LEON COUNTY RESEARCH & DEVELOPMENT AUTHORITY

NORTH FLORIDA INNOVATION LABS BUILDING

SCHEMATIC DESIGN REPORT | APRIL 2021

INNOVATION PARK of Tallahassee + RS&H AEI Affiliated Engineers ALW Architects Lewis + Whitlock

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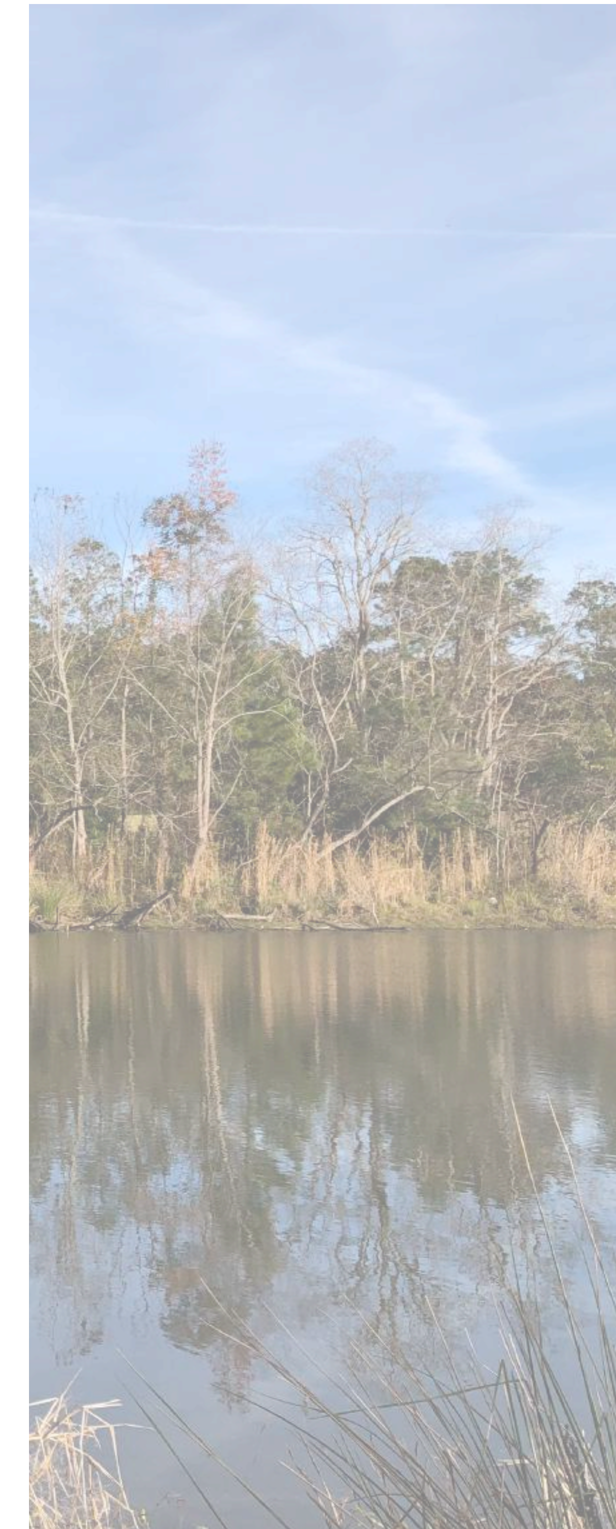
DESIGN SUMMARIES



ARCHITECTURAL DESIGN SUMMARY

The Schematic Design Phase of the North Florida Innovation Labs provided for development and critical review of multiple site and floor plan configurations to determine optimal use of a somewhat challenging site. The design team met with Ron Miller and Mary Jo Spector on three occasions to review site plan concepts, floor plan concepts, lab module organization, and building massing. The resulting floor plan concept is a two-story, 37,500 gross square foot building, located along the north western boundary of the site, proximate to the pond to the north.

Site

Located at the corner of W. Paul Dirac Drive and Ven Ness Court, the 3.51 acre site has a grade change of 20 feet from north to south, two significant live oaks trees along Paul Dirac Drive, a wetlands buffer, and significant landscape and building setbacks that when taken all together limit the available area for parking and building placement. The resulting building location is towards the north end of the site with an east-west orientation that takes advantage of the more moderate slopes found on site. A fortunate secondary advantage of this orientation is that it provides for the best solar orientation for daylighting along the north side of the building and protection of glazing on the south. The resulting site plan provides for 100 standard and 5 handicap parking spaces. A four foot retaining wall is required along the southern edge of parking to maintain grade at one of the existing Live Oak trees. An eight foot retaining wall is required at the northern perimeter of the building to transition from the building finish floor at 75' and the site grading at elevation 67'. This 8' retaining wall will be integrated into the building foundation as a stem wall. The primary building entrance is located off W. Paul Dirac Drive with delivery and service access located off Van Ness Court.

Site utilities are available as service connections with an 8" water main located on the north side of Van Ness Court and the west side of Paul Dirac Drive. The sewer main available for service connection is located on the north side of the property. Fire hydrants are located at the end of the cul-de-sac and about 100 feet north of the property on Paul Dirac Drive. Anticipating the need to sprinkle the building an on-site hydrant may be required.

Floor Plan

Organization of the building is based on a rational grid organization of 11' x 11', based on optimal laboratory planning parameters. A welcoming entry lobby is located along the southern side of the building facing W. Paul Dirac Drive, and adjacent to parking. The lobby experience includes a modest two-story atrium with the administrative suite adjacent to the entry, and easy access to the elevator and large conference room. As one enters the building, views of the conference room, monumental stair, and access to the elevated patio facing the pond are provided. The eastern three-quarters of the building is comprised of leasable laboratories and office space, organized into groups of two-module and four-module labs that can easily be combined for larger groupings as needed to suit tenant space needs. The western one-quarter of the building includes shared conference space, collaboration space, fabrication lab, metal shop, and shipping and receiving. Support spaces such as the break room, storage, and toilet rooms are centrally located.

Building Envelope

The modern aesthetic of the building envelope design is comprised of a combination of generous glazing, synthetic stucco and metal panels. The two-story entry glazing provides ample daylighting opportunities, welcoming potential tenants and guests. Glazing will be high performance, low-e glazing with window shading devices employed where possible. Siding materials, while not specifically designated at this time, are planned to be a combination of metal panels and synthetic stucco systems, utilizing a rainscreen drainage system over a continuous air and vapor barrier. Building insulation will primarily be located as batt insulation within the infill metal stud framing (see structural narrative). The roof system will be synthetic single-ply ethylene propylene diene terpolymer (EPDM) or thermoplastic polyolefin (TPO) roof, over tapered rigid insulation. Rainwater will be collected in internal roof drains that are piped through the building to a storm drain collection system.

General

The structural design will incorporate the program requirements for the variety of building elements through the implementation of efficient and cost-effective structural systems. The design will incorporate gravity and wind loads as required by Florida Building Code 7th Edition as well as implementation of local construction materials and methods.

Retaining walls along a portion of the perimeter of the building will be required and will affect the building design. The height of the retaining wall significantly affects the type of wall used and the cost to the project. We will investigate these issues during the following design phases.

Structural Design Criteria

Design Live Loads:

Meeting Rooms	100 PSF
Public areas, corridors	100 PSF
Mechanical/Electrical Rooms	100-200 PSF
Stairs and Lobbies	100 PSF
General Office	80 PSF
General Classroom	80 PSF
Storage Areas (General)	125 PSF
Storage Areas (Heavy)	250 PSF
Plaza "Stage"	150 PSF
Roof (Varying Slope)	12 - 20 PSF
Roof (Flat Areas)	30 PSF
Loading Dock Ramp and Slab	250 PSF

Superimposed Loads:

Mechanical/Electrical (General)	7 PSF
Ceiling	3 PSF
Partition Loads	20 PSF
Plaza areas (paver & 1 ft soil)	170 PSF
Other	Varies (as required by equipment)
Miscellaneous	5 PSF (minimum)

Wind Loads:

Florida Building Code (ASCE 7-16)	120 MPH
Exposure Category	B (Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.)
Internal Pressure Coefficient	+/- 0.18 (Enclosed building)
Soil Bearing Pressure:	TBD (Awaiting Soils Report)
Building Risk Category	II

Applicable Codes and Standards:

Florida Building Code, 7th Edition (2020).

American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures (ASCE 7-16)

American Institute of Steel Construction 2017

American Concrete Institute (ACI 318-14)

Building Code Requirements for Masonry Structures (ACI 530-13)

Precast/Prestressed Concrete Institute (PCI)

American Welding Society (AWS D1.1)

Steel Joist Institute (SJI)

Steel Deck Institute (SDI)

Foundation Description

The soils report has not been completed at this time. Based on preliminary investigation of the existing site location and the design of the adjacent Buildings additional geotechnical testing is being performed. The preliminary results indicate a conventional shallow foundation may be possible.

Expansive clays are often encountered in the Tallahassee area. If expansive clay materials are encountered, they will affect the final system recommended by the project geotechnical engineer.

Retaining walls are required around some of the building site. The economic design of these walls will be crucial for the project budget.

Superstructure Description

The design team will evaluate several options for the structural system of this project including, conventional cast-in-place flat slab, structural steel with composite steel floor deck, precast composite concrete joists with concrete slab, and concrete pan joist system. Based on the architectural considerations of the building and discussions with the design team, a structural steel system will most likely be used.

STRUCTURAL SYSTEM SUMMARY

A structural steel system has several advantages for a building of this size. The structural steel system has a fast erection time, which helps the schedule; a steel system permits longer spans, which reduces the number of columns; and it is lighter, which will produce smaller foundations than a conventional flat slab system. The significant disadvantages to the structural steel system include the additional cost of fireproofing of the steel members and a reduced amount of available space in the ceiling for electrical and mechanical systems which can increase the floor-to-floor height. Depending on the lab requirements, floor deflection and vibration will need to be considered. The lab planning consultant will need to provide direction on the limits of floor deflection and vibration that is acceptable.

The roof system will be composed of a low slope built-up roof. The flat areas will possibly be concrete topped to provide usable areas for mechanical equipment and as a basis for the roof system. The roof system will be used in conjunction with a metal roof deck to transfer required diaphragm loads to the primary shear walls.

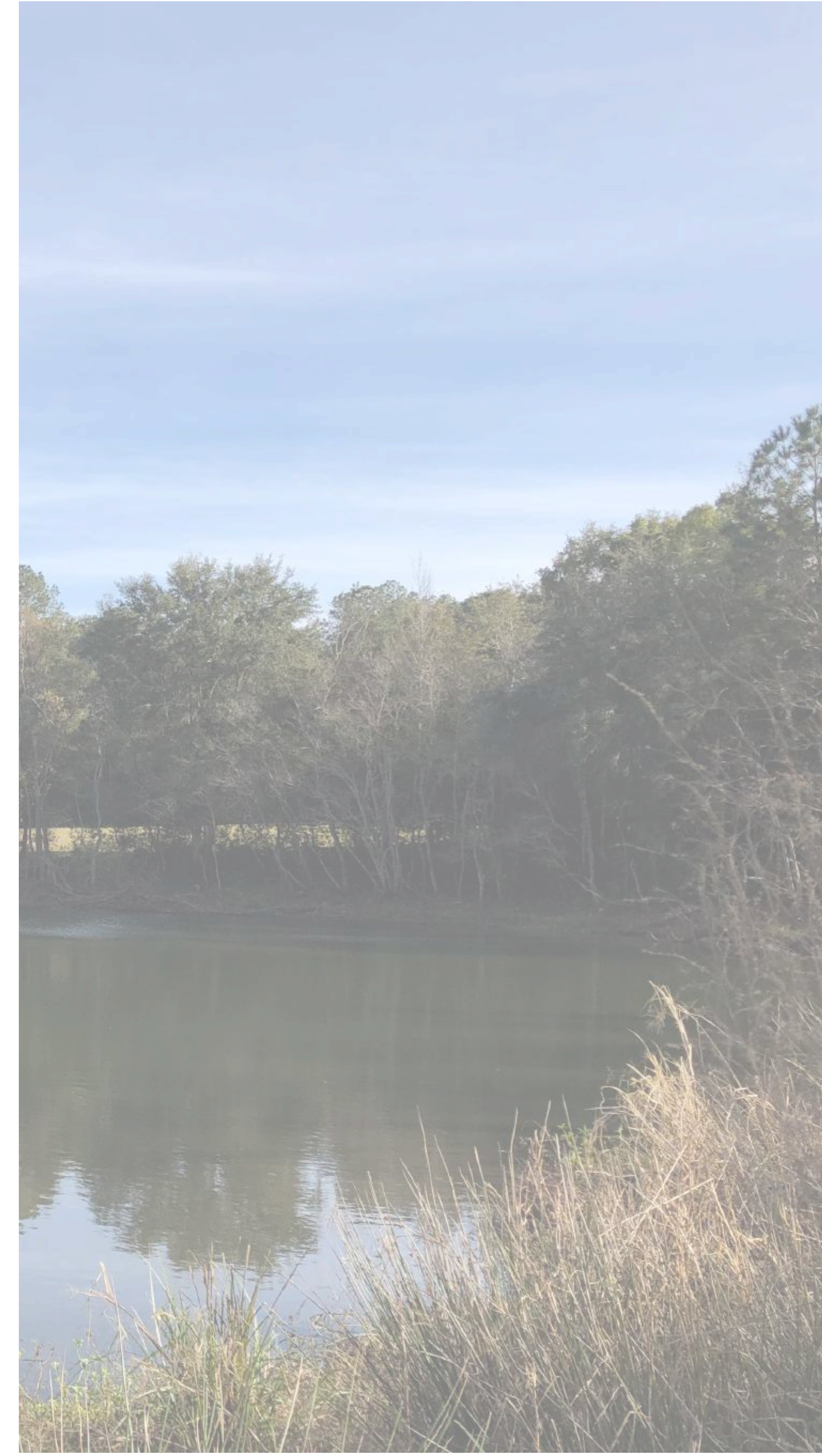
Exterior walls of this facility are anticipated to consist of non-load bearing steel stud wall system with an architectural veneer system. The use of a non-bearing, or infill system, will aid in construction speed by minimizing interference with other trades.

Lateral loads, due to wind forces, will be resisted by vertical bracing and possibly the CMU walls located at the primary egress stairs and the elevator shafts.

We will continue to discuss these issues with the Construction Manager to determine the best systems for the building.

Outstanding Issues:

Geotechnical Report: The Geotechnical Report is expected and upon receipt we will respond based on their recommendations.



I. INTRODUCTION

Project Goals and Objectives

The goals of this project are to set performance targets for occupant experience and resource utilization as a foundation for the basis of the design.

Occupant Experience

Occupant experience covers thermal quality, air quality, acoustics, and vibration. The following sections will define each of these categories and provide minimum performance thresholds.

Thermal Comfort

Thermal comfort is the primary purpose of the mechanical systems within the offices, conference spaces, laboratories, etc. Occupant comfort is defined as compliance with ASHRAE 55.

Operative temperature, humidity, air speed, local thermal discomfort and temperature variations with time are considered in the system design. The following thermal comfort criteria are used as the basis for system design:

Thermal Comfort Criteria					
Space	Metabolic Rate	Clothing Insulation	Air Temperature	Air Speed (1)	Humidity
	(met)	(clo)	(°F)	(fpm)	(%RH)
Lab/Office	1.1	0.57	75	20	50

Notes:

(1) Air speed at work surface

Air Quality

Indoor air quality is achieved through multiple means including but not limited to: supplying outside air through forced air or natural ventilation, filtering air, pressurization control, isolating contamination, and exhausting contaminated air.

The project shall comply with State code requirements to ensure occupant health and safety.

Acoustics

Acoustic requirements will be defined by standard design practice for mechanical systems.

Vibration

Vibration may adversely impact occupant experience and research conducted by occupants. Sources of vibration internal to the project shall be mitigated to meet owner requirements. The owner and design team shall coordinate spaces requiring specific vibration parameters and mitigation for significant sources of vibration such as rotating mechanical equipment shall be included.

Energy Performance Goals

The building will be designed to comply with State energy performance code.

II. CODE REQUIREMENTS AND SITE-SPECIFIC CONDITIONS

The following applicable Codes, Standards and Guidelines are intended to be used to determine acceptable design criteria, standard of performance, workmanship, etc.

Applicable Local Codes

The Building Systems will be designed in accordance with the Florida Building Code, 7th Edition (2020), the Florida Fire Prevention Code, 7th Edition (2020), and the Code of General Ordinances of the City of Tallahassee.

Applicable National Codes and Standards

IEEE - Institute of Electrical and Electronics Engineers

IESI - Illuminating Engineering Society of North America

NEC - 2017 National Electrical Code

NECA - National Electrical Contractors Association

NEMA - National Electrical Manufacturers Association

ADA - Americans with Disabilities Act Accessibility Guidelines

National Fire Protection Association (NFPA) Guidelines and Standards:

NFPA 1 – Fire Code, 2018 Edition

NFPA 13 - Installation of Sprinkler Systems, 2016 Edition

NFPA 30 - Flammable and Combustible Liquids Code, 2018 Edition

NFPA 45 - Fire Protection for Laboratories Using Chemicals, 2015 Edition

NFPA 54 - National Fuel Gas Code, 2018 Edition

NFPA 55 – Compressed Gases and Cryogenic Fluids Code, 2016 Edition

NFPA 72 - National Fire Alarm and Signaling Code, 2016 Edition

NFPA 101 - Life Safety Code, 2018 Edition

NFPA 110 – Standard for Emergency and Standby Power Systems, 2016 Edition

Guidelines and Standards

Laboratory Design Guidelines

In general, the laboratory design Guidelines have been developed using appropriate information from the following Standards:

- ACGIH Industrial Ventilation - A Manual of Recommended Practice (the latest edition)

- ANSI/AIHA Z9.5 2012 - Laboratory Ventilation Standard
- OSHA 29 CFR Part 1910 - Occupational Exposures to Hazardous Chemicals in Laboratories
- ASHRAE Standard 110-2016 - Method of Testing Performance of Laboratory Fume Hoods
- Biosafety in Microbiological and Biomedical Laboratories, Fifth Edition
- ANSI Z358.1 Emergency Eyewash and Shower Equipment, 2014

ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality, 2019 Edition

TIA- 569-D Telecommunications Pathways and Spaces

TIA- 606-B Administration Standard for Commercial Telecommunications Infrastructure

TIA- 607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

Building Utilization

It is anticipated that the building will be utilized as indicated in the following schedule. Systems service wet laboratory spaces will be designed to operate 24 hours per day, seven days per week. All other building systems will be designed to operate based on open/closed usage profile and provided with control systems that allow scheduling of equipment to accommodate operator defined schedules.

Schedules	
General Schedule	7am to 7pm
Critical Systems Schedule	24 hours

III. MECHANICAL SYSTEMS

BASE DESIGN CRITERIA

Outdoor Design Conditions

		Dry Bulb Temperature (°F)	Wet Bulb Temperature (°F)
Summer	System Design (1)	96.2	76.1
	Cooling Coil/Dehumidification Design (2)	82.8	78.8
Winter	System Design (3)	16.4	-

(1) Based on 0.4% Cooling DB/MCWB for Tallahassee Regional, as published in 2017 ASHRAE Fundamentals.

(2) Based on 0.4% Dehumidification DP/MCDB for Tallahassee Regional, as published in 2017 ASHRAE Fundamentals. DP is converted to WB.

(3) Based on 10 year Extreme Annual Heating DB for Tallahassee Regional, as published in 2017 ASHRAE Fundamentals.

System Design Conditions

System	Design Temperature (1) (°F)	Differential Temperature (1) (°F)
Heating Hot Water	130	30

(1) Refers to circulated fluid temperature.

Terminal Device Design Conditions

System	Design Temperature (1) (°F)	Differential Temperature (1) (°F)
Reheat Coils	130	30
Air Handling Unit Supply Air	55	N/A

(1) Refers to circulated fluid temperature unless otherwise indicated.

Indoor Design Conditions, Ventilation Rates and Pressure Relationships

Space Criteria							
Room	Temperature (°F) (2)		Humidity (%RH) (3)		Minimum Ventilation (ACH) (4)		Pressure Relationship
	Min.	Max.	Min.	Max.	Occ.	Unocc.	
Laboratory and Lab Support Spaces	70	72	(6)	50	6	4	Negative

<table>
<tr><th colspan="9">Space Criteria</th></tr>
<tr><th rowspan="2">Room</th><th colspan="2">Temperature (°F) (2)</th><th colspan="2">Humidity (%RH) (3)</th><th colspan="2">Minimum Ventilation (ACH) (4)</th><th rowspan="2">Pressure Relationship</th></tr>
<tr><th>Min.</th><th>Max.</th><th>Min.</th><th>Max.</th><th>Occ.</th><th>Unocc.</th></tr>
<tr><td>Sterilizer Room</td><td></td><td>78</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Office, Conference and Administrative Support Areas</td><td rowspan="4">68</td><td rowspan="4">75</td><td rowspan="4">(6)</td><td rowspan="4">50</td><td rowspan="4" colspan="2">(5)</td><td>Neutral or Positive</td></tr>
<tr><td>Toilet rooms/Janitor Closets</td><td>Negative</td></tr>
<tr><td>Corridor</td><td>Positive to Laboratory</td></tr>
<tr><td>Breakroom</td><td>Negative</td></tr>
<tr><td>Telecommunication Rooms</td><td colspan="2">72 (year round)</td><td>(6)</td><td>50</td><td colspan="2">NR</td><td>Neutral</td></tr>
<tr><td>Mechanical and Electrical Rooms</td><td colspan="2">78°F Maximum</td><td colspan="2">(6)</td><td colspan="2">NR</td><td>Neutral</td></tr>
<tr><td>Elevator Machine Room</td><td colspan="2">75 (year round)</td><td colspan="2">(6)</td><td colspan="2">NR</td><td>Neutral</td></tr>
<tr><td>Unoccupied Spaces</td><td>65</td><td>85</td><td colspan="2">(6)</td><td colspan="2">NR</td><td>Positive</td></tr>
</table>

(1) Minimum – Winter Heating
Maximum – Summer Cooling.
Occ. – Occupied Air Change Rate
Unoc. – Unoccupied Air Change Rate
NR – No requirement
N/A – Not applicable.

(2) Systems will be designed to meet the indicated temperature with a ± 2°F accuracy unless otherwise noted.

(3) Systems will be designed to meet the indicated relative humidity with a ± 5% accuracy unless otherwise noted.

(4) Total air changes per hour for supply air in positive pressure or neutral rooms, or return/exhaust air in negative pressure rooms.

(5) Based on Table 6-1 of ASHRAE 62.1 Standard 2013.

(6) Mechanical humidification not planned.

Assumed Heating and Cooling Loads

Internal Load Density					
Space	Lighting Density (W/sf) (1)	Equipment Density (W/sf) (1)	Occupant		
			Occupants per 1000sf	Sensible BTUH (3)	Latent BTUH (3)
Offices and Administrative Support Areas	1.0	2.0	(2)	250	200
Conference	1.2	2.0	(2)	250	200
Wet Laboratories	1.8	6.0	(2)	250	200
Laboratory Support Spaces (shared Equipment Spaces)	1.8	15.0	(2)	250	200
Computer Rooms/MDF/IDF Rooms	1.7	5,000 btu/hr per rack	None	N/A	N/A
Dry Lab	1.4	2.5	(2)	250	200
Sterilizer Room	2.5	15.0	(2)	250	200
Staff Lounge	1.0	3.0	(2)	250	200
Corridor	1.0	0	None	N/A	N/A
Storage Rooms	0.6	0	None	N/A	N/A

(1) Actual load will be used where higher than the listed value.

(2) Occupant density in each space will be based on code adopted ASHRAE Standard 62.1-2010 or the actual occupant density listed in the facility program.

(3) The occupancy heat rejection will be based on ASHRAE Handbook of Fundamentals 2013.

Infiltration

The building air flow calculations will account for building pressurization per below.

Type	Airflow
Exterior Doors	100 cfm per 3'0"x7'0" door
Loading Dock Doors	5 cfm per square foot of door opening area

Building Envelope

Performance criteria for building envelope construction materials will be in accordance with the data provided by Architect.

Acoustic Criteria

Sound attenuation equipment will be provided based on standard design practice including guidelines from 2015 ASHRAE Handbook – HVAC Applications for mechanical equipment-related background sound in spaces. Results may differ due to many items not under control of the design team including additional acoustic contributions from other than the mechanical equipment and actual building usage.

Systems Diversity

In conjunction with the variable flow systems serving the building, an HVAC equipment sizing diversity will be applied to the design supply air quantities for sizing the primary heating and cooling system equipment. Diversity factors will be based on expected use factors and maximum building population.

