animals through shared spaces. Many respondents also noted that the arrangement of their unit from “clean” to “dirty” spaces supports safe research practice and minimizes the risk of cross-contamination. Close proximity to administrative spaces simplifies auditing and compliance checks.