System	Type	Diversity Factor
Terminal Systems	N/A	100%
Air Handling Systems	Occupant	85%
	Lighting	90%
	Equipment	85%
Heating Hot Water	N/A	100%

Fume Hood Density

The current programming indicates eight 4'0" fume hoods and nine 6'0" fume hoods total for the entire building, to be installed initially. The building ventilation system will be designed to accommodate up to fifteen 4'0" fume hoods and fourteen 6'0" fume hoods total for the entire building.

Biosafety Cabinet Density

The current programming indicates seven 4'0" fume hoods could be replaced with 4'0" Class II, Type B2 BSCs (100% exhaust to building exterior). The current programming indicates eight 6'0" fume hoods could be replaced with 6'0" Class II, Type B2 BSCs (100% exhaust to building exterior).

Snorkel Density

The current programming indicates fifty-five (55) snorkels total for the entire building.

Lab Equipment Exhaust

The exhaust air requirements for fume hoods will be based on maintaining a face velocity of 80 fpm through the open sash with the sash positioned at 18" above work surface.

Acid, combustible, or flammable storage cabinets are not vented unless otherwise noted.

Hood Description/Exhaust Requirement:
4'-0" restricted sash (horizontal) bench hood: 500-600 cfm
6'-0" restricted sash (horizontal) bench hood: 800-900 cfm
4'-0" Class II, type B2 (100% exhaust) biological safety cabinet: 800 cfm ± 5% @ 2.0" WG
6'-0" Class II, type B2 (100% exhaust) biological safety cabinet: 1,250 cfm ± 5% @ 2.0" WG
4" point (snorkel) exhaust: 80 cfm

HVAC PIPING SYSTEMS DESCRIPTIONS

This section includes general descriptions for HVAC and process piping systems. Refer to Pipe Distribution Criteria for more detail.

Heating Hot Water System

System Description

Heating hot water system will serve AHU heating coils and terminal heating devices such as reheat coils, unit heaters, radiant panels, and cabinet unit heaters.

Heating hot water system will be variable volume system utilizing a modulating 2-way control valve at each terminal heating device. Distribution pumps will each be provided with VFD.

A differential pressure transmitter between the supply and return mains will be utilized to vary the speed of the pumps, via variable frequency drives, to maintain a constant pressure differential between the piping mains.

Equipment and Components

Hot water boiler will be condensing type with sealed combustion with natural gas burner.

Distribution pumps will be base mounted end suction centrifugal type with VFDs.

The heating hot water system will also include the following components:

- Chemical pot feeder
- Air separator
- Bladder type expansion tank
- Make-up water assembly
- Heating coils
- Unit heaters
- Appropriate valving and piping specialties

Refer to System Equipment Reliability, Generator Power, and Capacity Matrix located at the end of Mechanical Systems Basis of Design for more detail.

Pipe Distribution Criteria

Piping Distribution Criteria			
System	Material	Size Criteria	Pipe and Fitting Insulation
Heating Hot Water	Type L copper piping with soldered fittings for pipes 2" and smaller and ST carbon steel piping with welded fittings for pipes 2-1/2" and larger. Grooved end steel piping and fittings are optional in mechanical rooms only in lieu of welded fittings. Unions will not be provided at terminal heating devices in copper piping.	Maximum pressure drop of 4 ft of water/100 ft of pipe for piping 6" or smaller. 10 fps maximum velocity for piping 8" and larger.	Rigid glass fiber insulation with appropriate insulation jacket

HVAC AIR SYSTEMS DESCRIPTIONS

This section includes general descriptions for HVAC air systems. Refer to Duct Distribution Criteria for more detail.

Air Handling Systems

System Description

Office, Conference Room, and Admin/Support Areas Air Handling Systems

Factory packaged rooftop air handling units will be manifolded to serve the Dry Labs, Offices, Conference Rooms and Admin/Support Areas.

System will be a single duct variable air volume reheat system, providing heating and cooling to the spaces.

An air-cooled condenser with DX cooling coils will be utilized in the air handling unit to provide mechanical cooling.

Air will be supplied to all appropriate spaces and a portion of this air will be returned to the air handling unit or relieved to outside via in-line return fan. The remaining portion of air not returned to the air handling unit will be utilized as make-up air for the exhaust systems and building pressurization.

Ducted return air system will be used instead of return air ceiling plenum to return air from the spaces back to the AHU.

Air handling system will operate 10 hours per day, 5 days per week. Air handling system will operate with occupied, unoccupied and morning warm-up control cycles.

Laboratory Air Handling Systems

Factory packaged rooftop air handling units will be manifolded to serve the metal shop and laboratory spaces.

System will be single duct, variable air volume, reheat system, providing heating and cooling to the spaces.

A total heat recovery wheel will be provided to recover heat from the general laboratory exhaust system.

Air supplied to all spaces will be exhausted to outdoors. No air from the metal shop, laboratory or support spaces will be returned to the air handling unit.

Air handling unit will operate 24 hours per day, 365 days per year.

Equipment and Components

Components	AHU Systems	
	Office, Conference Room, and Admin/Support Areas	Laboratory
Supply Air Module		
Outside Air Intake Damper	X	X
Total Energy Recovery Wheel, with Bypass Dampers		X
Return Air Mixing Chamber	X	
Hot Water Preheating Coil	X	X
DX Cooling Coils	X	X
Supply Fan Arrangement	Multi-fan array(2)	Multi-fan array(2)
Supply Fan to VFD ratio	Multiple	Multiple
Sound Attenuator	Duct- mounted Supply Air	Duct- mounted Supply Air
MERV 8, 2" Prefilters	X	X
MERV 14 Cartridge Final Filters		X
UV Radiation Lights downstream of cooling coil	X	X
Isolation/Smoke Dampers	X	X
Electronic Airflow Measuring Stations	X	X
Return Air Module		
Return Fan Arrangement	Multi-fan array(2)	N/A
Return Fan to VFD ratio	Multiple	
Isolation/Smoke Dampers	X	
Return Air Damper	X	
Relief Air Damper	X	

Components	AHU Systems	
	Office, Conference Room, and Admin/Support Areas	Laboratory
Fan Inlet Side Sound Attenuator	X	
Electronic Airflow Measuring Stations	X	

(1) Components are not listed in airflow tunnel order.

(2) Quantity of fans dependent on size of unit. Utilize economies of scale to select the appropriate number of fans for each individual unit.

Supply fans will be plenum type with airfoil blades. Fan speed and air volume will be modulated through variable frequency drives (VFDs) controlled by supply duct static pressure controller.

Return fans will be plenum type with air foil blades. Fan speed and air volume will be modulated through VFDs controlled by return fan discharge static pressure controller.

Design Criteria

Air Handling Unit Maximum allowable nominal face velocities at Maximum airflow	
Air Intake Louvers	400 fpm through free area of louver
Intake Hoods	400 fpm through free area of louver
Relief Hoods	800 fpm through free area of louver
Hot Water Heating Coils	700 fpm
Energy Recovery Wheel	500 fpm
Pre-filters	500 fpm
Final-filters	500 fpm
Sound Attenuating Devices	Maximum 1,200 fpm or maximum 0.25" w.g.

Laboratory Exhaust Systems

System Description

Laboratory General Exhaust System

Laboratories will be served by a central exhaust air system. The system will combine laboratory snorkel, canopy hoods, and Class II Type B2 biosafety cabinet exhaust with general exhaust.

System will consist of exhaust fans connected to a common exhaust fan inlet plenum and will be located on the roof. The fans are intended to operate in parallel and will each be sized for a fraction of the design load.

Laboratory exhaust system will be variable air volume. While the system is variable air volume, the exhaust fans operate at constant volume to maintain a constant stack discharge velocity. A static pressure sensor in the exhaust fan inlet plenum modulates an outside air bypass damper, introducing the required outside air into the plenum to maintain a constant flow rate through the fans.

Fume Exhaust System

Chemical fume hoods will be served by a dedicated central exhaust air system. The system will be sized to accommodate future fume hood growth established in the equipment and redundancy matrix.

System will consist of exhaust fans connected to a common exhaust fan inlet plenum and will be located on the roof. The fans are intended to operate in parallel and will each be sized for a fraction of the design load.

Laboratory exhaust system will be constant air volume. The exhaust fans operate at constant volume to maintain a constant stack discharge velocity.

Each system will operate 24 hours per day, 365 days per year.

Equipment and Components

Components	Lab Exhaust Systems	
	General Exhaust	Fume Exhaust
Common exhaust fan intake plenum	X	X
Sound attenuating device.	X	X
Isolation damper at each fan inlet.	X	X
Exhaust fans	SWSI Centrifugal fan	SWSI Centrifugal fan
Exhaust stack for each fan discharge.	X	X
Outside air bypass intake with sound attenuating louver, control damper, and weather hood.	X	X

Exhaust fans will be of AMCA Class "C" spark-proof construction with bearings and motors out of the air stream. Motors will have electric brakes to prevent counter rotation during start up.

Fans will have baked heresite chemical resistant coating on surfaces in contact with air stream.

Induced flow exhaust fans will be used to dilute contaminated air at the stack outlet and increase outlet air volume.

Fans will have packless type sound attenuating devices on the exhaust main, and the outside air by-pass duct.

Refer to System Equipment Reliability, Generator Power, and Capacity Matrix located at the end of Mechanical Systems Basis of Design for more detail.

Air Terminal Devices

Individual spaces up to four spaces having a common exterior exposure or a common interior space, and common occupancy, will be served by one supply air terminal (AT) device.

One air terminal device will be provided where individual space temperature control is required.

Air terminal devices will be utilized for fume hoods, biosafety cabinets, snorkel exhausts, and general exhaust.

Air Terminal Devices			
Spaces and System	Service	Type	Sound Attenuation
Office, Conference Room, and Admin/Support Areas Air Handling Systems	Supply	Galvanized steel single blade damper ATs will have internal liner with airflow measuring ring. (1)	(2)
General Lab	Supply and Exhaust	Pressure independent ATs will have airflow measuring station or characterized plunger and fast acting 24V actuator.	(3)
Specialty Lab Exhaust	Fume Hood Exhaust	None	N/A

(1) ATs will be provided with system pressure independent DDC controllers with 24 V electric actuators.

(2) Ductwork will not be lined. Sound attenuating flexible duct up to 6 ft in total length, will be provided at the diffusers and grilles to control noise. Sound attenuators at the discharge of supply will be provided to minimize noise.

(3) Ductwork will not be lined. Sound attenuating flexible duct up to 6 ft in total length, will be provided at diffusers and grilles to control noise. Sound attenuators at the discharge of supply and inlet of exhaust air terminal devices will be provided to minimize noise.

General Exhaust Systems

System Description

General/Sanitary

The system will service toilet rooms, janitor's closets, etc.

System will consist of multiple exhaust fans that will be controlled via occupied/unoccupied control.

The exhaust system will be constant volume.

Equipment and Components

Exhaust Components	General/Sanitary Exhaust System
Roof mounted downblast centrifugal fan	X
Fan Inlet Side Sound Attenuator	X
Automatic damper	X

Refer to System Equipment Reliability, Generator Power, and Capacity Matrix located at the end of Mechanical Systems Basis of Design for more detail.

Ductwork Systems

Ductwork will be constructed in accordance with SMACNA Standards for appropriate pressure class. Ductwork will be sealed to meet SMACNA Seal Class A as a minimum and to limit ductwork leakage not exceeding 1% of the design flow rate for high pressure ductwork and 2% for low pressure ductwork.

Duct System Distribution Criteria based on diversified CFM where applicable.

Supply and Exhaust System with Air Terminals

Description	Construction	Design Criteria	Insulation
Shaft	Galvanized Steel +4" Pressure class	(1)	.Fiberglass insulation
Air Handling Unit to Air terminal (AT) Device	Galvanized Steel +4" Pressure class	(1)	.Fiberglass insulation
Air Terminal Device to Supply Diffuser	Galvanized Steel +2" Pressure class	(2)	Fiberglass insulation
Laboratory General Exhaust Grille to AT	Galvanized Steel (-2)" Pressure class	(2)	Fiberglass insulation
AT to Heat Recovery Device	Galvanized Steel (-4)" Pressure class	(2)	None
Heat Recovery Device to Fan Inlet	Galvanized Steel (-6)" Pressure class	(1)	Fiberglass insulation
Exhaust Fan Stack Discharge Velocity	+10" Pressure class 304 stainless steel, all welded construction	(3)	None

(1) Maximum pressure drop of 0.15"/100 ft when ≤ 10,000 cfm

Maximum velocity of 2,000 fpm when > 10,000 cfm

Maximum velocity of 2,500 fpm when > 10,000 cfm in mechanical room, risers in shafts, and where space constraints dictate quantity of fans dependent on size of unit. Utilize economies of scale to select the appropriate number of fans for each individual unit.

(2) Maximum pressure drop of 0.1"/100 ft when ≤ 8,000 cfm

Maximum velocity of 1,600 fpm when > 8,000 cfm

(3) Nozzle velocity 3000 - 3500 fpm

Return/Exhaust System without Air Terminals

System	Construction	Design Criteria	Insulation
Return and General/Sanitary Exhaust Ductwork Sizing	Galvanized Steel ±2" Pressure class	(1)	None

(1) Maximum pressure drop of 0.1"/100 ft when ≤ 8,000 cfm
Maximum velocity of 1,600 fpm when > 8,000 cfm

Fume Exhaust

System	Construction	Design Criteria	Insulation
From Equipment, Grille, etc. to Air Terminal Device	(-2)" Pressure class 304 stainless steel, all welded construction	(1)	None
Air Terminal Device to Fan Inlet	(-4)" Pressure class 304 stainless steel, all welded construction	(2)	None
Exhaust Fan Stack Discharge Velocity	+10" Pressure class 316 stainless steel, all welded construction	(3)	None

(1) Maximum pressure drop of 0.1"/100 ft when ≤ 8,000 cfm
(2) Maximum pressure drop of 0.15"/100 ft when ≤ 10,000 cfm
Maximum velocity of 2,000 fpm when > 10,000 cfm
(3) Nozzle velocity 3000 - 3500 fpm

Miscellaneous Systems

Dust and Mist Collection

No dust collection systems will be provided as part of this project. Systems will be designed with makeup air to accommodate the future installation of dust collection systems, if required, by the Owner.

No mist collection systems will be provided as part of this project. If necessary in the future, mist collection systems will be provided by the Owner.

Mechanical Rooms, Elevator Machine Rooms and Technology/IT Rooms

Each room will be provided with a dedicated single split-system DX air conditioning unit and ductwork as required to maintain required space temperatures depending on the room size and HVAC load.

AC unit to include supply fan driven by electronically commutated motor, filters, and DX cooling coil.

Systems will be a constant air volume system providing cooling only to the spaces, and will consist of indoor cassette units and outdoor DX condensing units.

Air supplied to the spaces will be re-circulated.

Mechanical System Equipment Reliability, Generator Power, and Capacity Matrix

System	Component	Component Redundancy	Generator Power
Hot Water System	Boilers	2@100% (N+1)	Y
	Variable Primary Pumps	2@100% (N+1)	Y
Air Handling	Office	2@70% (1.7 x N)	N
	Laboratory	2@70% (1.7 x N)	Y
	Supply Fans - Office	(N+1)	N
	Supply Fans - Laboratory	(N+1)	Y
	Return Fans	(N+1)	N
Exhaust Air	General/Sanitary	1@ 100% (N)	N
	Laboratory General	2@100% (N+1)	Y
	Fume Hood	2@100% (N+1)	Y
Terminal Cooling	Elevator Machine Room Cooling	1@ 100% (N)	N
	Mechanical Room Cooling	1@ 100% (N)	Y
	IT Room Cooling Units	1@ 100% (N)	N

1. Refer to Generator Power Load matrix within the Electrical Basis of Design for further definition of the source of generator power.
2. Redundancy N+1 refers to system requiring N operating components to provide 100% of load with one additional component provided.
3. Redundancy 2N refers to system requiring N operating components with N operating components idle to provide 100% component redundancy.

END OF BOD

IV. BUILDING AUTOMATION SYSTEM

EXECUTIVE SUMMARY

System Description

Mechanical systems will be controlled and monitored through a DDC based Building Automation System (BAS) with distributed processing at the local level. High Voltage Electric actuation will be utilized for all larger control valves and dampers while Low Voltage Electric actuation will be utilized for terminal unit control. Electric actuation will be utilized for terminal unit control.

The control system will be standalone for monitoring and alarming at a central monitoring station.

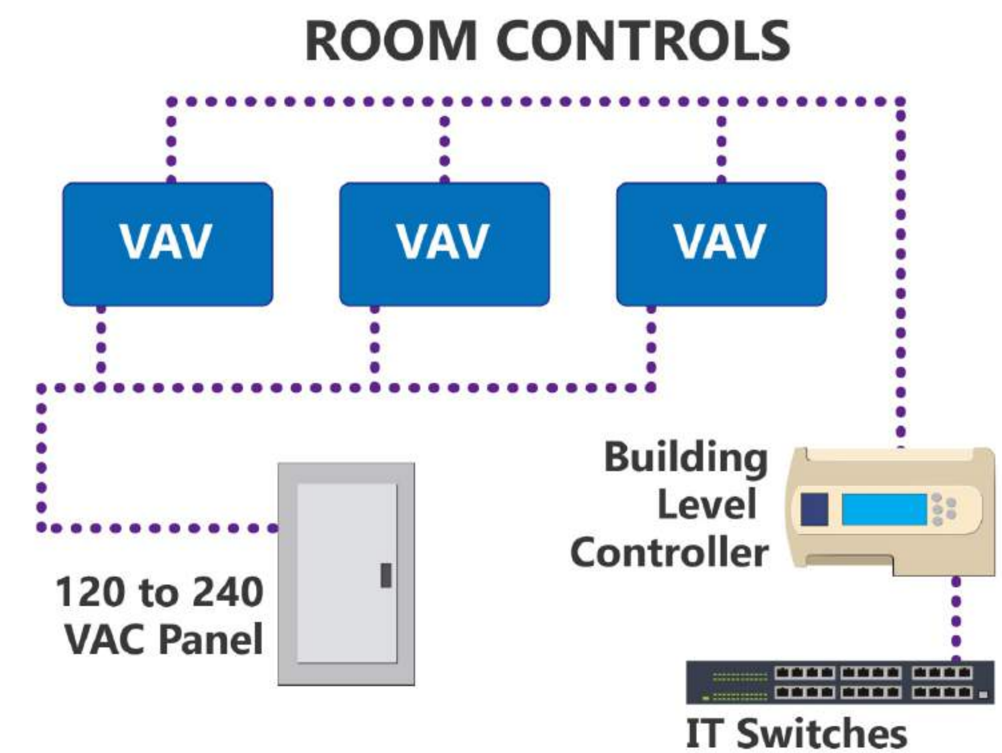
BAS will integrate with the following control systems/ equipment via communication-based interface or dedicated contacts and will provide graphical user interfaces via BAS Web server as necessary.

Table M29 – BAS Systems

System	Description
Boilers	BAS will provide graphical interface including equipment flow diagram showing all sensing and control devices associated with the system and provide ability to monitor, schedule and override applicable controls.
Variable Frequency Drives	BAS will provide additional monitoring and remote notification for alarming.
Packaged HVAC equipment	Packaged equipment will include but not be limited to air handling units, fan coil units, cabinet unit heaters, fume hoods, and numerous other pieces of equipment.
Generator System	BAS will provide additional monitoring and remote notification for alarming.
Domestic Equipment: Sumps, ejectors, hot water equipment, pure water equipment, pressure boosters, etc.	BAS will provide additional monitoring as needed and remote notification for alarming of all systems.
CO2 Sensors	CO2 sensors will be utilized in all densely occupied spaces (conference rooms, Lecture Hall, etc.) and will be used for local demand-controlled ventilation.
Fume Hood and Laboratory Air Flow Control System	BAS will provide additional monitoring and remote notification for alarming.
Laboratory equipment such as refrigerators/freezers	BAS will provide additional monitoring and remote notification for alarming as required by Owner.

Design Criteria

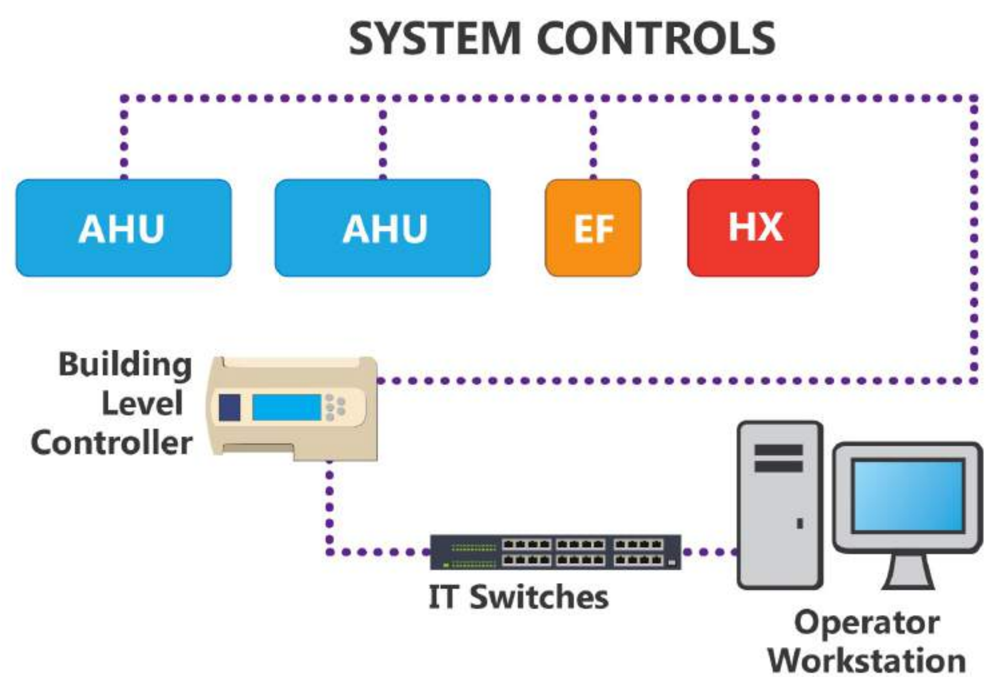
DDC controllers will utilize distributed architecture and will not rely on "front-end" or higher-level controller to perform required control sequence.



Systems with redundant mechanical equipment will have redundant controls installed to prevent a single controller failure from causing a total system failure.

DDC controllers serving major equipment will have a minimum of 2 spare points of each type (DI, DO, AI and AO) at each panel. For universal points, the spares will be divided evenly between the analog and digital types of points.

Control panels and DDC controllers serving equipment fed by emergency/stand-by power shall also be served by emergency/standby power. All BAS and DDC system primary controllers, PC's and communications equipment that monitors life safety and critical points (fire alarm, elevator emergency, etc.) will be supported by emergency generators. Control panels and DDC controllers fed by emergency/standby power will be served by individual UPS for each controller/system with minimum of 5 minutes of backup time.



Airflow tracking control using DDC will be utilized instead of space pressure control, to maintain the space pressure (positive, neutral or negative) as required by the programming

Equipment and Material

All control wiring will be installed in dedicated metal conduit.

END OF BOD

V. ELECTRICAL SYSTEMS

BASE DESIGN CRITERIA

Design Voltages

Type	Voltage
Building Service	480Y/277V , 3 phase, 4 wire + ground
Motors; ½ HP and larger	480V, 3 phase, 3 wire
Motors; less than ½ HP	120 or 208 Volts, 1 phase, 2 wire + ground
Lighting	277 Volts, 1 phase, 2 wire + ground
Specific Equipment	480 Volts, 3 phase, 3 wire + ground
Lab Support and Specialty Equipment	208Y/120V, 3 phase, 4 wire
Receptacles	120V, 1 phase, 2 wire + ground

Equipment Sizing Criteria

Branch Circuit Sizing Criteria

Type	Load
Lighting	Actual Installed VA
Receptacles	180 VA per outlet (duplex or single)
Multiple Outlet Assemblies	180 VA per 2'
Special Outlets	Actual Installed VA of Equipment Served
Motors	125% of Motor VA
Special Equipment	Actual Installed VA

Diversity Factor

Diversity factors will be used in establishing power service, feeder and equipment capacities. The diversity factor represents the ratio of the sum of the individual non-coincident maximum demands of various subdivisions of the system to the maximum demand of the complete system and will be established using historical data from similar buildings in conjunction with industry standards.

Long Continuous Load/Demand Factors Criteria

Type	LCL Factor
Lighting (Continuous Loads)	125% of installed VA
General Receptacles	100% of first 10 kVA installed plus 50% of remainder
Motors	125% of VA of largest motor plus 100% of VA of all other motors

Type	LCL Factor
Fixed Equipment	100% of total installed VA

Load Calculation Criteria

Functional Area Load Density Criteria – Peak Connected

Functional Area	Service Load Density (VA/sq ft)	EM-SB Load Density (VA/sq ft)
Office Receptacle	4.0	0
Lighting	1.0	0.25
Lab	12.0	1
Lab Support	30.0	1
General Receptacle	2.0	0
Conference Rooms	2.0	0
Corridor	1.0	0
Public Space	4.0	0
Building Support	2.0	0.1

Notes:
1. VA/sf values is based on historical data from projects with similar program elements.
2. EM-SB = Emergency -Standby

Mechanical Equipment Load Density Criteria - Peak Connected

Mechanical System	Service Load Density (VA/sq ft)	EM-SB Load Density (VA/sq ft)
Ventilation (V)	TBD	TBD
Refrigeration Systems (Process and Comfort) (R)	TBD	TBD
Heating Systems (H)	TBD	TBD
Piping Systems (P)	TBD	TBD
Miscellaneous Equipment (M)	TBD	TBD
Fire Protection Systems (FP)	TBD	TBD
Elevators (EL)	TBD	TBD

Notes:
1. VA/sf are values have been calculated using the equipment data list established for use on this project.
2. EM-SB = Emergency - Standby

Load Tables

System Capacity and Calculated Demand Load

Building Load Summary		
	Normal Power	Standby Power
kVA	612	120
VA/SF	12	2.35
W/SF	10.8	2.11

Notes:
1. Service load calculations to be provided as design progresses.
2. Includes 25% spare capacity.
3. Power factor is anticipated to be 90% and is derived from historical data on recent projects with similar program elements.

SYSTEMS DESCRIPTIONS

Electrical Service

System Description

The facility will be fed from a single feeder from the City of Tallahassee electrical utility serving the site.

The utility transformer will provide 480V secondary service to connect to the service entrance switchboard.

Design Criteria

The primary system service capacity will be designed to serve the calculated connected load of the facility plus an additional 20% for anticipated future loads.

Surge protection shall be provided at the main switchboard.

Emergency/Standby Power System

System Description

Emergency power source for the facility will consist of an Emergency Power Supply (EPS) coupled to an emergency Power supply System (EPSS). The EPS will include single diesel-operated engine generator set.

The emergency power system will be a Level 1 system per NFPA 110.

The 100 KW/ 125 kVA, 480Y/277V, Emergency/Standby generator will be diesel engine driven. The generator will have adequate capacity to operate the generator at full load for at least 8 hours.

The emergency/standby power generator will be located in a weather-proof, sound-attenuated exterior enclosure. The generator set will be mounted on a concrete-filled inertia base mounted on spring isolators.

The emergency/standby power will be distributed to multiple automatic transfer switches segregated by system. Refer to Generator Power Load Matrix for description of segregated systems and associated loads served.

Design Criteria

The capacity of the generator will be sufficient to serve the facility, with approximately 25 KW future capacity.

Electrical Distribution

System Description

Normal Power Distribution

The normal distribution system shall include all electrical distribution equipment from the serving utility service point to the branch distribution outlet device, not including those systems and devices as described in the following subsections.

Secondary service will be distributed to the switchboard unit via 1200-amp rated feeder conduit. The raceway will originate at the transformer and route into the main electrical room, where it will feed directly into the main circuit breaker.

Distribution to the building panelboards will consist of conduit and wire. Each main distribution board will be fed directly from the service entrance switchboard.

480Y/277V distribution will be accomplished with conduit risers. The risers will deliver power to a normal power lighting panelboard and 480:208Y/120V distribution transformers.

Each 208Y/120V secondary distribution transformer will deliver power to a Distribution Panel. The Distribution Panel will deliver power to the branch circuit panelboards.

Emergency/Standby Power Distribution

As required by Code, the feeders and branch circuit wiring to emergency loads (lighting, fire alarm, telecommunications, etc.) will be in dedicated raceway. Individual feeders will originate at the emergency distribution panel and will rise through the building to serve the emergency lighting panels. The emergency branch circuit panelboards will be served from the emergency lighting panels via the distribution transformer.

Individual standby equipment feeders will originate at the standby equipment switchboard and will rise through the building to serve the standby equipment distribution transformers. The transformers will serve 208Y/120V distribution panels which will in turn serve the individual standby equipment branch circuit panelboards.

Design Criteria

Building service and distribution equipment sizes will be based on estimated demand plus known or anticipated future loads.

Power distribution equipment will be sized to support 25% spare capacity (amperes) to accommodate functional changes over the life of the building.

Power distribution equipment will be sized to include 15% spare circuit breakers plus spaces for future circuit breakers

Equipment and Components

Equipment	Description of Components
Switchboards	UL 891 construction Front access NEMA 1 enclosure Copper Bus Main Circuit Breaker Group mounted bolt-on feeder circuit breakers Electronic trip circuit breakers with field-adjustable and field-changeable trip units will be used for all circuit breakers 250 amps and greater and for smaller sizes if special circumstances exist. Circuit breakers 1600 amps and greater will be UL listed for applications at 100% of their continuous ampere rating in their intended enclosure
Distribution Panelboards	UL 891 listed, Front access NEMA 1 enclosure switchboards Copper Bus Main Circuit Breaker Fixed, individual-mount circuit breakers Electronic trip circuit breakers with field-adjustable and field-changeable trip units will be used for all circuit breakers 250 amps and greater and for smaller sizes if special circumstances exist.
Branch Panelboards	UL 67 listed 54 Pole, NEMA 1 enclosure, recessed and/or surface mounted Copper Bus Main Circuit Breaker as needed Molded case with non-adjustable trip units to be used for all circuit breakers 225 amps and smaller All circuit breakers will be bolt-on style Panelboard covers will be hinged trim with door-in-door construction.
Distribution Transformers	480 Delta to 208Y/120 VAC, Wye, three-phase, four-wire; 3-coil, 2-winding type; 150°C rise above 40°C ambient Copper Winding K1 rated Neutral conductors for K-4 and higher units to be increased in size from the transformer to the first distribution panel and will be able to support 150% of the normal phase current. Transformers will incorporate vibration isolation pads in their construction located between the core/coil assembly and the transformer case
Automatic Transfer Switches	Three pole Copper Bus .65kAIC rating

Equipment	Description of Components
	Solid Neutral Open Transition Transfer Controls: Solid State microprocessor Isolation Bypass: None 3 cycle for use with molded case breakers short circuit rating

Grounding System

System Description

A complete low-impedance grounding electrode system will be provided for this facility. The grounding electrode system will include the main water service line, structural steel, and ground ring around the perimeter of the building. The equipment grounding system will extend from the building service entrance equipment to the branch circuit. All grounding system connections will be made using exothermic welds at the exterior and irreversible compression connections inside the building.

Bonding jumpers will be provided as required across pipe connections to water meters, dielectric couplings in a metallic cold water system, and across expansion/deflection couplings in conduit and piping systems.

All feeders and branch circuits will be provided with an equipment ground conductor. Under no circumstances will the raceway system be used as an equipment grounding conductor.

Design Criteria

The grounding electrode system will be designed in accordance with NEC article 250.

System resistance to ground will be 5.0 ohms or less.

All conductors will be installed in steel conduit unless installed below grade or in concrete.

Equipment and Components

The reference ground for the equipment grounding system will be established from a structural ground grid as follows:

A No. 4/0 AWG bare copper ground wire will be installed at 30" below grade around the entire perimeter of the building. 3/4" x 10 ft driven copper ground rods (test wells) will be installed and connected to this ground loop at not-greater-than 200' intervals with a No. 4/0 AWG bare copper conductor. Steel columns in exterior walls will also be connected to this ground loop with 4/0 AWG bare copper at intervals not to exceed 60'. Interior steel columns will be connected to the exterior ground loop on each side of the building at intervals not to exceed 200' with a No. 4/0 AWG bare copper conductor.

Wall-mounted copper ground bus will be located in the main electrical room, floor electrical rooms, and voice/data rooms. The main electrical room ground bus will be connected to exterior ground loop.

Distribution

A separate, insulated 4/0 AWG ground wire will be provided from the main electrical room ground bus to each floor's electrical room ground buses, underground incoming water service line ahead of meter, and underground gas line at the building entrance.

The main service entrance neutral will be bonded to the system ground bar within the switchboard by a removable bus bar link.

A code-sized, unbroken bond leader will be connecting the electrical room ground bar to the XO terminal of the local transformers.

A No. 4/0 AWG, bare copper, grounding electrode conductor will be extended to all voice/data rooms, so that those systems can be properly bonded.

A separate ground wire will be provided for all circuits.

Lightning Protection System

System Description

A lightning protection system will be provided to protect structure and associated appurtenances as recommended in the Lightning Risk Assessment which will consist of a system of conductance designed to safely divert the energy of a lightning strike to the earth while minimizing damage to the facility.

Design Criteria

System will comply with NFPA 780 - Standard for the Installation of Lightning Protection Systems. The installer will be certified with the Lightning Protection Institute and the installing Contractor will provide a UL Master Label for the completed system.

Equipment and Components

Materials will be rated Class I for structure heights of 75' or less.

Air terminals will be solid copper with a blunt safety tip, 10" minimum height, and have a mounting base suitable for the location.

Conductors will be bare-stranded copper, except aluminum will be used where installation is in contact with aluminum surfaces.

Ground rods will be copper-clad steel, 3/4" diameter by 10' long, with a bronze mechanical-type conductor clamp.

Distribution

The system layout and design will encompass all exterior surfaces of the facilities under a complete zone of protection as defined by NFPA 780. Air terminal spacing will not exceed 20 ft, except spacing up to 50' is allowed for non-perimeter areas of flat roofs. Locations will comply with NFPA 780 and will generally follow the building roof ridges and/or perimeters.

One (1) down conductor will be provided for every 100 ft of building perimeter, with a minimum of two (2) conductors. Conductors will be configured to provide a two-way path to earth. Metal bodies will be bonded to the conductor system in accordance with NFPA 780.

A ground rod will be connected to each down conductor. The electric power service grounding system will be bonded to the Lightning Protection System.

Lighting Systems

System Description

A complete lighting system for all indoor and outdoor illumination will be provided. The indoor and outdoor lighting systems will consist of LED lighting fixtures.

In general, indoor lighting controls will consist of low-voltage switches controlled by low-voltage lighting control system , room vacancy or occupancy sensors, and ambient daylight sensors. Outdoor lighting controls will utilize photocells and time switches with line voltage manual override switches

Emergency/night lighting will be provided by unswitched branch circuits. These unswitched branch circuits will be fed from an emergency lighting panel. Exit signs and emergency egress lighting will be provided throughout the facility to illuminate egress corridors, stairwells, lobbies, etc. Exit and egress lighting circuits will originate from emergency system branch panels. Base design intent is that egress lighting circuits will be constant "on" with no toggle switch control.

Illuminance Levels Design Criteria

Space	Average Maintained Foot-candles
Office	30-50
Laboratory, Support, Technical Area	50
Laboratory Bench and Table Top	50-100
Conference	40-60
Manufacturing	50-70
Corridor	5-20
Lobby	10-25
Toilets	5-20
Storage	10-30
Mechanical/Electrical	30-50
Task	40
Open Parking	0.5
Exterior Lighting	1-2

Space	Minimum Vertical Footcandles	Minimum Horizontal Footcandles
Technology Distribution Rooms	20	50

Equipment and Components

Space	Fixture Type
Laboratory and Laboratory Support	Direct/indirect LED fixtures or 2' x 4' LED troffer with acrylic lens.
Office	2' x 2' or 2' x 4' LED fixture.
Common Area	Premium quality architectural LED lighting
Circulation	1' x 4', LED troffer with acrylic lens
Building Support	4', surface- or pendant-mounted, open industrial LED fixture
Open Parking	LED parking lot fixture, Dark Sky-compliant

EXIT signs will be State Fire Marshal approved LED type, located in all paths of egress.

Lamps and Ballasts

In general, fluorescent lamps will be 32W T8, 28W T5, and 54W T5HO, 3500K color temperature, with a color rendering index of 85 or greater. Metal halide lamps will be clear with a color rendering index of 60 or greater.

Fluorescent ballasts will be high-frequency electronic type with less than 10% total harmonic distortion. High-intensity discharge ballasts will be high power factor, constant wattage type.

LED lamps to be LM-79 and LM-80 tested, have two step MacAdam ellipse tolerance, and have a minimum CRI of 80 to be supplied with applicable drivers or power supplies.

Lighting Control

All lighting will be controlled to meet or exceed the requirements of the Florida Energy Conservation Code.

Photocells and occupancy sensors will be utilized in select spaces to minimize energy consumption. Occupancy sensors will be passive infrared or a combination infrared/ultrasonic type.

Dimmers will be provided in conference rooms and other areas as required. All corridor lighting will be controlled by a time clock or occupancy sensors.

A programmable, low-voltage control system will be provided. It will consist of low-voltage switching and relays and will control all lighting excluding interstitial, mechanical, and janitorial spaces. The system will be software based and will provide flexible control of automatic and manual on/off, recording, and reporting functions.

Distribution

In general, fluorescent and high-intensity discharge lighting will be 277V. Incandescent lighting will be 120V, and lighting control wiring will be low voltage.

All lighting circuit wiring will be in conduit and routed concealed within walls, partitions, or ceiling spaces. Surface-mounted conduit will be minimized and used only in non-finished spaces.

Animal holding room lighting fixtures will be served from the standby power system.

The ampacity of lighting circuits will be sized for 25% future growth plus 125% continuous loading factor per the National Electric Code.

Telecommunication System

System Description

Telecommunications infrastructure will be provided to facilitate the installation of telecommunications networks by the Owner.

The building will be connected to the nearest telecommunications manhole for outside plant cabling by the serving utility.

Design Criteria

Owner will provide system cabling and termination equipment including, but not limited to, patch panels, faceplates, inserts, wireless access points, switches, routers, and rack-mounted uninterruptible power supplies (UPS).

Infrastructure will include blank IT outlets distributed throughout the building and connected back to TR rooms via a conduit and cable tray system.

Design will be coordinated with Owner.

In MTR and TR rooms, one NEMA 5-20 quadraplex outlet and one NEMA L5-30 twistlock outlet will be provided for each rack. Each outlet will be on a dedicated circuit. Along all walls, one 120VAC, 20A duplex outlet will be provided every 6'-0" mounted at 6" AFF.

Equipment and Material

Service entrance conduits will be (2) 4", routed to the existing telecommunications manhole system serving Innovation Park.

Conduits installed between MTR and each TR room shall be (2) 4" size.

Interior conduit shall be minimum 1" size for each outlet.

Cable trays shall be aluminum ladder type and shall be trapeze supported or wall mounted. Center support cable trays shall not be accepted.

A flush, two-gang box (4" x 4" x 2.5" deep) with single-gang plaster ring shall be provided at each IT outlet location.

ReadySpec Backboard panels will be ¾" x 4' x 8' sheets of A-C grade plywood and shall be gray in color with 100% acrylic latex primer/sealer applied to front and sides of plywood substrate. Each board will be anchored securely to the wall.

Distribution

The main telecommunications room/service entrance facility (MTR) will be on the first floor and a telecommunications room (TR) will be located on the second floor.

The two rooms will be stacked and have interconnecting 4" conduit sleeves.

Cable trays will be routed above accessible corridor ceilings on each floor and extend the full length of the floor to be in close proximity to each occupied area.

Fire Alarm System

System Description

The fire alarm system will be a stand-alone, fully addressable system comprised of smoke detectors, heat detectors, duct detectors, manual pull stations, and audio/visual signaling devices.

Design Criteria

The fire alarm system will comply with requirements of NFPA 72 for a protected premises signaling system except as modified and supplemented by this document.

A main fire alarm control panel will be located at the main electrical room.

A fire alarm annunciator panel will be located at the main building entrance, as directed by the Fire Marshal.

Audio/visual devices will be installed in all areas of the building in accordance with the NFPA and the ADA Guidelines.

Smoke detectors shall be installed as required by the Florida Building Code. Smoke detectors will be installed in, but not limited to, the following locations: air handling units, elevator lobbies, and elevator control/machine rooms. Smoke detectors will be located within 15' of all fire alarm control equipment panels.

Heat detectors will be installed in areas that are not feasible for smoke detectors.

Manual Pull Stations will be installed adjacent to all exit doors from each floor and from the building.

The fire alarm system will be able to communicate with the applicable central receiving station.

Equipment and Material

The fire alarm system will be an electronically multiplexed voice communication system.

Remote transponder panels will be used to provide supervised amplifiers and signal circuits for audio/visual devices and magnetic door holders.

The system will utilize individual, addressable photoelectric smoke detectors; heat detectors; addressable manual pull stations; and addressable monitor and control modules. The system will monitor all sprinkler supervisory and water flow switches and will interface with elevators, HVAC smoke control, and smoke fire dampers.

Distribution

All initiating and signaling devices will operate at 24VDC and will be installed in accordance with manufacturer's specifications.

All wiring will be installed in conduit. Minimum conduit size will be 3/4".

Emergency Responder Radio Reinforcement System

System Description

As described in section 9.6 of NFPA 1221, all new buildings shall have approved radio coverage for emergency responders within the building based on the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

Design Criteria

Minimum required system coverage and signal strength shall be as defined in sections 9.6.7 and 9.6.8 of NFPA 1221. System shall be capable of receiving final approval from the local fire code official.

System shall be powered from at least two independent power sources. The primary source shall be a dedicated branch circuit from the building's normal power distribution system. The secondary source shall be a dedicated battery system with a minimum of 12 hours runtime at 100 percent system load.

System shall include automatic supervisory signals to communicate system malfunctions to the building's fire alarm system, in addition to annunciating system faults at a dedicated system panel.

System shall be capable of adapting to frequency changes in the public safety communication system without having to replace the entire system head-end.

System will use a roof-mounted donor antenna to connect to the public safety communication system.

ELECTRICAL SYSTEM STANDARDS

Feeder and Branch Circuits

Secondary distribution and branch circuit system design will be based on a maximum of 5% voltage drop from the transformer to the utilization equipment

Feeder and branch circuit sizes will be based on the load supplied and adjusted for voltage drop.

Feeder and branch circuit ampacity will not be smaller than the upstream overcurrent device or downstream equipment bus.

Circuit Voltage Length	Wire Size
480Y/277 volt circuits over 150' in length	Increase wire size one size for each 150' of length
208Y/120 volt circuits over 60' in length	Increase wire size one size for each 60' of length

Receptacles

Receptacles in offices, general support rooms and similar locations, (depending upon room layout) will be provided with a minimum of (4) outlets total or (1) outlet on each wall. Enclosed offices will be provided with a double duplex receptacle at desk location.

Conference rooms and common areas will be provided with at least (1) duplex receptacle per wall. Typically receptacles to be spaced on 12' centers.

Building Support (Equipment rooms, storage rooms) will be provided with (1) duplex receptacle per wall or (1) per every 150 square feet, whichever is greater

Duplex receptacles in office areas, lounges, lobbies, etc., shall be circuited with an average of (6) duplex receptacle's per 20A, single pole circuit.

Receptacles designated to serve desk top computer loads shall be circuited with an average of (3) duplex receptacle's per 20A, single pole circuit.

Each workstation to receive minimum of (2) receptacles that will be circuited with maximum of (4) receptacle's per 20A, single pole circuit.

Receptacles along laboratory benches shall be circuited with an average of (4) duplex receptacle's per 20A, single pole circuit.

Equipment such as refrigerators or freezers shall be connected to dedicated circuits.

Each fume hood to be provided with a minimum of (2) 20A single pole circuits.

Ground fault protection will be provided for outlets within 6' of a sink edge and other wet locations. Electrical outlets will be individually ground fault interrupted (GFCI) protected (not at the circuit breaker or first outlet on the circuit).

Ceiling service panels will be installed in the open laboratories, be inset into ceiling grid and will have twist-lock outlets for 120V and 208V service as required to support the laboratory. Each circuit will have a dedicated neutral. Shared neutrals will not be allowed.

Overcurrent Protective Device Coordination

Overcurrent protective devices supporting Emergency NEC Article 700 (typically exit and egress lighting systems will be selectively coordinated from source of supply (normal and emergency) through final device. Selectivity will be through the entire instantaneous region including ground fault.

Overcurrent protective device will be selectively coordinated with supply side overcurrent protective devices as follows:

System	Seconds
Emergency System (NEC 700)	0.01
Optional Standby System (NEC 702)	0.10
Elevators	0.01
Normal Power System	0.10

Arc Flash

The electrical distribution system will be configured to allow equipment to be worked on energized using reasonable PPE (category 3 or less). Arc flash calculations for Arc Flash Incident Energy (AFIE) levels and flash protection boundary distances will be by the contractor based on the actual equipment supplied using an independent Registered Profession Engineer in the State of Florida using SKM System Analysis tools.

Fault Current Ratings

The preliminary available fault current will be determined design of the project and will be verified by 3rd party calculations provided in contractor submittals.

Equipment will have ratings not less than the calculated symmetrical short circuit value at each point in the distribution system.

Equipment will be fully rated for the calculated available short circuit. Series ratings will not be allowed.

Short Circuit Ratings	
208Y/120V	480Y/277V
10 kAIC where fed via 75kVA and smaller transformers	14 kAIC where fed via 300 kVA and smaller transformers
22 KAIC where fed via 112.5 kVA transformer	30 kAIC where fed via 500 kVA transformer
22 KAIC where fed via 150 kVA transformer	35 kAIC where fed via 750 kVA transformer
42 KAIC where fed via 225 kVA transformer	42 kAIC where fed via 1000 kVA transformer
42 KAIC where fed via 300 kVA transformer	65 kAIC where fed via 1500 kVA transformer
65 KAIC where fed via 500 kVA transformer	100 kAIC where fed via 2000 kVA transformer
-	100 kAIC where fed via 2500 kVA transformer

Conduit and Raceway

Conduit Types and Application	
Conduit Type	**Application**
Electrical Metallic Tubing (EMT)	Low voltage feeders and branch circuit wiring where installed above 6'-6" AFF, when exposed in unfinished spaces.
Galvanized Rigid Steel (GRS)	Low voltage feeders and branch circuit wiring where exposed below 6'-6" AFF. Exterior locations, Under slab, Areas subject to physical abuse
Schedule 40 PVC	Concrete encased ductbanks and direct buried under slab

Conduit will be run concealed, unless installed in mechanical, electrical, telecom, interstitial areas and other similar unfinished spaces.

Minimum conduit size for power circuits will be 3/4".

Conduits will be independently supported.

All conduit stub-ups from below floor or in floor (where specifically allowed) will be galvanized rigid steel.

Surface mounted conduits below 6'-6" will be rigid galvanized steel with threaded fittings and boxes will be cast steel.

EMT fittings will be set screw type with steel body.

Conduits may be installed below floor slabs on grade.

Conduits and boxes will be installed a minimum of 1' and a maximum of 3' above ceilings. Installation outside of this zone will not be allowed. Special permission may be obtained to run ceiling conduits outside of this zone providing that pull and junction boxes are unobstructed and accessible from floor using a standard 8 foot ladder. Also, light fixtures, smoke detectors, junction and pull boxes and other equipment that is installed on or directly above the ceiling will be serviced and maintained without damage to ceiling tiles and other building elements.

Raceways for 2-hour rated systems shall be installed in either: UL listed assemblies for 2 hour fire rated applications or in 2-hour rated enclosures.

For lighting conduit homeruns, a j-box will be located above light fixture in an accessible location to allow for future expansion.

No home run will terminate in a wall mounted device box. A separate J-box will be provided above device box above ceiling in an accessible location.

Wire and Cable

Cable Types		
Voltage Class	**Insulation**	**Notes**
600 V	THHN, THWN-2 or XHHW-2	Conductors #10 and smaller will be solid copper. Conductors larger than #10 will be stranded copper

All feeder conductors to be 98% conductivity copper.

All branch wiring conductors will be 98% conductivity copper.

Minimum wire size #12 AWG, for all areas.

Multi-wire branch circuits will be provided with dedicated neutral conductors for each phase, common neutral circuits will not be permitted.

Feeder conductors will be terminated using compression lugs. Mechanical lugs will not be used for feeders. Branch circuit conductors will typically be terminated using mechanical lugs.

Conductor insulation color code will be as follows:

Conductor Color Code	
208Y/120V	**480Y/277V**
Phase A – Black	Phase A – Brown
Phase B – Red	Phase B – Orange
Phase C – Blue	Phase C – Yellow
Neutral – White	Neutral – Gray
Ground – Green	Ground – Green

Wiring Devices

Wiring devices will be specification grade, complete with all accessories

Isolated ground receptacles will be used only when necessary. If used, isolated grounds will be in addition to equipment ground. Panelboard will have an isolated ground bus that will be connected back to applicable derived system or service.

Receptacle and Switch Color Code	
Normal Power	White
Emergency Power	Red

Receptacles, switches, etc., will have faceplates with labeling indicating system panel and circuit identification.

Motors and Motor Control

Stand-alone motor disconnects (separate from starter or VFD) will be fused and will be installed at each motor.

Motors smaller than 60 HP that are not provided with a variable frequency drive (VFD) will be provided with an across the line combination magnetic motor starter. Motors 60 HP and larger that are not provided with a variable frequency drive (VFD) will be provided with reduced voltage motor starter. Refer to other sections of the narrative for VFD requirements.

Combination motor starters will use circuit breakers or motor circuit protectors in lieu of fuses to reduce the possibility of single phasing. For mechanical and HVAC equipment that are not provided with a VFD, individual combination motor starters will be located within sight of the motor.

Selected motors will have variable frequency drives (VFDs) as described in other sections of this narrative.

VFD drive specifications will require that the VFDs for the project be provided such that the Special Category harmonic limits recommended in IEEE 519-2014 be maintained. The supplier of the drive will be required to perform harmonic analysis as defined in IEEE 519-2014 and employ as a minimum 6 pulse VFD with equivalent 5% impedance by employing a combination of line reactors and/or DC bus choke to achieve the equivalent impedance.

Grounding and Bonding

A separate, insulated equipment grounding conductor, sized per the National Electrical Code, will be provided within each raceway and cable tray, with each end terminated on a suitable lug, bus, enclosure, or bushing.

A grounding riser with ground box will be located in each electrical closet.

Surge Protection

Surge Protective Devices (SPD) will be used as design dictates. A single SPD device will be installed on the load side of each main service disconnects, the generator switchboard and at the first distribution panel on the load side to each automatic transfer switch. Second-tier SPD devices at branch panelboards and other locations will be incorporated as required but is not anticipated at this time.

EMF and Harmonics

Electrical vaults and major electrical equipment rooms containing transformers larger than 300 kVA to not be located adjacent to occupied workstations.

The power service will be required to meet the requirements IEEE Standard 519 to insure proper service. Harmonic distortion will be limited to 5% maximum at the point of common coupling. The point of common coupling is being defined as the secondary side of upstream utility transformer.

Electrical Rooms

Electrical equipment rooms will be positioned to facilitate unobstructed initial installation of large equipment, and unobstructed removal and replacement of defective equipment.

Adequate space will be provided for maintenance of electrical equipment and equipment removal.

Pipes and other equipment foreign to the electrical equipment will not be located in, enter, or pass through such spaces or rooms.

Panelboards will be grouped, surface-mounted, in dedicated ventilated rooms. Electrical rooms will be stacked vertical whenever practicable.

Penthouses and mechanical rooms will be utilized for electrical equipment and panelboard placement where applicable for optimization of space.

Panelboards serving lighting and appliance circuits will be located on the same level as the circuits they serve and will be served from source of supply with a dedicated feeder.

Feed through, subfed and double section panelboards will not be used unless required to comply with selective coordination requirements

Prohibited Materials and Construction Practices

The entire Emergency/Standby power distribution system will consist of conduit and wire. Busway will not be used in any portion of this system

Use of wood strips and wood screws to support lighting fixtures.

Extra-flexible non-labeled conduit

Conduit installation in concrete slabs

Conduit less than 3/4" diameter will not be used except for switch legs, fixture whips and door controls

Use of wire ties to support conduit

Suspension systems for conduits, fixtures, etc. connected to other utility equipment is prohibited. Any suspension system with multiple levels must be hung from trapeze suspension systems

Use of Incompatible Materials: Aluminum fittings and boxes will not be used with steel conduit. All materials in a raceway system will be compatible

Direct burial electrical cable

Generator Load Matrix

System	Functional Area	Associated Loads	Generator Power
Emergency Systems NEC Article 700 Systems classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction.		Egress Lighting	100%
		Exit Signs	100%
		Fire Alarm Detection and Annunciation Systems	100%
		Elevator Cab Lighting, Communication, and Control Signal Systems	100%
		Fire Pump	100%
		Generator Set Accessories	100%
Optional Standby Systems NEC Article 702 Systems intended to supply power to public or private facilities or property where life safety does not depend on the		Access Control System	100%
		Telecommunication System	100%
		Building Automation System (BAS) and Accessories	100%
		Select Mechanical Equipment, controls and associated dampers	See Mech Matrix
		Fire Protection Dry Pipe Air Compressor	See FP Matrix
	Laboratory	Refrigerators	100%
	Laboratory	Freezers	100%
	Laboratory	Incubators	100%

System	Functional Area	Associated Loads	Generator Power
performance of the system.		Sump Pumps	See Plbg Matrix

END OF SECTION

VII. PIPING SYSTEMS

SYSTEM DESCRIPTIONS

Storm Drainage

System Description

A storm drainage system will be provided to convey rainwater from flat roofs to site storm sewers.

Secondary roof drainage will be accomplished by using a dedicated piped overflow drainage system separate from the primary storm drainage system which will discharge through the building wall onto grade. Clearwater waste from air handling units, coolers, and other devices and equipment that discharge clearwater will be conveyed by gravity flow through a separate piping system and will connect to the building storm drain.

Design Criteria

The primary storm drainage system will be sized based on a maximum rainfall rate of 4.6 in/hr. The secondary storm drainage system will be sized based on the same design criteria as the primary system.

The sizing for all clearwater discharge from equipment system will be based on the maximum flow rate of the equipment.

Equipment and Components

Storm and clearwater drainage systems which cannot discharge to the storm sewer by gravity flow will be drained by gravity to a sump with pump(s) and will be pumped into the building storm drainage system.

Sump pumps will be connected to the emergency (standby) power system to permit operation during a loss of normal power.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for pump redundancy.

Distribution

Storm and Clearwater Waste Systems Materials		
System	Below Ground	Above Ground
Storm	Schedule 40 PVC with DWV pattern solvent cement socket fitting joints	Schedule 40 PVC with DWV pattern solvent cement socket fitting joints

Roof and overflow drain bodies and above ground storm, secondary roof drainage and clearwater waste piping will be insulated.

Waste and Vent Systems

System Description

A sanitary waste and vent system will be provided for all plumbing fixtures and other devices that produce sanitary waste. Plumbing fixtures will be drained by gravity through conventional soil, waste, and vent stacks, building drains and building sewers to the site sewer.

All vivarium waste will be considered sanitary waste. All fixtures located within the vivarium will be connected to the sanitary waste and vent system.

Plumbing fixtures in laboratories and laboratory support spaces will be provided with a drainage system separate from the sanitary drainage system. The laboratory waste system will drain by gravity flow and routed outside the building. The effluent from the laboratory waste system will discharge into the site sanitary sewer.

All fixtures will have traps and will be vented through the roof. Vent terminals will be located away from air intakes, exhausts, doors, openable windows, and parapet walls at distances required by the plumbing code.

Sanitary waste drainage systems which cannot discharge to the sanitary sewer by gravity flow will be drained by gravity to a sump with pump(s) and will be pumped into the building sanitary drainage system. Refer to Appendix-System Equipment Reliability, Generator Power, and Capacity Matrix for pump redundancy.

Design Criteria

The waste and vent piping will be sized in accordance with code requirements.

Equipment and Components

Floor drains, floor sinks and indirect waste receptors will be provided with electronic trap primers when subject to loss of their trap seals due to evaporation caused by infrequent use.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for pump redundancy.

Distribution

Waste System Materials		
System	**Below Ground**	**Above Ground**
Gravity Sanitary Waste and Vent	Schedule 40 PVC with DWV pattern solvent cement socket fitting joints	Schedule 40 PVC with DWV pattern solvent cement socket fitting joints
Pressurized Sanitary Waste	Schedule 40 PVC with solvent cement socket fitting joints	Schedule 40 PVC with solvent cement socket fitting joints
Laboratory Waste and Vent	Schedule 40 chlorinated polyvinyl chloride pipe (CPVC), ASTM D1784, with solvent cement joints	Schedule 40 chlorinated polyvinyl chloride pipe (CPVC), ASTM D1784, with solvent cement joints
High Temperature Waste	Service-weight hub-and-spigot cast iron pipe with neoprene push-on compression gaskets	Hubless cast iron pipe with standard weight stainless steel clamp

Waste piping will be pitched according to code to maintain a minimum velocity of 2 fps when flowing half full.

Vents and the venting systems will be designed and installed so that the water seal of a trap will be subject to a maximum pneumatic pressure differential equal to 1" water column. This will be accomplished by sizing and locating the vents in accordance with the venting tables contained in the plumbing code.

Elevator Sump Pumps

System Description

An elevator sump shall be required in the base of each elevator pit. Unless noted otherwise sump pit shall be formed into the elevator hoist-way base. Sump pump discharge will be with an air gap to a receptor and into the building sanitary drainage system. Refer to Appendix-System Equipment Reliability, Generator Power, and Capacity Matrix for pump redundancy.

Design Criteria

Sump pump will be sized in accordance with code requirements. Provide a pump sufficient to discharge 50 gpm per elevator car.

Equipment and Components

Sump pump shall be submersible type. Sump pumps will be connected to the emergency (standby) power system to permit operation during a loss of normal power.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for pump redundancy.

Distribution

Piping shall be the same material and joint type as sanitary drainage system.

Domestic Water

System Description

Domestic water will be provided to all toilet room fixtures, electric water coolers/drinking fountains, sinks, emergency shower/eyewash units, and any other devices that require a domestic water supply.

Hot water at 120°F will be provided to all fixtures and devices that require hot water.

Non-potable water system will provide make-up water to irrigation, mechanical (HVAC) systems such as heating hot water, chilled water, and cooling towers. A reduced pressure backflow preventer will protect the domestic water supply.

Design Criteria

Each water heater will be sized for 100% of the design hot water load at an outlet temperature of 120°F.

Backflow preventers will be sized for 100% of the design flow.

Equipment and Components

A water meter will be provided on the service main in a vault below grade outside of the building. The water meter will be sized for the building's maximum design flow rate.

The building's water system will be isolated from the municipal water system by a duplex reduced pressure backflow preventer located downstream of the water meter.

Domestic hot water will be produced by duplex gas-fired, storage-type water heaters. Tube bundles in water heaters will be double walled

Remote fixtures will be provided with hot water by electric instantaneous water heaters.

Booster water heaters will be provided as part of equipment, dishwashers, laundries, etc., which have water temperature requirements above the normal distribution temperature stated above.

The hot water system temperature will be maintained by recirculating the hot water through a continuous loop with an in-line circulating pump.

Water softener(s) will be installed ahead of the water heater(s).

Water hammer arrestors will be provided at all quick closing solenoid valves and at other potential water hammer sources.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for water heater and pump redundancy.

Distribution

Water System Materials		
Size	**Below Ground**	**Above Ground**
2-1/2" and Smaller	• Copper water tube, Type K, soldered joints and wrought copper fittings	Type L copper tube with press fit joints
3" and Larger:	Ductile iron, Class 52, AWWA C151, cement mortar lined with restrained mechanical joints and ductile iron fittings PVC pressure pipe, DR 18, with integral bell and elastomeric gaskets and soldered joints with PVC schedule 80 socket pattern fittings	Type L copper tube with grooved joints and wrought copper fittings with rolled groove couplings

Piping 2-1/2" and larger and located in mechanical equipment rooms may be rolled groove mechanical joints.

The hot water system will be insulated in accordance with Code. The cold water system will be insulated to prevent condensation from forming. Isolation valves will be provided at all riser connections, branch piping runouts to fixture groups, and at devices requiring maintenance.

The piping will be sized to limit the velocity in any section of the system to a maximum of 8 fps for cold water system and 4 fps for hot water and hot water circulating systems.

Plumbing Fixtures			
Fixture	**Type**	**Operation**	**Flow Rate**
Water Closets	Wall hung, vitreous china, with elongated bowls, high efficiency.	Flush valves will be diaphragm type, sensor operated, battery powered	1.28 gallon flush
Urinals	Wall hung, vitreous china, high efficiency	Flush valves will be diaphragm type, sensor operated, battery powered	0.125 gallon flush
Lavatories	Refer to architectural floor plans for areas with wall hung units and counter mounted units.	Faucets will be hot and cold mixing type, sensor operated, battery powered	0.5 gpm Laminar flow control
Sinks	Countertop mounted stainless steel	Faucets will be hot and cold mixing type. Sinks in break rooms will be fitted with garbage disposals.	1.5 gpm flow control
Laboratory Sinks, Cup Sinks	Integral with casework. Faucets will be furnished with the casework and installed by the Division 22 contractor		
Electric Water Coolers	Wall mounted, self-contained, dual level with bottle filler	Manual push button operated, with stainless steel cabinets and disposable activated carbon water filters	
Janitor Sinks	Floor mounted, precast terrazzo, drop front, with stainless steel splash wall panels	Faucets will be hot and cold mixing type with hose connections and integral spout vacuum breaker	
Exterior Hose Bibbs	Flush mounted freeze resistant with vacuum breaker and loose key operator	Manual	-
Mechanical Room Hose Bibbs	Surface mounted with in-line vacuum breakers	Manual	-
Emergency Eyewashes	Counter mounted, fixtures will comply	Manual, Stay open valve.	

Plumbing Fixtures			
Fixture	Type	Operation	Flow Rate
	with ANSI Z358.1.		
Emergency Showers and eyewashes	Unfinished spaces will be free standing combination shower eyewash units with floor mounting flanges. The fixtures will comply with ANSI Z358.1. Finished spaces will be emergency showers and eyewashes with recessed stainless-steel wall boxes with pulldown eyewash and pulldown shower operator. The showerhead will be wall mounted. Exposed piping will be brushed stainless steel. The fixtures will comply with ANSI Z358.1. Fixtures in laboratory areas will be furnished by the casework contractor and installed by the Division 22 contractor.	Manual, Stay open valve.	-

High Purity Water

System Description

A system will be provided to produce and distribute water meeting the quality requirements of ASTM Type II from the facilities soft water system.

Water Quality								
Design Standard	Resistivity	Silica	Sodium	pH	Chlorides	TOC	Bacteria	Endotoxin
ASTM Type II	≥1 MΩ-cm @25°C	≤3μg/L	≤5μg/L	No Limit	≤5μg/L	≤50μg/L	No Limit	No Limit

This system will not be validated.

Pure water will be continuously circulated in closed loops to users throughout the laboratories.

Point of use polishing units will be provided for use points that require a higher level of quality water.

The system will be automatically monitored and controlled by a dedicated PLC based control system that will send a discrete alarm signal to the Building Automation System in the event of deviations.

Design Criteria

The system design will be based on performing sanitation using peracetic acid solutions.

The capacity of the production equipment and the storage tank will be based on the programmed use points and the following consumption estimates:

Use Point Type	Peak Flow Rate	Daily Usage
Laboratory Sink	1 gpm	15 gallons
Water Polisher	0.5 gpm	10 gallons
Glasswasher	2 gpm	200 gallons
Autoclave	3 gpm	200 gallons

The production equipment shall be sized to produce the total estimated consumption in 8 hours of operation. The capacity of the production system is estimated at 3 gpm.

The storage tank will be sized to provide storage for 24 hours of estimated usage.

The distribution system will be designed to maintain the temperature of the water under 80°F.

The distribution system will be designed to continuously circulate water at a minimum velocity corresponding to a Reynolds number of 20,000. The maximum demand for the distribution system shall be based estimated at 1500 gallons per day.

Equipment and Components

The production equipment is anticipated to consist of a prefilter, multimedia filter, carbon filter, water softener, single pass RO unit, two-bed deionization exchange cylinders, mixed bed deionization exchange cylinders, a one micron post filter, a 185 nm ultraviolet light, and a 0.2 micron final filter.

The distribution system equipment will include centrifugal pump(s) to provide circulation and 254 nm UV lights followed by 0.2 micron filters to control bacterial growth.

Materials in contact with pure water will be:

- Equipment: 316L stainless steel polished to 25 Ra
- Storage tank: Polyethylene, steam-cured fiberglass
- Piping: high purity Polypropylene
- Elastomers: EPDM

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for production and distribution equipment redundancies

Distribution

The distribution system will be comprised of 2 loops through which water will be continuously circulated. Each distribution loop will employ a series loop layout.

All tee connections shall be installed to minimize the dead leg. The distance from the sealing point on the branch to the inside of the main line wall shall be less than six (6) branch line diameters.

Piping will be installed so that it is completely free draining. A minimum slope of 1/8 inch per foot will be maintained.

Sink use points shall be non-recirculating faucets. Pipe loop drops within the room will be enclosed.

The quality of the water in the distribution system will be monitored by the PLC that will send a discrete alarm signal to the Building Management System in the event of deviations.

High Purity Water System Materials		
Service	Below Ground	Above Ground
High Purity Water	N/A	Polypropylene piping will be used for the distribution system. Joints will be made by IR butt fusion. Sanitary clamps or sanitary unions will be used where breakable connections are required. Piping will be continuously supported.

Special Gases-Laboratory System

System Description

Special gases will be provided to all points of use as required by the Owner. Special gases shall include but not be limited to helium, argon, carbon dioxide, oxygen, and hydrogen. Cylinders may be user provided and placed adjacent to equipment or points of uses.

Equipment and Components

Special gases service will be supplied by a manifold system consisting of primary and reserve cylinders. The number of cylinders on each system will be based upon building use criteria but will not be less than two cylinders per bank. The manifold system will be an automatic switchover type set to distribute special gases at 55 psig.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for special gas equipment redundancy.

Laboratory Compressed Air

System Description

Laboratory grade compressed air will be provided to all laboratory areas at a pressure of 50 psig and a dew point of 40°F. Compressed air will be provided as required by the Owner.

Design Criteria

Compressed air piping system will be sized based on 1 scfm per outlet plus any flow required for individual pieces of equipment. Diversity factors will be applied to laboratory outlets as indicated below:

Table 2 Compressed Air System Diversity Factors			
Number of Outlets	Diversity Factor	Minimum Flow (scfm)	Empirical Formula for Flowrate (scfm)
1-5	1.00	0	No. of Outlets*1
6-12	0.80	5	5+(No. of Outlets-5)*5/7
13-33	0.60	10	10+(No. of Outlets-12)*10/21
34-80	0.50	20	20+(No. of Outlets-33)*20/47
81-150	0.40	40	40+(No. of Outlets-80)*20/70
151-315	0.35	60	60+(No. of Outlets-150)*50/165
316-565	0.30	110	110+(No. of Outlets-315)*60/250
566 and up	0.25	170	170+(No. of Outlets-565)*80/435

The compressors will be controlled by pressure switches in receiver set to operate between 100 and 115 psig. Each compressor will be sized for 75% of the maximum total demand. The compressors will be controlled on lead/lag/alternate basis.

Equipment and Components

Laboratory grade compressed air will be produced by oil-free reciprocating air compressors. Compressors will be base mounted. Air will be treated with coalescing filters, particulate filters and dried with refrigerated air dryers. Compressed air will be stored in an ASME rated vertical receiver with outlet pressure regulator.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for equipment redundancy.

Distribution

Compressed Air System Materials		
Service	Below Ground	Above Ground
Compressed Air	N/A	Type L copper tube, ASTM B88 with press fit joints

Laboratory Vacuum

System Description

Laboratory vacuum air will be provided to all laboratory areas as programmed. Vacuum will terminate at laboratory outlets or equipment connections as required.

Design Criteria

Laboratory vacuum piping system will be sized based on 0.5 scfm per outlet plus any flow required for individual pieces of equipment. Diversity factors will be applied to laboratory outlets as indicated below:

Table 2 Laboratory Vacuum System Diversity Factors			
Number of Inlets	Diversity Factor	Minimum Flow (scfm)	Empirical Formula for Flowrate (scfm)
1-5	1.00	0	No. of Inlets*0.5
6-12	0.80	2.5	(5+(No. of Inlets-5)*5/7)*0.5
13-33	0.60	5	(10+(No. of Inlets-12)*10/21)*0.5
34-80	0.50	10	(20+(No. of Inlets-33)*20/47)*0.5
81-150	0.40	20	(40+(No. of Inlets-80)*20/70)*0.5
151-315	0.35	30	(60+(No. of Inlets-150)*50/165)*0.5
316-565	0.30	55	(110+(No. of Inlets-315)*60/250)*0.5
566 and up	0.25	85	(170+(No. of Inlets-565)*80/435)*0.5

The piping system will be sized to limit pressure drop across the system to maximum of 3" of mercury vacuum.

The pumps will be controlled by pressure switched in receiver set to operate between 23" and 27" of mercury vacuum. Each pump will be sized for 65% of the maximum total demand. The pumps will be controlled on lead/lag/alternate basis.

Equipment and Components

Laboratory vacuum will be produced by rotary vane vacuum pumps. Pumps will be base mounted. Vacuum will pass through a liquid separator and an ASME rated vertical receiver prior to passing through the pumps.

Refer to Piping System Equipment Reliability, Generator Power, and Capacity Matrix at the end of this section for laboratory vacuum equipment redundancy.

Distribution

Special Gas System Materials		
Service	Below Ground	Above Ground
Vacuum	N/A	Type L copper tube, ASTM B88 with soldered joints and wrought copper fittings
Vacuum Exhaust	N/A	Schedule 80 CPVC with solvent cement joints and fittings

Natural Gas

System Description

Natural gas is anticipated to be piped to equipment (ex: boilers, water heaters) as required to meet building needs. Gas pressure will be determined based on equipment requirements. Natural gas is anticipated to be a centrally piped and distributed system to serve lab and fume hood gas outlets. Natural gas will be extended to the building from the gas company's natural gas main in the street. It is anticipated that the gas meter(s) will be located at grade at the service entrance to the building.

Design Criteria

All design and installation will be in accordance with the applicable codes

Natural gas will be supplied at a pressure of 14" water column. The piping will be sized to limit the pressure drop across the system to 0.5" water column.

Natural gas shutoff valves, where required, will be located in ceiling spaces a recessed wall valve box at 4'-6" above finished floor.

Natural gas piping system will be sized based on 5 cfh per outlet plus any flow required for individual pieces of equipment. Diversity factors will be applied to laboratory outlets as indicated below:

Table 2 Natural Gas System Diversity Factors			
Number of Inlets	Diversity Factor	Minimum Flow (cfh)	Empirical Formula for Flowrate (cfh)
1-5	1.00	0	No. of Inlets*5
6-12	0.80	5	(5+(No. of Inlets-5)*5/7)*5
13-33	0.60	50	(10+(No. of Inlets-12)*10/21)*5
34-80	0.50	100	(20+(No. of Inlets-33)*20/47)*5
81-150	0.40	200	(40+(No. of Inlets-80)*20/70)*5
151-315	0.35	300	(60+(No. of Inlets-150)*50/165)*5

Equipment and Components

Natural gas meter and building pressure regulating valves will be provided by and in accordance with gas utility company requirements.

Where shutoff valves are installed in valve boxes, the valve boxes will be steel frames with steel doors, piano hinges and level latches. All pipe penetrations through the box walls will be sealed.

Point of use pressure regulators will be self-operated spring-loaded constant pressure valves with internal relief capability.

Distribution

Natural Gas System Materials		
Size	Below Ground	Above Ground
2-1/2" and Smaller, Pressure Less than 1 psig:	Polyethylene tubing, SDR-11 with socket fusion fittings and joints. Anodeless gas riser will be used	Schedule 40 carbon steel pipe with threaded joints and malleable iron fittings

Natural Gas System Materials		
Size	Below Ground	Above Ground
	for transition from below ground to above ground pipe.	
3" and Larger, Pressure Less than 1 psig:	Polyethylene tubing, SDR-11 with butt fusion fittings and socket fusion joints. Anodeless gas riser will be used for transition from below ground to above ground pipe.	Schedule 40 carbon steel pipe with butt welded joints and fittings

Natural gas valves 2-1/2" and smaller will be two-piece ball valves with bronze bodies and stainless steel balls. Valves 3" and larger will be plug valves with cast iron bodies.

Piping System Equipment Reliability, Generator Power, and Capacity Matrix

System	Component	Component Redundancy	Generator Power
Domestic Hot Water	Gas Water Heater	2@100% (N+1)	N
	Hot Water Return Pump	2@100% (N+1)	N
Sump Pumps	Elevator Sump Pumps	1@100% (N)	Y
Purified Water	Carbon Filter	1@100% (N)	N/A
	Reverse Osmosis Unit	1@100% (N)	N
	Service Exchange Deionization Columns	6@33% 2N	N/A
	Storage Tank(s)	1@100% (N)	N/A
	Distribution Pumps	2@100% (N+1)	N
	UV Lights	1@100% (N)	N
	Sanitization Heat Exchanger	1@100% (N)	N
	Temperature Maintenance Cooling Heat Exchanger	1@100% (N)	N/A
Laboratory Gases	Bottled Laboratory Gases		N/A
	Laboratory Compressed Air Package	2@100% (N+1)	N
	Laboratory Vacuum Package	2@100% (N+1)	N

1. Refer to Generator Power Load matrix within the Electrical Basis of Design for further definition of the source of generator power.
2. Redundancy N+1 refers to system requiring N operating components to provide 100% of load with one additional component provided.
3. Redundancy 2N refers to system requiring N operating components with N operating components idle to provide 100% component redundancy.

END OF BOD

VIII. FIRE PROTECTION SYSTEMS

SYSTEM DESCRIPTIONS

Fire Service

System Description

An underground fire line will supply the sprinkler system in the building.

Design Criteria

The design of the underground fire lines shall comply with NFPA 24.

Current water supply flow test data will be obtained from the City Water Department in order to determine the capacity of the water mains.

Equipment and Material

Piping for all underground lines will be cement lined ductile iron or, where approved by the Owner and local Authority Having Jurisdiction, Polyvinyl Chloride (PVC).

Wet Pipe Sprinkler System

System Description

The building will be protected throughout with hydraulically calculated sprinkler systems, which except for special protection needs, will be wet pipe systems. All areas of the building will be protected per NFPA 13, including electrical rooms (i.e. switchgear rooms, transformer rooms, generator rooms, electrical closets, and similar rooms), loading docks, stair towers, exterior canopies, and mechanical rooms.

Design Criteria

The sprinkler system for the building will be designed and installed in accordance with NFPA 13.

All systems will be hydraulically calculated with a computer calculation program using the Hazen-Williams method.

If there are no special Client standards or Client insurance carrier recommendations, the following sprinkler design densities shall apply:

Sprinkler Design Densities			
Hazard-Areas Designated as	Density-Minimum Sprinkler Flow	Remote Area	Hose Stream Allowance
Light Hazard	0.10 gpm per sq ft	1500 sq ft	100 gpm

Sprinkler Design Densities			
Hazard-Areas Designated as	Density-Minimum Sprinkler Flow	Remote Area	Hose Stream Allowance
Ordinary Hazard Group 1	0.15 gpm per sq ft	1500 sq ft	250 gpm
Ordinary Hazard Group 2, where stockpiles of combustibles do not exceed 12 ft.	0.20 gpm per sq ft	1500 sq ft	250 gpm

The pipe sizing for the systems will be as required to satisfy the hydraulic demand.

Equipment and Material

Piping 2" and smaller in size will be Schedule 40 black steel with threaded joints.

Piping larger than 2" will be Schedule 10 black steel with welded fittings or roll groove couplings or Schedule 40 black steel with welded fittings, threaded joints, or roll groove couplings.

All sprinklers in Light Hazard areas will be quick-response type.

The type of sprinkler installed in a particular area will be selected by the Engineer and the Project Architect. Generally, concealed sprinklers will be installed in areas of high visibility and quality of finishes. Recessed sprinklers will be installed in other areas having suspended ceilings. Pendent or upright sprinklers will be installed in areas without ceilings. Sidewall sprinklers will be provided only when other types cannot be utilized.

Areas subject to temperatures below 40°F will be protected by dry sprinklers when possible. If dry sprinklers cannot be provided, then a dry pipe sprinkler system will be installed. Glycol antifreeze system will not be an option to dry sprinklers or dry pipe system.

Distribution

The sprinkler system will be provided throughout the building in accordance with NFPA 13 and, when required by the Owner, with insurance carrier recommendations.

Dry Pipe Sprinkler System

System Description

Areas of the building subject to temperatures below 40°F will be protected by a dry pipe sprinkler system.

Design Criteria

The dry pipe sprinkler system will be designed and installed in accordance with NFPA 13.

All systems will be hydraulically calculated with a computer calculation program using the Hazen-Williams method.

If there are no special client standards or client insurance carrier recommendations, the following sprinkler design densities shall apply:

Sprinkler Design Densities			
Hazard-Areas Designated as	Density-Minimum Sprinkler Flow	Remote Area	Hose Stream Allowance
Light Hazard	0.10 gpm per sq ft	1950 sq ft	100 gpm
Ordinary Hazard Group 1	0.15 gpm per sq ft	1950 sq ft	250 gpm

- The system demand will be based upon the most remote 1950 sq ft for ceilings that are pitched less than or equal to a 2 in 12 slope. Ceilings exceeding this pitch will require that the 1950 sq ft remote area size is increased by 30%.

The pipe sizing for the systems will be as required to satisfy the hydraulic demand.

Equipment and Material

Piping 2" and smaller will be Schedule 40 galvanized steel with threaded joints.

Piping larger than 2" will be Schedule 10 galvanized steel with welded fittings or roll groove couplings or Schedule 40 galvanized with welded fittings, threaded joints, or roll groove couplings.

All sprinklers in Light Hazard areas will be quick-response type.

Depending upon the actual installation method, sprinklers on dry pipe systems will be either: upright type; dry pendent type; or pendent and sidewall type sprinklers installed on return bends, where the sprinklers, return bend, and branch line piping are in an area maintained at or above 40°F.

A UL Listed dry pipe valve with trim will be provided.

Distribution

The sprinkler system will be provided throughout the building in accordance with NFPA 13 and, when required by the Owner, with insurance carrier recommendations.

Fire Protection Equipment Reliability, Generator Power, and Capacity Matrix

System	Component	Component Redundancy	Preliminary Capacity	Generator Power
Dry System	Air Compressor	N	-	100%

A. Generator power requirements to be evaluated as design progresses.

END OF BOD

CODE SUMMARY

CODE SUMMARY

The project will comply with the provisions of the Florida Building Code 2020 (7th edition) and the Florida Fire Prevention Code 2018, Florida Accessibility Code 2020, Florida Energy Conservation 2020, and applicable city and county ordinances.

Occupancy Type: Business
The proposed building occupancy falls under the category of Business (with a possible sub-occupancies of Factory/Industrial for the machine shop, and storage/shipping). If this is determined by the code official to be a sub-occupancy, a 2-hour fire separation will be required.

Construction Type: Type IIIB, sprinklered with an addressable fire alarm control panel and system devices. The current building parameters fall below the height and area thresholds of: 4-stories at 75' and 57,000sf fully sprinklered, respectively.

Fire Resistance Rating:

Primary Structure	*0 hrs*
Non-bearing walls & Partitions -exterior	*0 hrs (per table 602)*
Non-bearing wall & partitions -interior	*0 hrs (except as modified by lab hazard or sub-occupancy classification type*
Floor Construction	*0 hrs*
Roof Construction	*0 hrs*

Means of Egress:
Occupancy load = 37,500sf / 150sf/occupant = 250 occupants or 125 per floor. *Note: a slight increase if sub-occupancies for industrial and shipping areas are determined by the code official at 100sf/occupant and 200sf/ occupant respectively.*

Two means of egress required with discharge to public way. The Interior Lobby Stair if used as a means of egress as currently planned, will require opaque barrier with fire/smoke separation from adjacent spaces. The stair may be fully glazed on the exterior wall. Another option is third exit access stair from level 2 exterior to the building. If the third stair option is applied, the lobby stair becomes a communicating stair, with glazing separating one of the floors. The design team will meet with City of Tallahassee Code and Fire Officials at the conclusion of schematic design to review for code compliance and to familiarize code staff with the proposed design.

Common Path of Travel =	*100'*
Arrangement of Exits =	*1/3 overall diagonal distance*
Exit Access Travel Distance =	*300'*

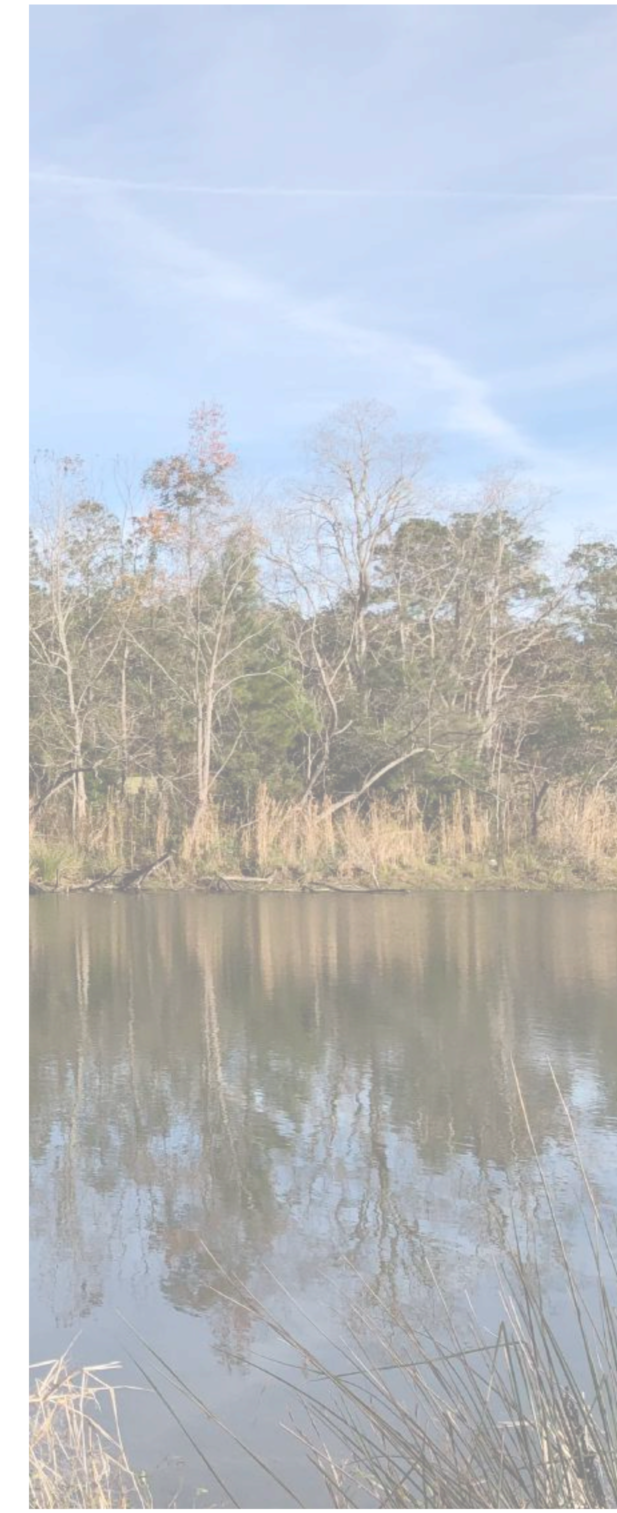
Sound Transmission:
The proposed facility will comply with code requirements per section 1207 for air and structure borne sound transmission. See structural narrative for sound isolation requirements for sensitive microscope use and other sound isolation parameters. Partition ratings to exceed STC 50 or as dictated by laboratory type.

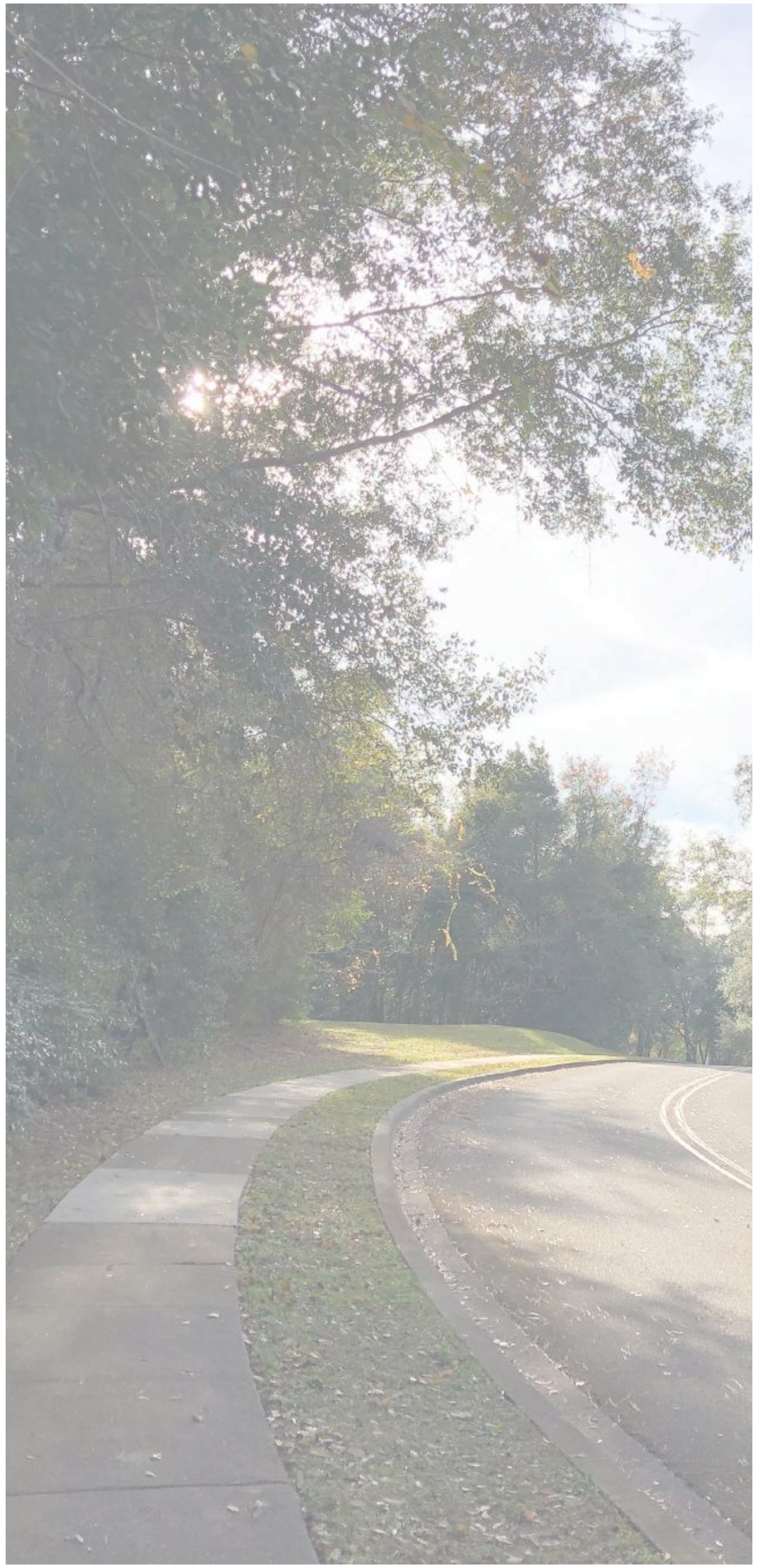
Roof access:
While stair roof access is not required by code, the northwest enclosed stair extends to the roof with door access to mechanical equipment and roof maintenance.

Elevators and Conveyance Systems:
In accordance with ADA, a compliant machine room elevator is to be provided.

Energy Conservation Envelope Compliance:
Tallahassee is in Climate Zone 2A

Roof:	*R25ci (continuous insulation)*
Walls:	*R13 + 5ci (continuous insulation)*
Slabs:	*NR*
Non-swing Doors:	*R4.5*





PROJECT SCHEDULE

2021

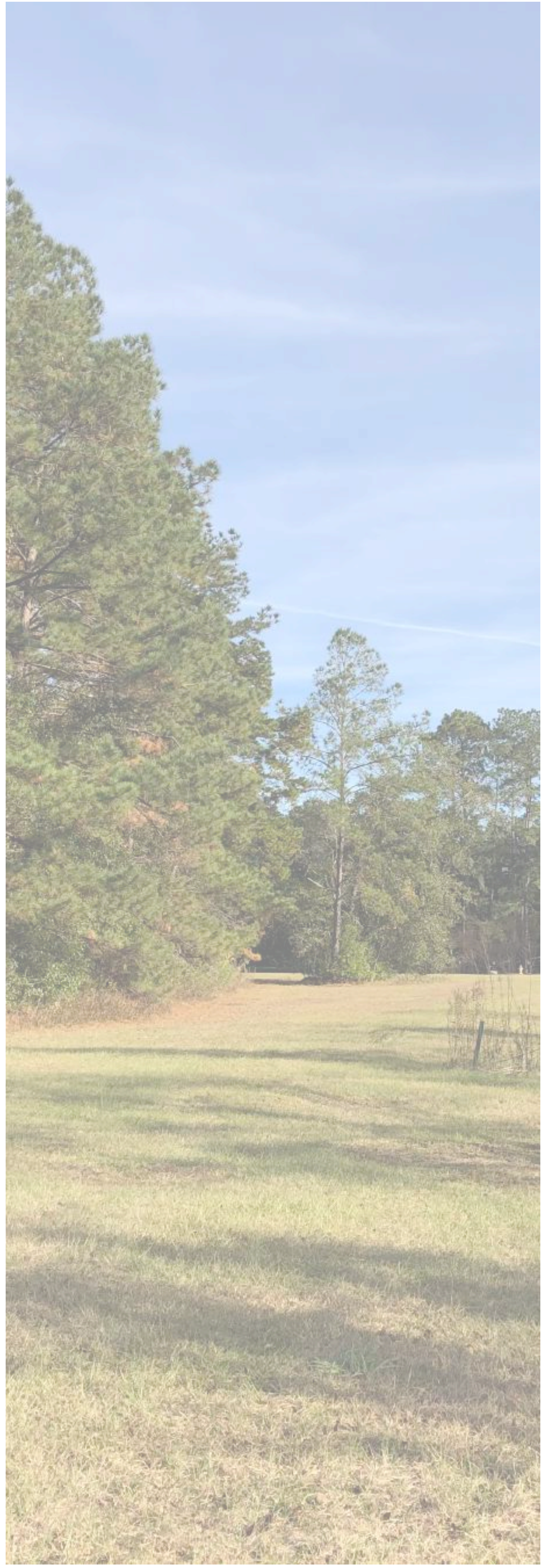
Feb	04	LCRDA Contract Approval
	11	Architects NTP / Programming Kick-Off (4 weeks)
		Site Survey Start
	17	Programming Workshop 2
	24	Programming Workshop 3
Mar	02	Programming Workshop 4
	05	Survey Complete
	12	Draft Program Submittal
	15	Begin Schematic Design (SD) Phase (3.5 weeks)
	24	SD Workshop 1
	31	SD Workshop 2
Apr	07	SD Workshop 3
	14	SD Review Meeting
	19	SD Submittal/ Owner Review
	19	Begin Design Development (DD) (11 weeks)
	TBD	DD Client Meetings
Jul	01	DD Submittal / Owner Review
		Submit COT for Conceptual Site Plan Approval
	08	Owner Review Complete
		50% Construction Document Submittal (50% CD) Kick-Off (10 weeks)
	29	COT Conceptual Site Plan Approval
		Submit NFI and Concurrency Application (COT)
Aug	26	NFI and Concurrency Application Approval (COT)
		Submit LCRDA Committee Application
Sep	16	50% CD submittal / Owner Review
	30	Owner Review Complete
		100% Construction Document Submittal (100% CD) Kick-Off (10 weeks)
Oct	26	LRCDA Committee Approval
		Submit COT Environmental Permit and NWFWMD
Dec	09	100% CD Submittal / Owner Review
Dec	13	Submit for Building Permit (8 weeks)
		COT Environmental Permit and NWFWMD Approval

2022

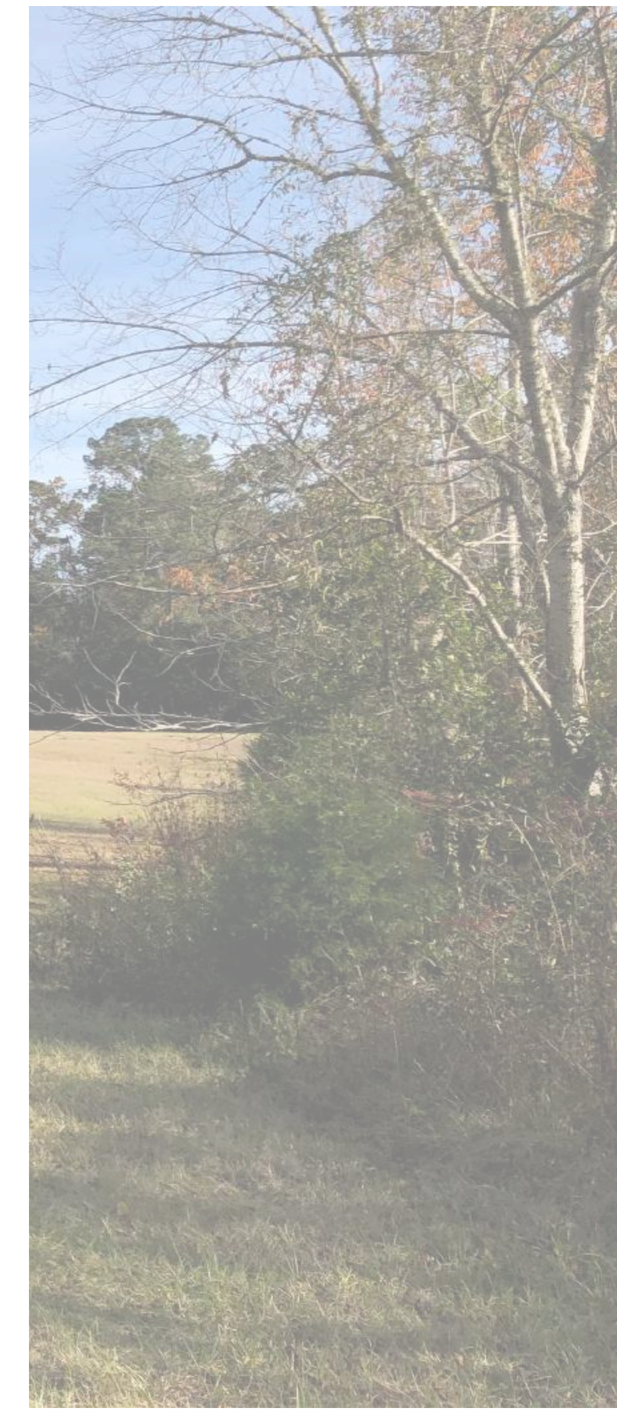
Jan	11	Release Bid Advertisement
Feb	07	Building Permit Approval (estimated)
	15	Bid Opening
Mar	01	Award Contract for Construction
	10	Preconstruction Conference
	17	Notice to Proceed w/ Construction (18 months)

2023

Jun	30	Substantial Completion (estimated)
Sep	01	Final Completion (estimated)



COST OPINION



PROJECT BUDGET
North Florida Innovation Labs
April 16, 2021

Part 1 - Building Cost

Facility/Space Type	Net Area (NASF)	Net to Gross Conversion	Gross Area (GSF)	Unit Cost (Cost/GSF)	Total Cost
Office	4,428	1.50	6,642	$316.14	2,099,802
Conference / Training	742	1.50	1,113	$316.14	351,864
Wet Laboratories	15,609	1.50	23,414	$316.14	7,401,944
Fabrication	1,573	1.50	2,360	$316.14	745,932
Support	3,630	1.50	5,445	$316.14	1,721,382
Warehousing	1,210	1.50	1,815	$316.14	573,794
Part 1 - Totals	**27,192**		**40,788**		**$12,894,718**

Part 2 - Site Cost

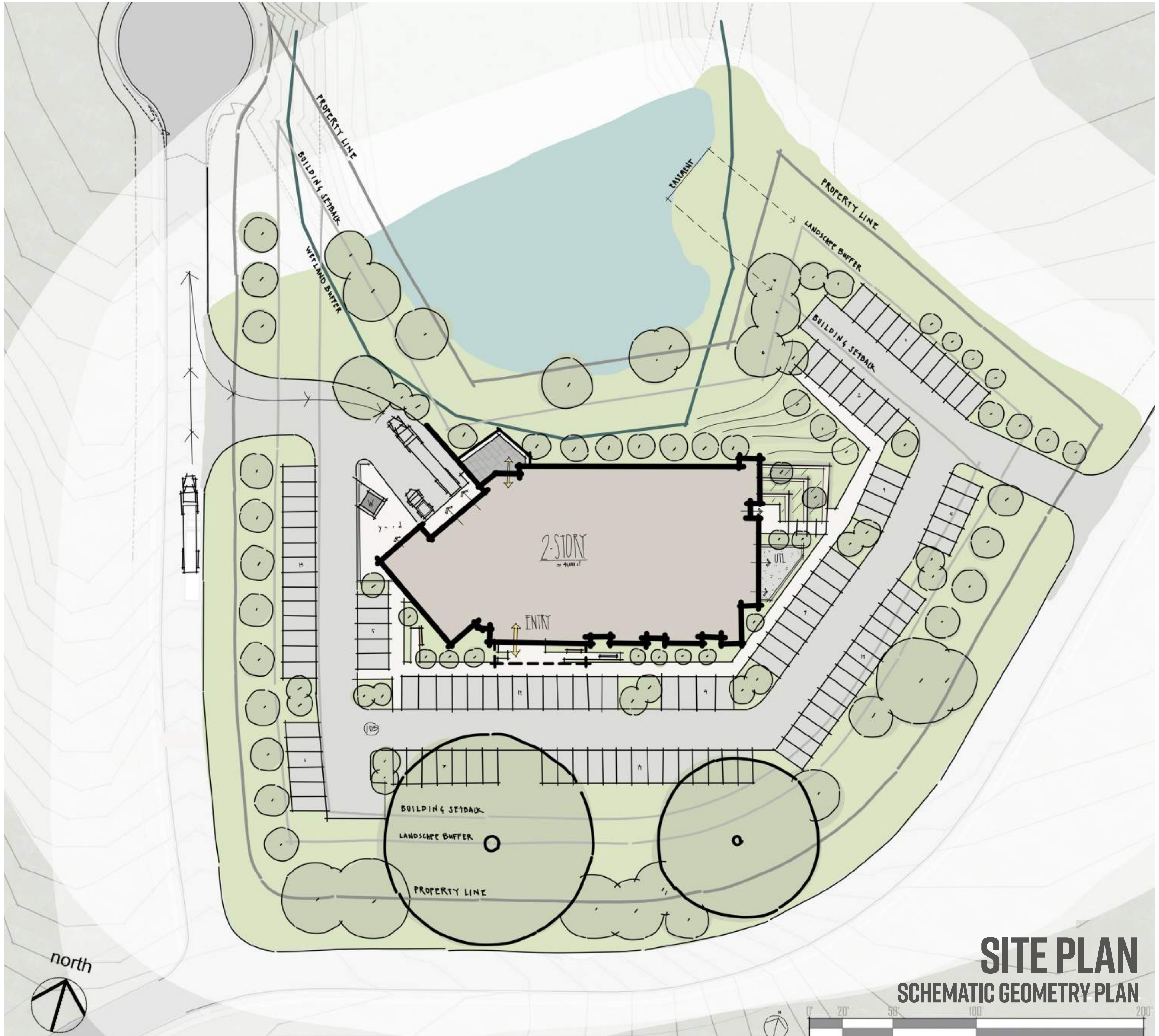
Site Development Cost (TBD)	**$1,226,851**

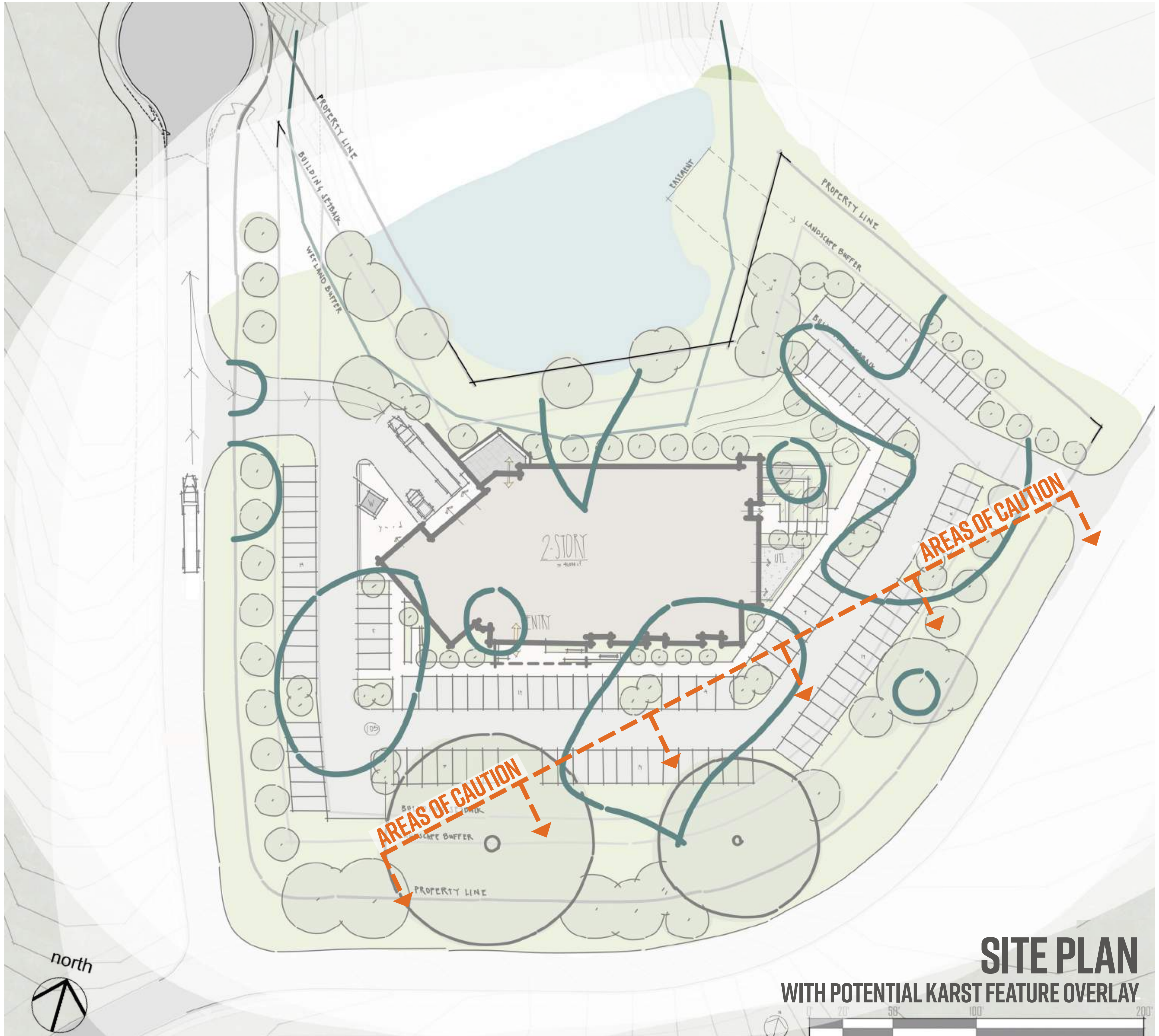
Part 3 - Related Project Cost

Professional Fees Committed	$1,466,549
Design Fee Contingency	$93,926
Permit Fees	$28,000
Furnishings and Moveable Equipment	$0
A/V Equipment	$0
Project Contingency	$1,313,326
Part 3 - Totals	**$2,901,801**

TOTAL (Sum of Parts 1, 2, and 3)	**$17,023,370**

PLANS, SECTIONS + 3D VIEWS

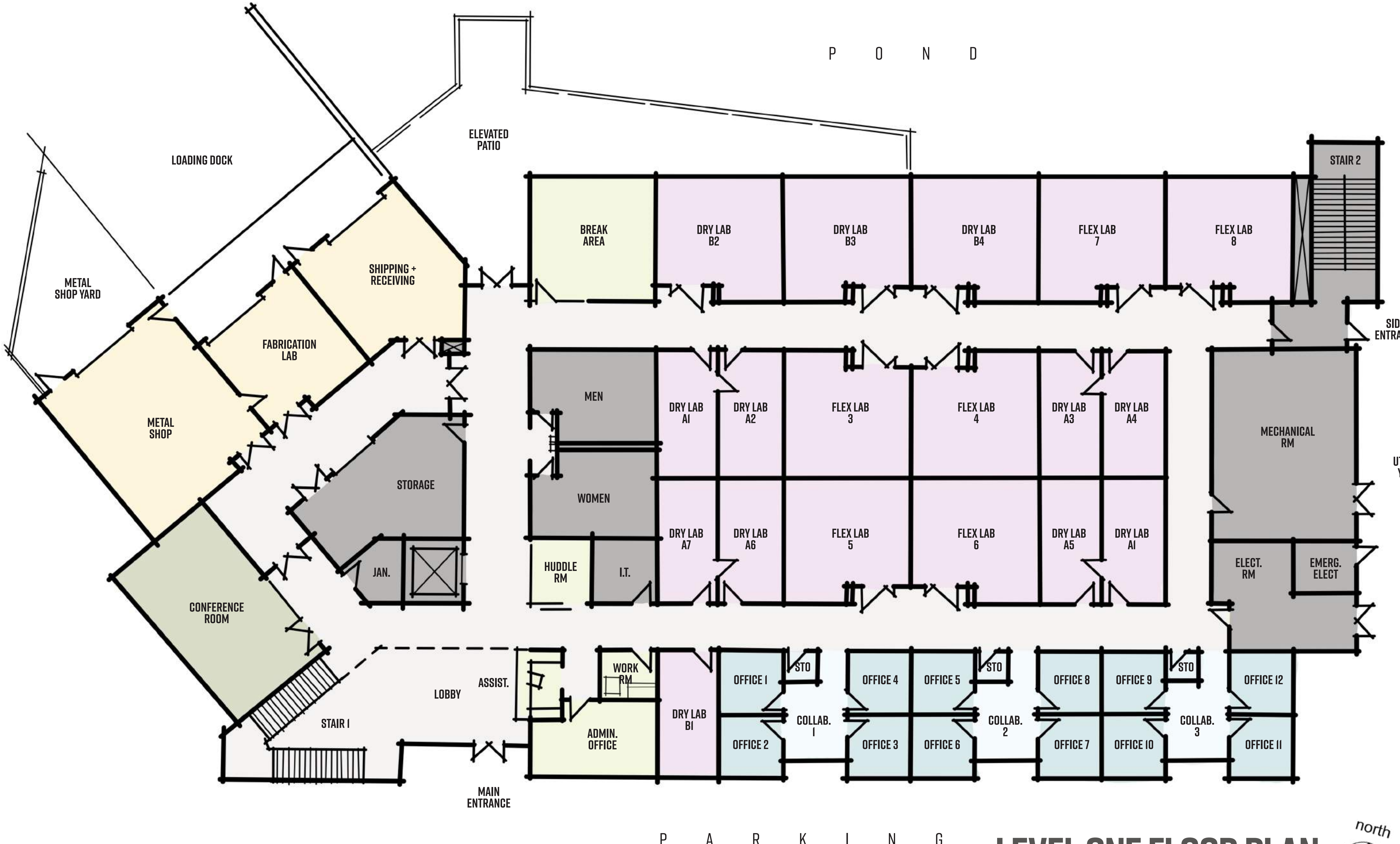

PROPERTY LINE
BUILDING SETBACK
WETLAND BUFFER
EASEMENT
PROPERTY LINE
LANDSCAPE BUFFER
BUILDING SETBACK
2-STORY
ENTRY
UTL
BUILDING SETBACK
LANDSCAPE BUFFER
PROPERTY LINE
north
SITE PLAN
SCHEMATIC GEOMETRY PLAN
0' 20' 50' 100' 200'



SITE PLAN

WITH POTENTIAL KARST FEATURE OVERLAY


F.F.E. 75'
65'
65'
70'
72'
75'
76'
78'
80'
82'
70'
72'
73'
75'
76'
78'
80'
82'
PROPERTY LINE
BUILDING SETBACK
LANDSCAPE BUFFER
PROPERTY LINE
north
SITE PLAN
WITH SCHEMATIC TOPOGRAPHIC OVERLAY

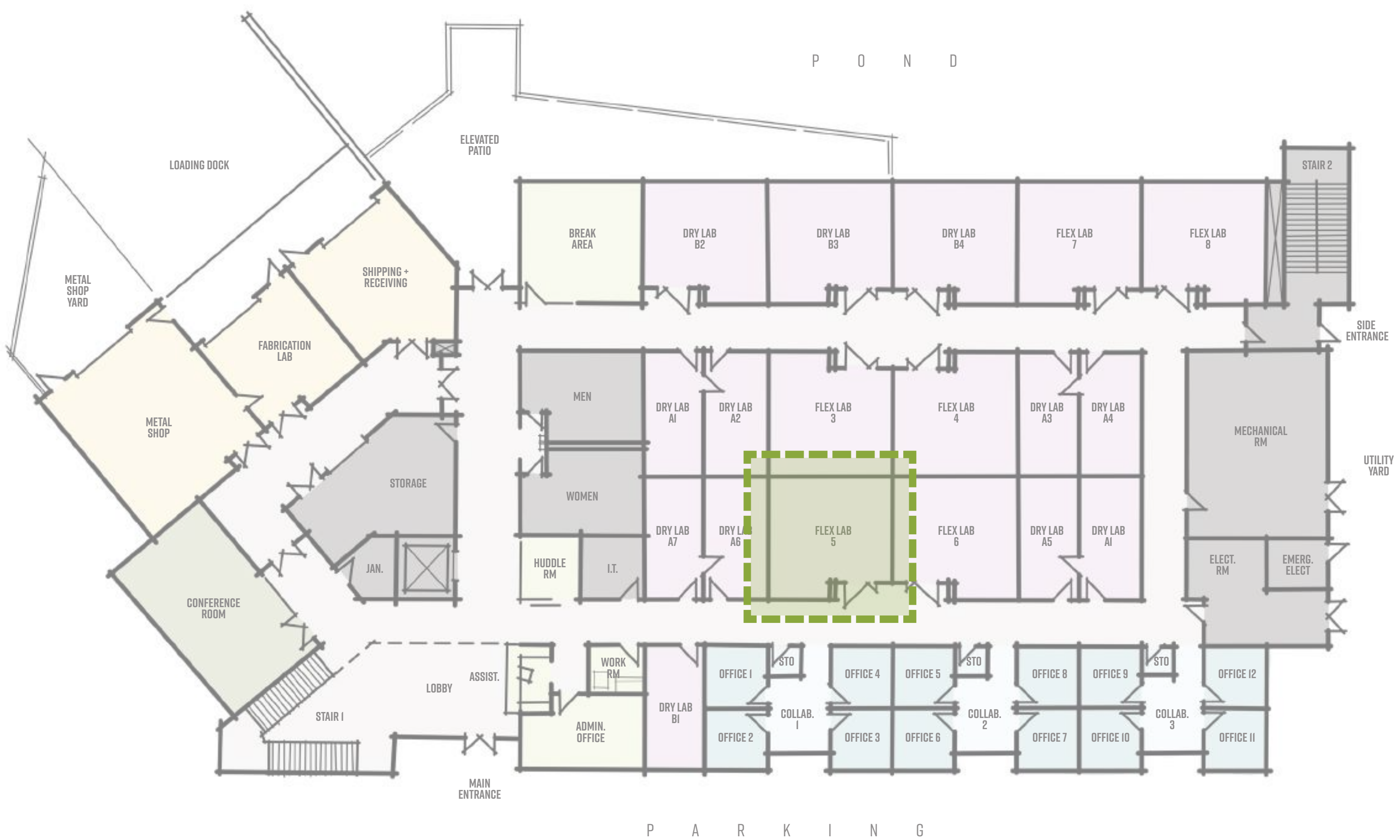


LEVEL ONE FLOOR PLAN

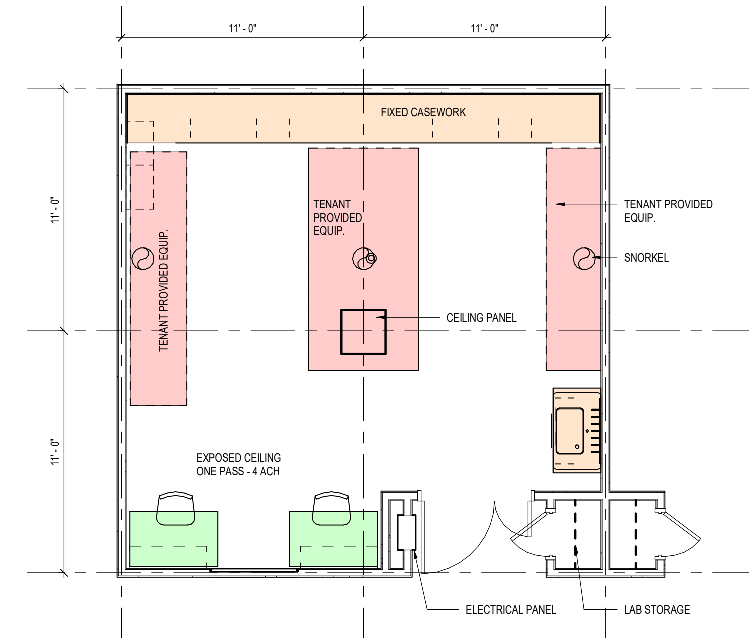
SCALE: 1/16" = 1'-0"

LEVEL TWO FLOOR PLAN

SCALE: 1/16" = 1'-0"



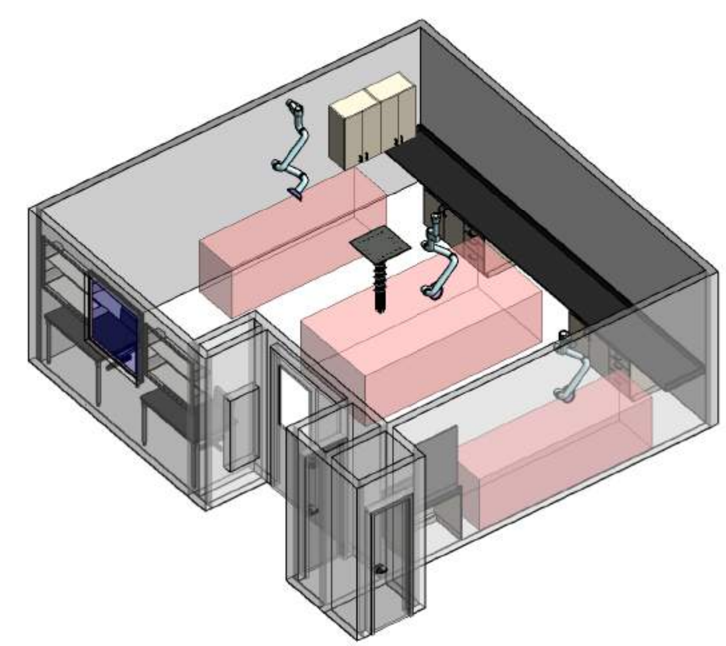
LEVEL ONE



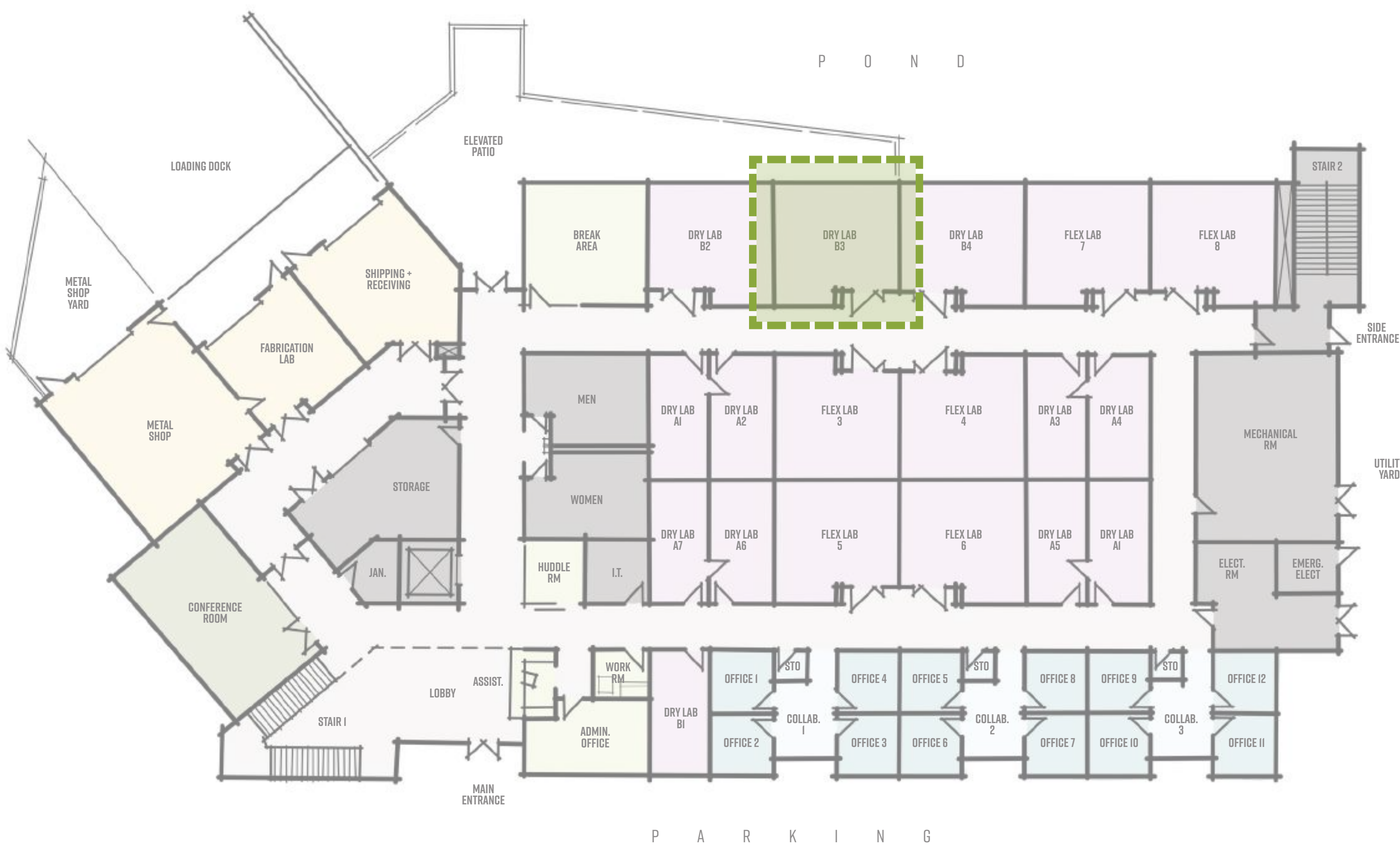
FLEX LAB:
4 MODULE LAB

A1 FLEX LAB PLAN
SCALE: 1/4" = 1'-0"

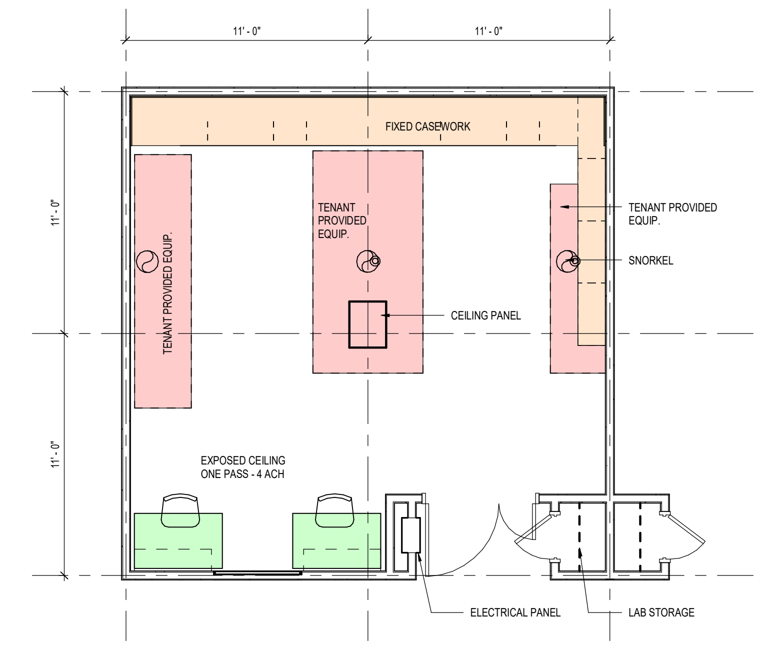
FLOOR PLAN LEGEND	
(orange)	FIXED IN PLACE
(green)	MOBILE
(pink)	TENANT PROVIDED



A2 FLEX LAB 3D
SCALE:



LEVEL ONE

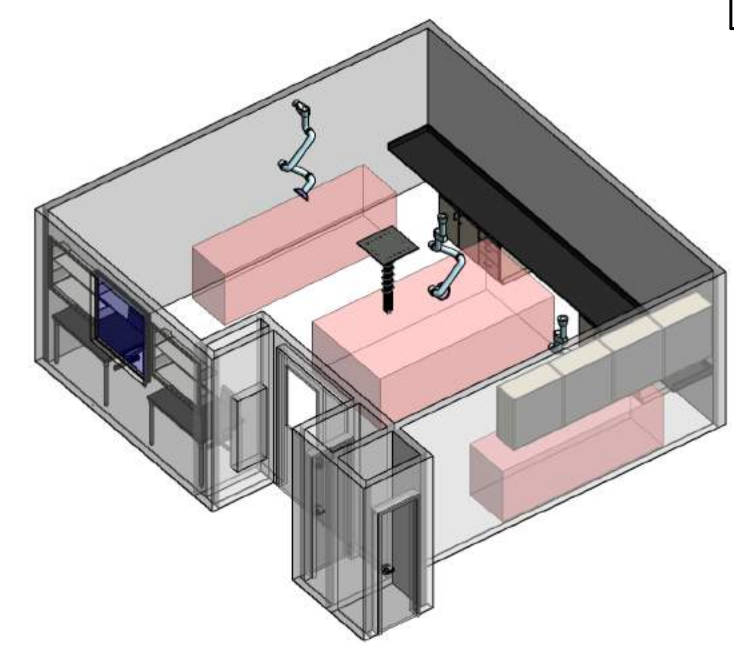


DRY LAB B:
4 MODULE LAB

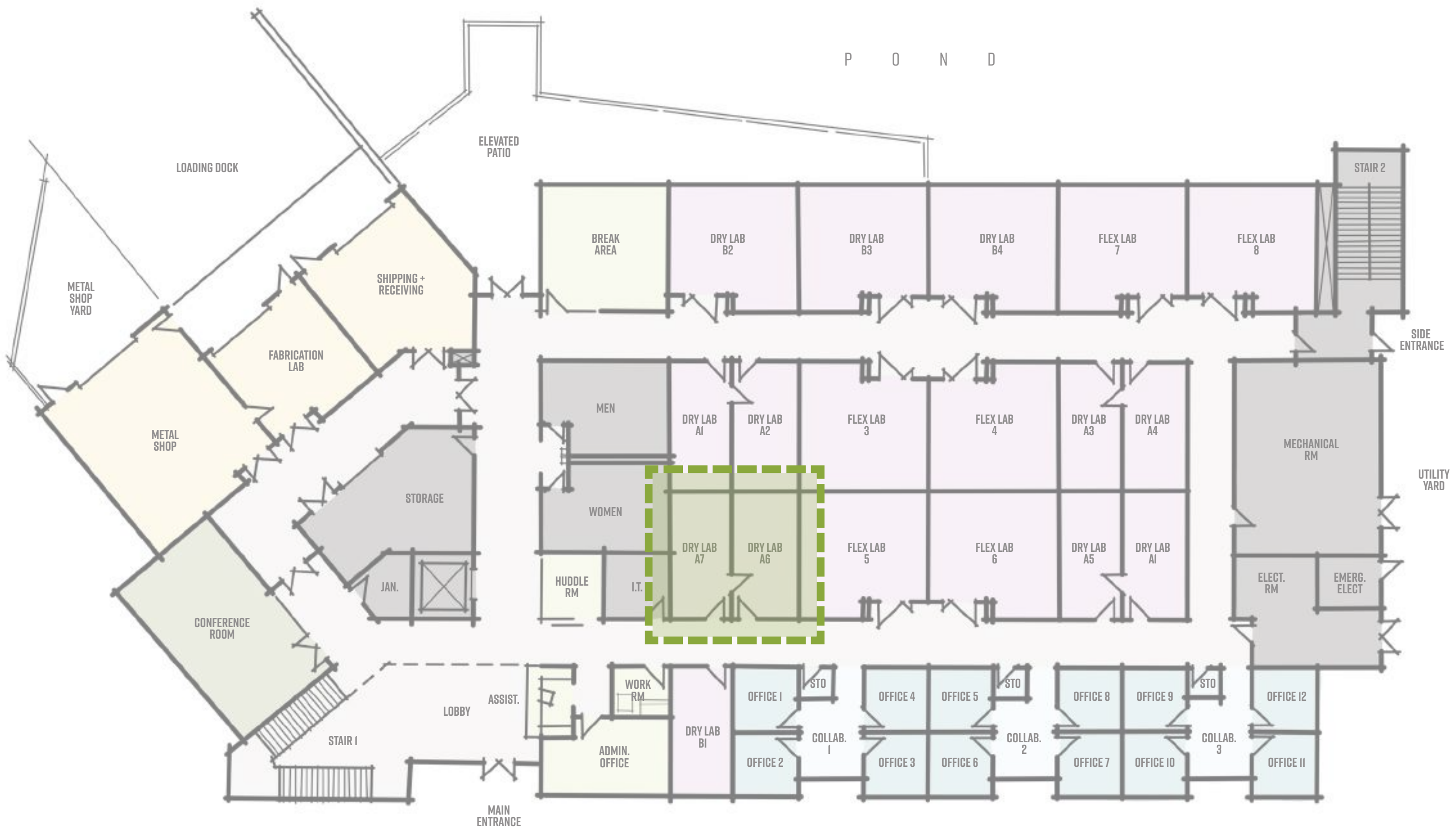
B2 DRY LAB B
SCALE: 1/4" = 1'-0"

FLOOR PLAN LEGEND

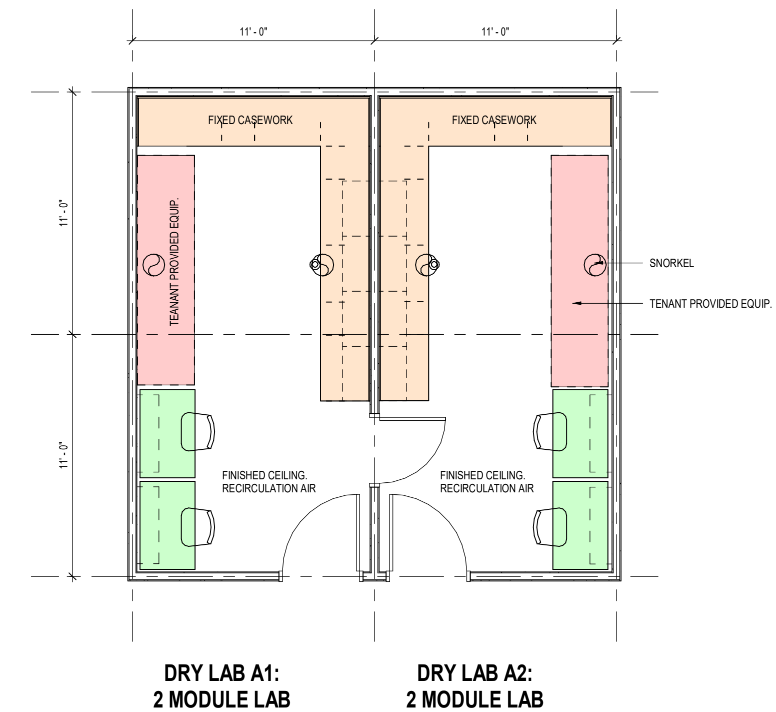
- FIXED IN PLACE
- MOBILE
- TENANT PROVIDED



A2 DRY LAB B 3D
SCALE:



LEVEL ONE



B1 DRY LAB A

SCALE: 1/4" = 1'-0"

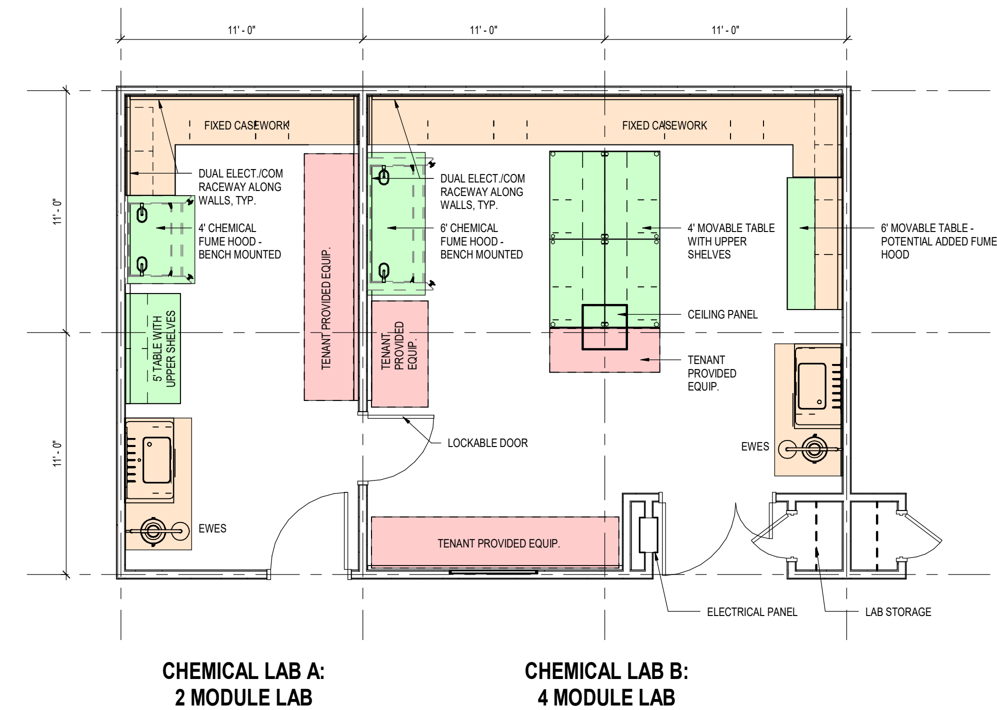
FLOOR PLAN LEGEND

- FIXED IN PLACE
- MOBILE
- TENANT PROVIDED

A1 DRY LAB A 3D

SCALE:

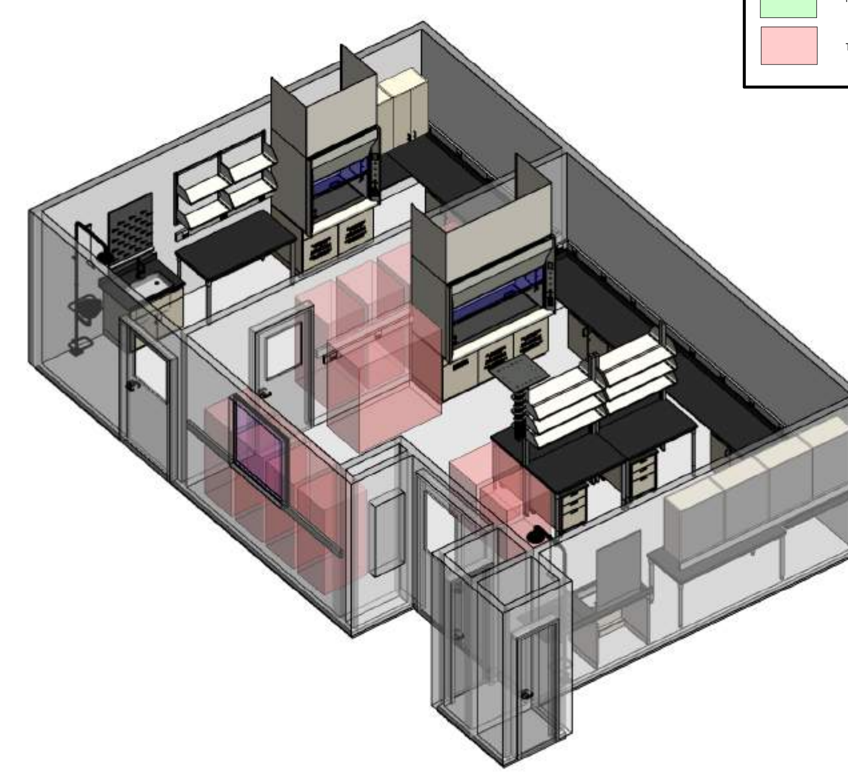
LEVEL TWO



B2 CHEM LAB PLAN
SCALE: 1/4" = 1'-0"

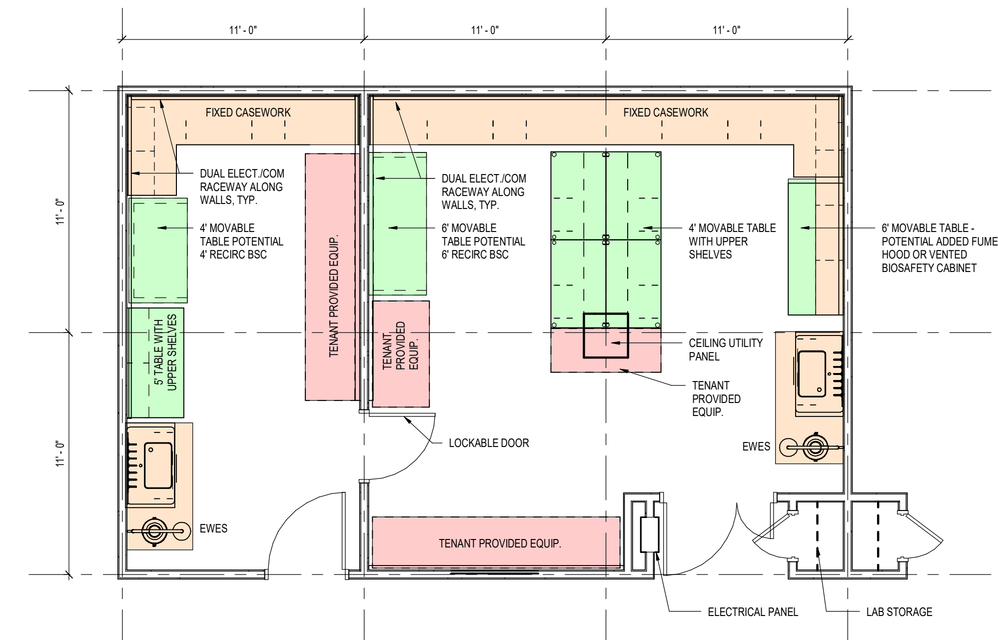
FLOOR PLAN LEGEND

- FIXED IN PLACE
- MOBILE
- TENANT PROVIDED



A2 CHEM LAB 3D
SCALE:

LEVEL TWO



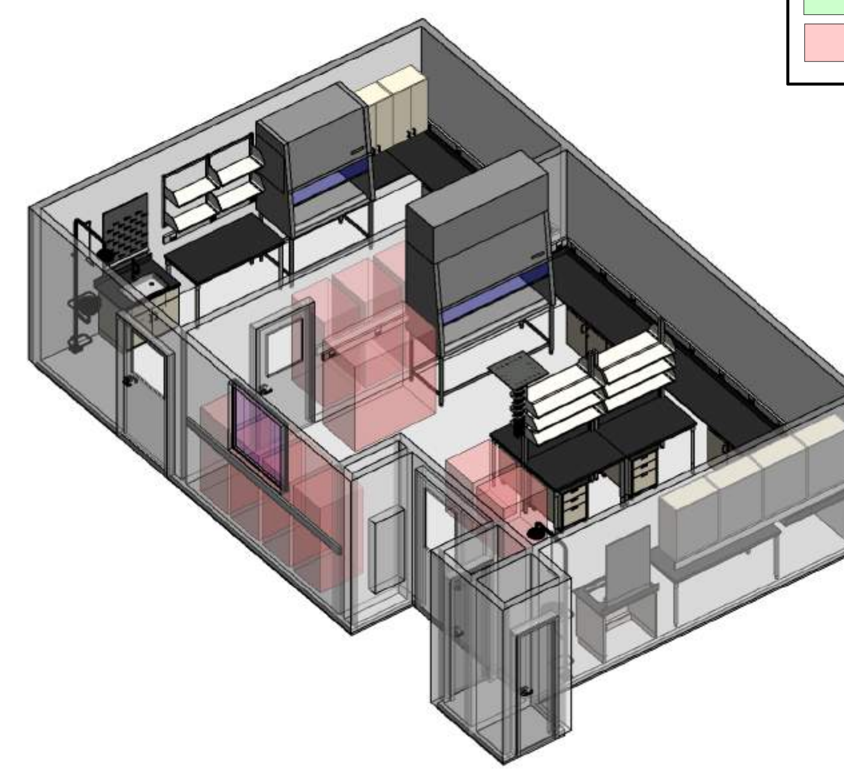
BIOLOGICAL LAB A:
2 MODULE LAB

BIOLOGICAL LAB B:
4 MODULE LAB

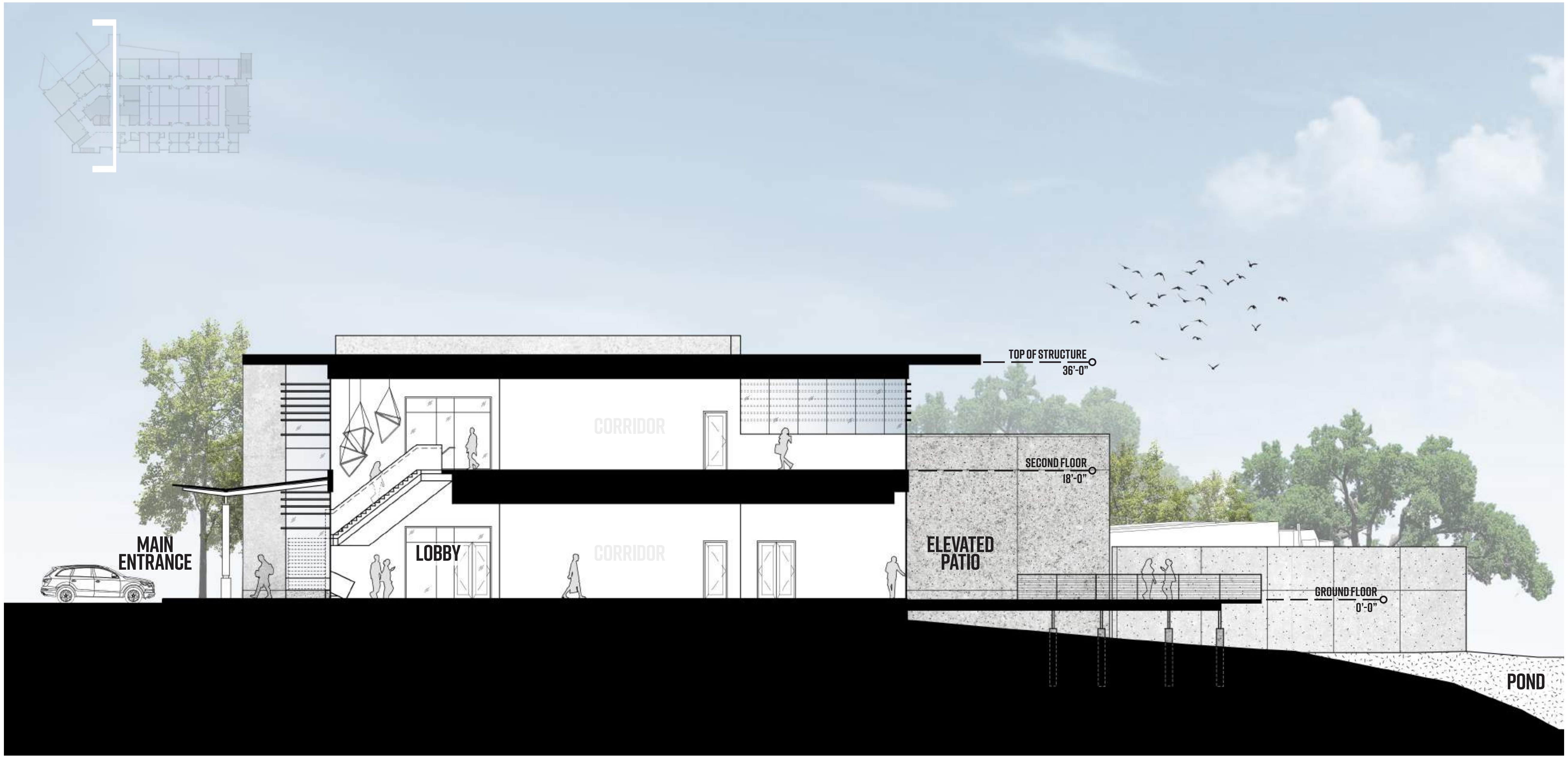
B1 BIO LAB PLAN
SCALE: 1/4" = 1'-0"

FLOOR PLAN LEGEND

- FIXED IN PLACE
- MOBILE
- TENANT PROVIDED



A1 BIO LAB 3D
SCALE:



BUILDING SECTION A

SCALE: 1/16" = 1'-0"

BUILDING SECTION B

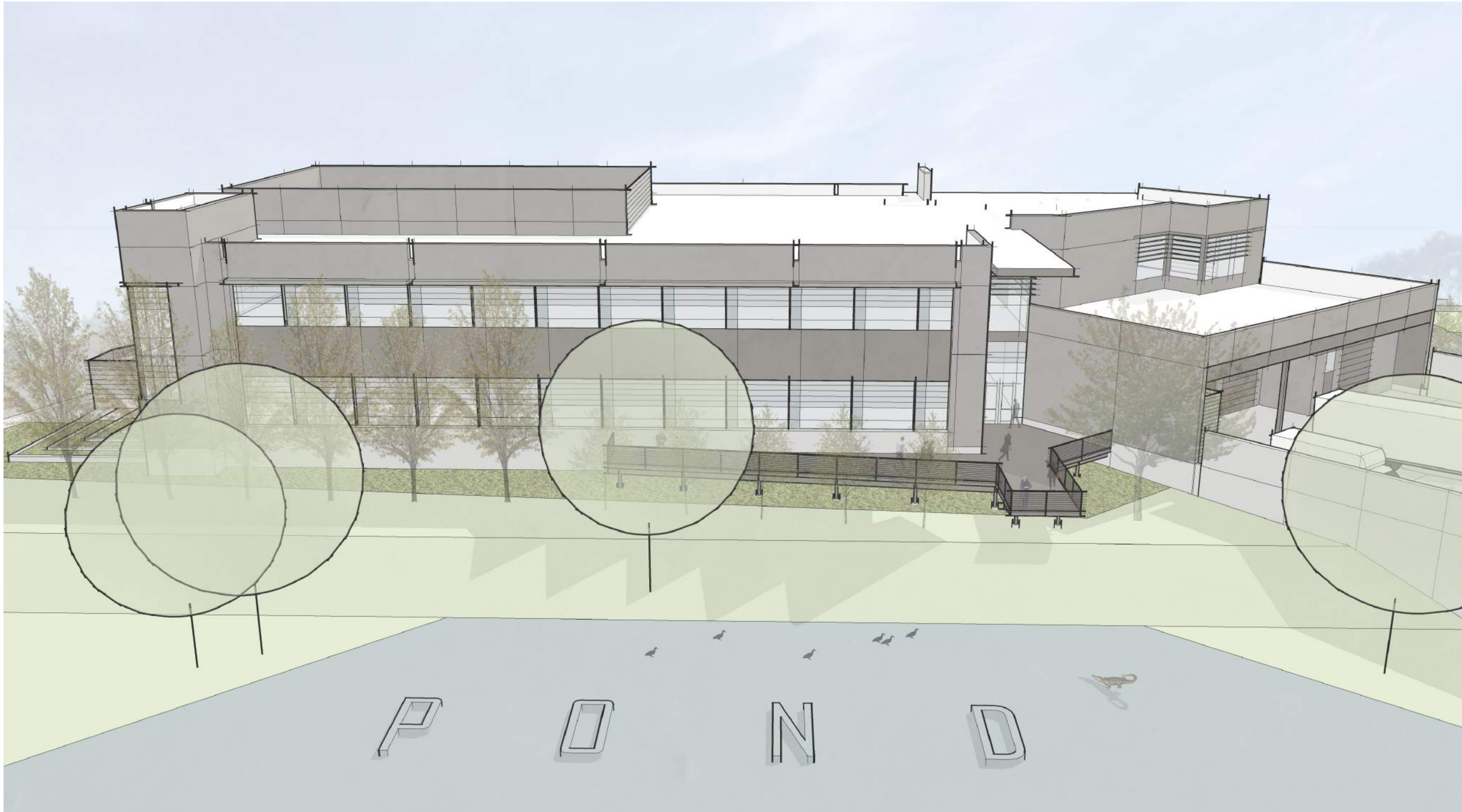
SCALE: 1/16" = 1'-0"

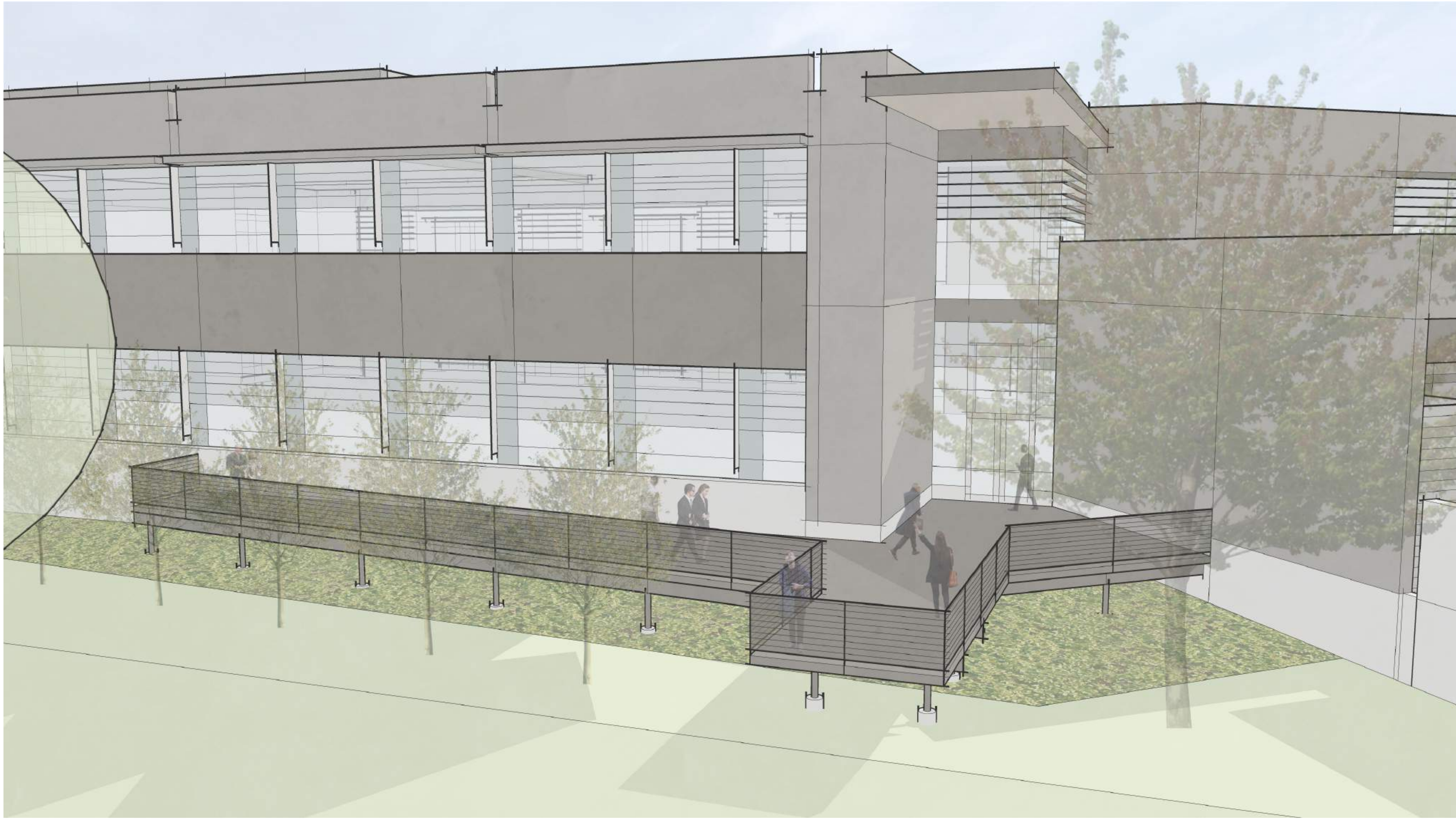
BUILDING SECTION C

SCALE: 1/16" = 1'-0"

BUILDING SECTION D

SCALE: 1/16" = 1'-0"


POND



APPENDIX

ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.

March 26, 2021

EGS File: 375-01-21-02

Architects Lewis + Whitlock, P.A.
206 W. Virginia Street
Tallahassee, Florida 32301

ATTN: Camden Whitlock, AIA
Principal

SUBJECT: **Summary of Geophysical Survey**
Preliminary Karst Evaluation
North Florida Innovation Labs
1729 W. Paul Dirac Drive
Tallahassee, Florida

Dear Cam:

Environmental and Geotechnical Specialists, Inc. (**EGS**) has completed the requested geophysical survey and geotechnical soil borings associated with the proposed North Florida Innovation Labs facility located within Innovation Park in Tallahassee, Florida. The preliminary results presented in this summary Report are based on our interpretation of the geophysical scans with regard to the potential for sinkhole activity at the subject site. In general, the geophysical survey and preliminary karst evaluation were considered necessary because the site setting is located in an area known to have a moderate to high potential for sinkhole development.

The geophysical survey consisted of performance of Electrical Resistivity Imaging (**ERI**) to identify potentially "active" karst features which could lead to the development of sinkholes. **ERI** is a geophysical tool that is used to characterize the subsurface stratigraphy by identifying variations in the electrical resistivity of the subsurface materials. As depicted in the attached *Subsurface Anomaly Location Map* provided as **Figure 1**, a total of 13 **ERI** scans were performed for the investigation.

Following the completion of the **ERI** survey and review of the data, **EGS** performed a total of 7 Standard Penetration Test (**SPT**) borings and 4 hand auger borings to physically evaluate the subsurface materials and relative densities within any notable "anomalies" (possible karst feature) detected. As depicted on **Figure 1**, the soil borings were primarily positioned within the anomalies identified by the **ERI** scans, with some borings installed outside the anomalies for comparison.

Based on the preliminary review of both the geophysical survey and soil boring data, the following subsurface conditions should be noted:

- *As depicted on **Figure 1** and the "typical" **ERI** profiles provided as **Figures 2A** through **2C**, several vertical anomalies were detected which potentially indicate the presence of either "active" or "inactive" (relic) karst conditions. These anomalies generally consisted of "dips" of the highly resistive surficial sands (resistivity range: 200 to 900 Ohm-m / **Orange** shading on profiles) downward into the underlying clay confining layer and weathered limestone (resistivity range: <175 Ohm-m / **Blue** shading on profiles).*

- *The soil borings performed were found to be in close agreement with the geophysical survey; however, **EGS did not encounter** any actively eroding subsoils or voids ("active" karst conditions) at any boring location. The site is generally underlain by a surficial layer of loose to medium dense silty to clayey sand which extends to an approximate Elevation (EL) of 50 feet, as referenced to the North American Vertical Datum of 1988 (NAVD '88), at which point the materials transition into more plastic clayey/silty sand and clay which extends to about EL 30. Below EL 30 highly plastic clay and weather limestone exist.*

- ***EGS believes** that the subsurface anomalies detected by the **ERI** scans are likely associated underlying dormant karst conditions and do not appear to be actively eroding or contributing to any visible surface subsidence. **EGS cautions** that some possibility of future karst development within the project area is possible; **however, based on consideration of both the geophysical and soil boring data, the potential for sinkhole formation is considered to be moderate if low-vibration construction techniques are utilized (i.e., compaction in "static" mode only / non-vibratory).** As an additional precaution, **EGS recommends** that no buildings be sited between the **ERI-11** transect line and Paul Dirac Drive, due to the notable size of subsurface anomaly detected along the **ERI-12** transect line. If siting of a structure in this location is required, **EGS recommends** performance of additional soil borings along the **ERI-12** transect line to a depth approximately 60 feet below grade to further evaluate the anomaly.*

Actively eroding karst features (developing sinkholes) are typically identifiable by the presence of very loose (**SPT "N" < 3**) soils and significant loss of drilling fluid circulation during boring installation. These conditions often reveal subsoils which are raveling or migrating downward into a deep void within the underlying limestone. It should be noted that some partial loss of drilling fluid circulation did occur at a depth of approximately 8 feet below existing grade at Soil Boring **IP-SPT-2**; however, the underlying soils encountered were comprised of medium dense sands and do not appear to be actively eroding at this location.

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Based on this preliminary review, shallow foundations appear to be feasible. A mat foundation is also an option to reduce risk of future settlement impacts to the proposed structure. The design should consider collection and disposal of surface water, understanding that control of surface water runoff is critical in this area. Sinkholes can result from surface water runoff from buildings and other impervious areas. Surface water should be directed well away from the building area.

We will proceed with the geotechnical evaluation following completion of the building siting and establishment of the finished floor elevation.

If you have any questions please do not hesitate to call me at (850) 536-8359.

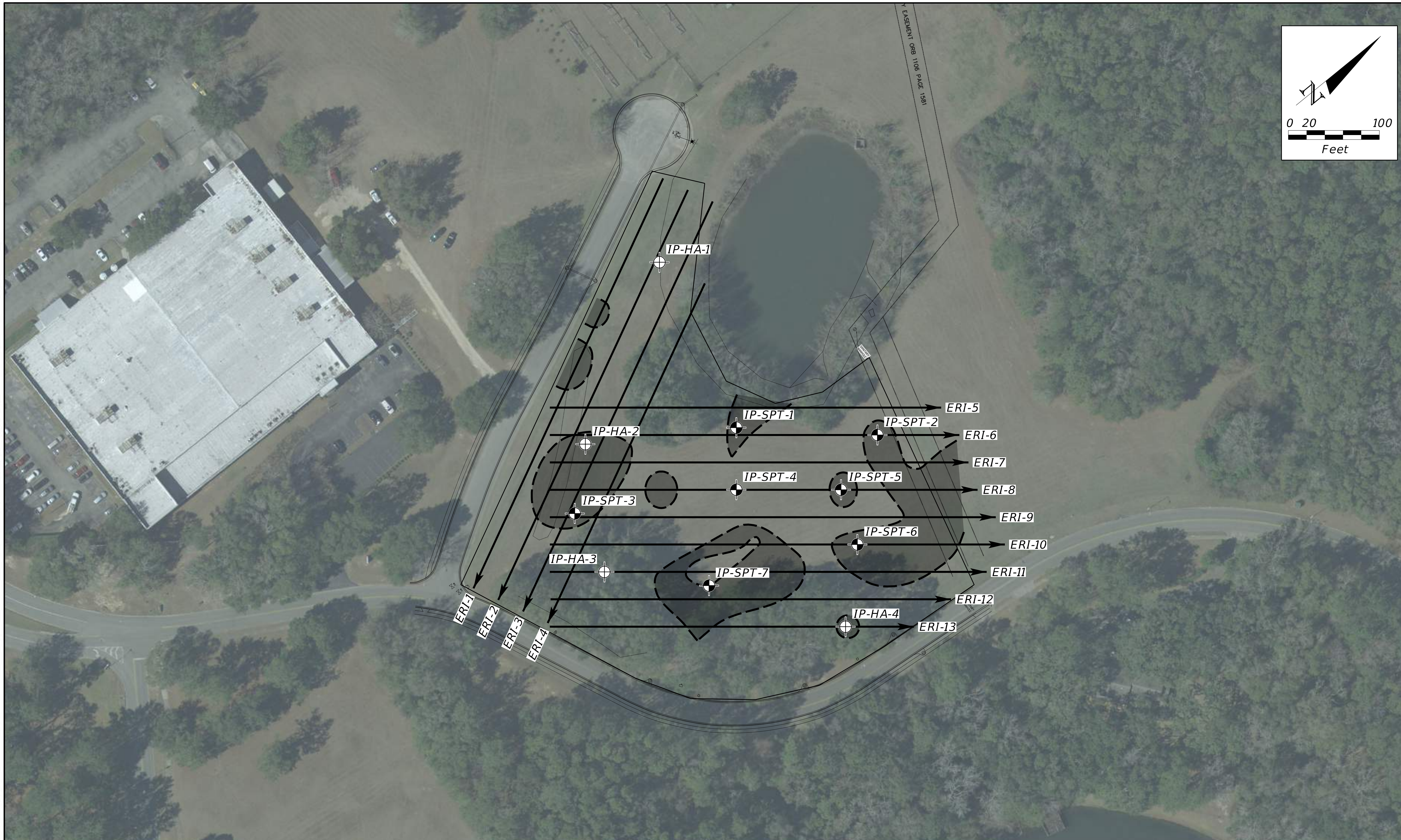
Sincerely,

Environmental & Geotechnical Specialists, Inc.

Craig E. Dunkelberger, P.E.
Senior Geotechnical Engineer

Matthew R. Landschoot, P.E.
Senior Geotechnical Engineer

Attachments



LEGEND

- HAND AUGER BORING LOCATION
- SPT BORING LOCATION
- ERI TRANSECT LINE LOCATION
- POTENTIAL SUBSURFACE ANOMALY LOCATION

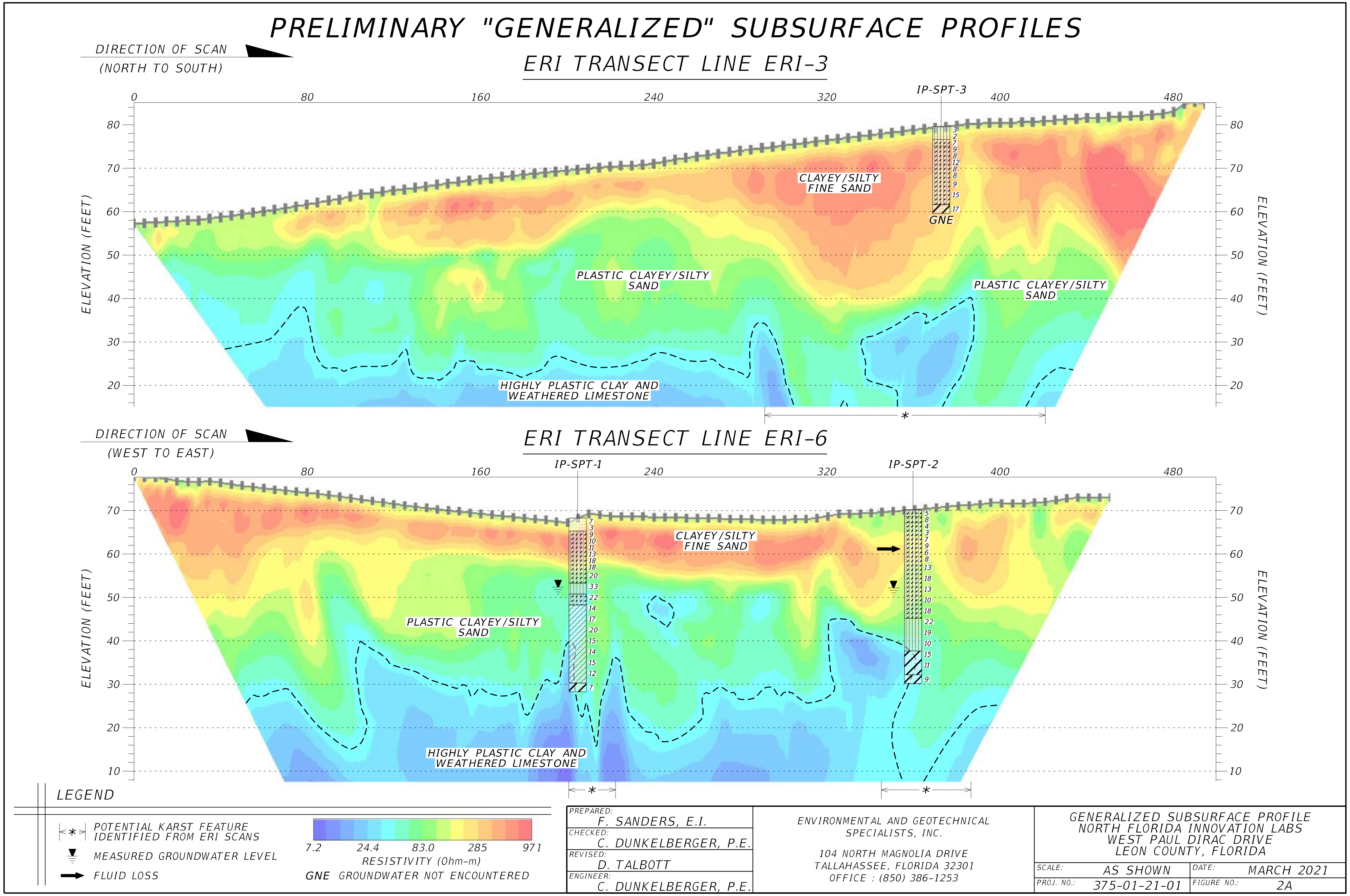
PREPARED:	D. TALBOTT
CHECKED:	C. DUNKELBERGER, P.E.
REVISED:	D. TALBOTT
ENGINEER:	C. DUNKELBERGER, P.E.

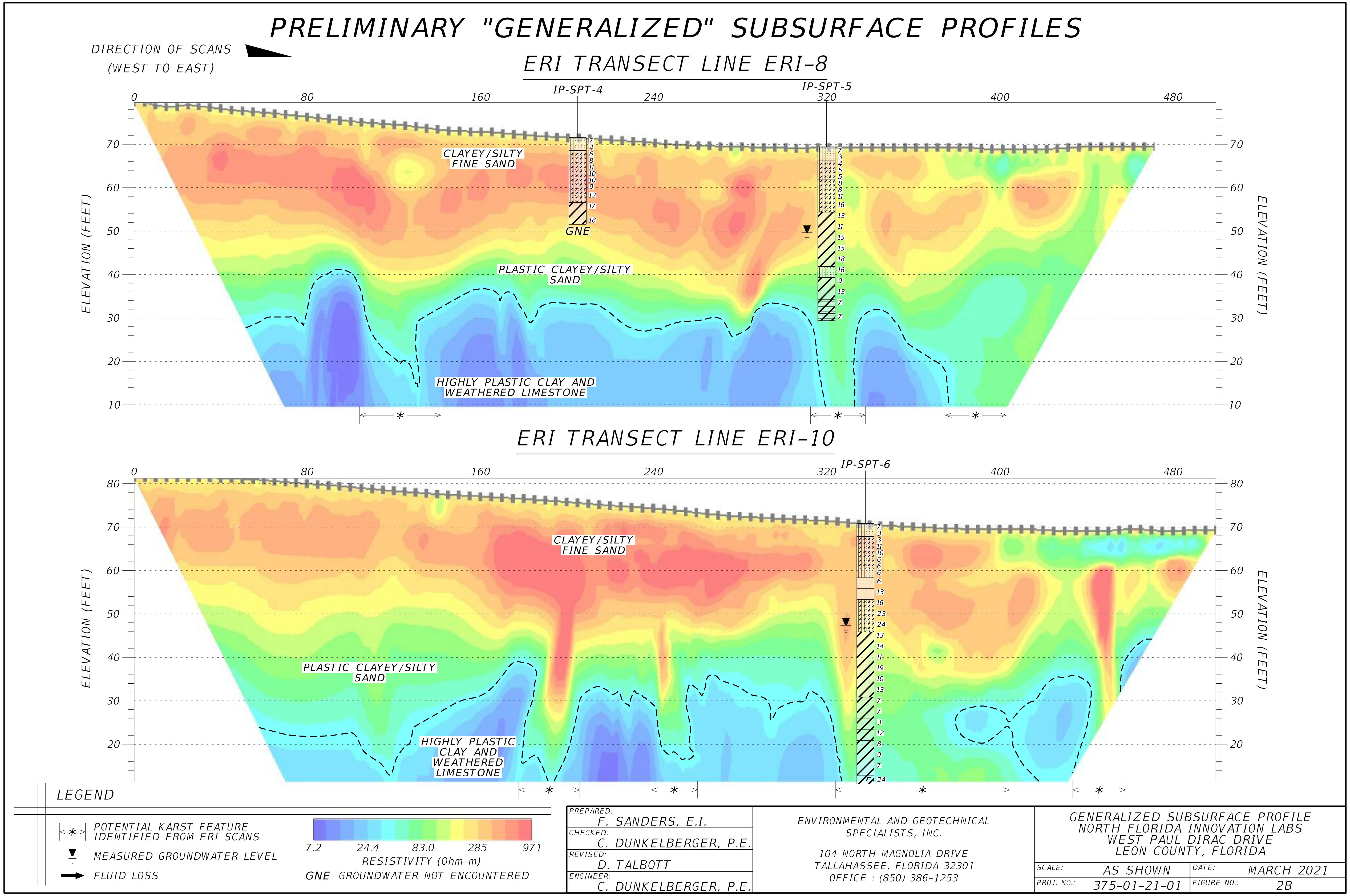
ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.

104 NORTH MAGNOLIA DRIVE
TALLAHASSEE, FLORIDA 32301
OFFICE : (850) 386-1253

SUBSURFACE ANOMALY LOCATION MAP
NORTH FLORIDA INNOVATION LABS
WEST PAUL DIRAC DRIVE
LEON COUNTY, FLORIDA

SCALE:	AS SHOWN	DATE:	MARCH 2021
PROJ. NO.:	375-01-21-01	FIGURE NO.:	1


PRELIMINARY "GENERALIZED" SUBSURFACE PROFILES
DIRECTION OF SCAN
(NORTH TO SOUTH)
ERI TRANSECT LINE ERI-3
IP-SPT-3
CLAYEY/SILTY FINE SAND
GNE
PLASTIC CLAYEY/SILTY SAND
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
ELEVATION (FEET)
DIRECTION OF SCAN
(WEST TO EAST)
ERI TRANSECT LINE ERI-6
IP-SPT-1
IP-SPT-2
CLAYEY/SILTY FINE SAND
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
LEGEND
POTENTIAL KARST FEATURE IDENTIFIED FROM ERI SCANS
MEASURED GROUNDWATER LEVEL
FLUID LOSS
7.2 24.4 83.0 285 971
RESISTIVITY (Ohm-m)
GNE GROUNDWATER NOT ENCOUNTERED
PREPARED: F. SANDERS, E.I.
CHECKED: C. DUNKELBERGER, P.E.
REVISED: D. TALBOTT
ENGINEER: C. DUNKELBERGER, P.E.
ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.
104 NORTH MAGNOLIA DRIVE
TALLAHASSEE, FLORIDA 32301
OFFICE : (850) 386-1253
GENERALIZED SUBSURFACE PROFILE
NORTH FLORIDA INNOVATION LABS
WEST PAUL DIRAC DRIVE
LEON COUNTY, FLORIDA
SCALE: AS SHOWN
DATE: MARCH 2021
PROJ. NO.: 375-01-21-01
FIGURE NO.: 2A



PRELIMINARY "GENERALIZED" SUBSURFACE PROFILES
DIRECTION OF SCANS (WEST TO EAST)
ERI TRANSECT LINE ERI-8
IP-SPT-4
IP-SPT-5
CLAYEY/SILTY FINE SAND
GNE
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
ELEVATION (FEET)
ERI TRANSECT LINE ERI-10
IP-SPT-6
CLAYEY/SILTY FINE SAND
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
ELEVATION (FEET)
LEGEND
POTENTIAL KARST FEATURE IDENTIFIED FROM ERI SCANS
MEASURED GROUNDWATER LEVEL
FLUID LOSS
7.2 24.4 83.0 285 971
RESISTIVITY (Ohm-m)
GNE GROUNDWATER NOT ENCOUNTERED
PREPARED: F. SANDERS, E.I.
CHECKED: C. DUNKELBERGER, P.E.
REVISED: D. TALBOTT
ENGINEER: C. DUNKELBERGER, P.E.
ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.
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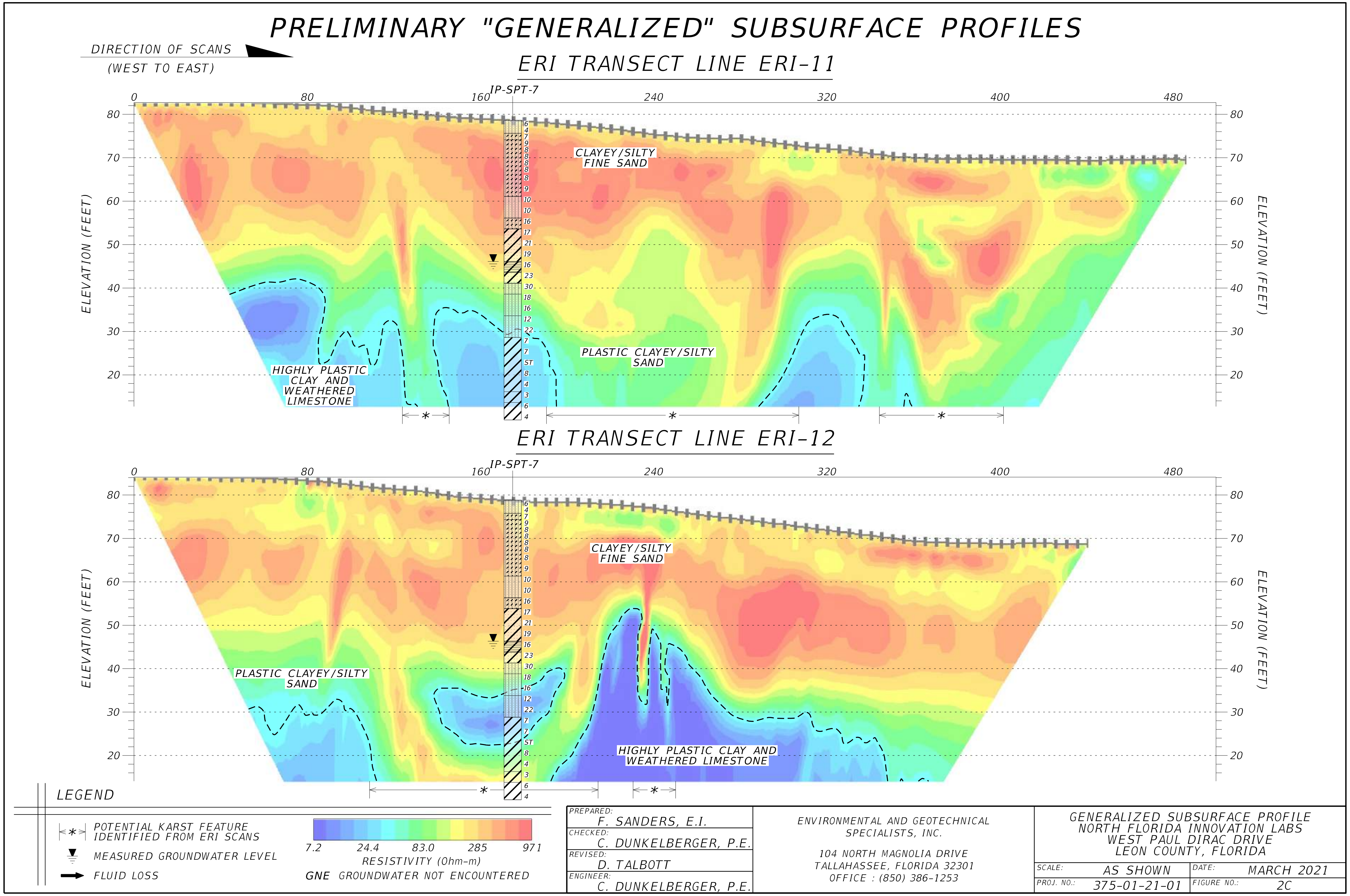
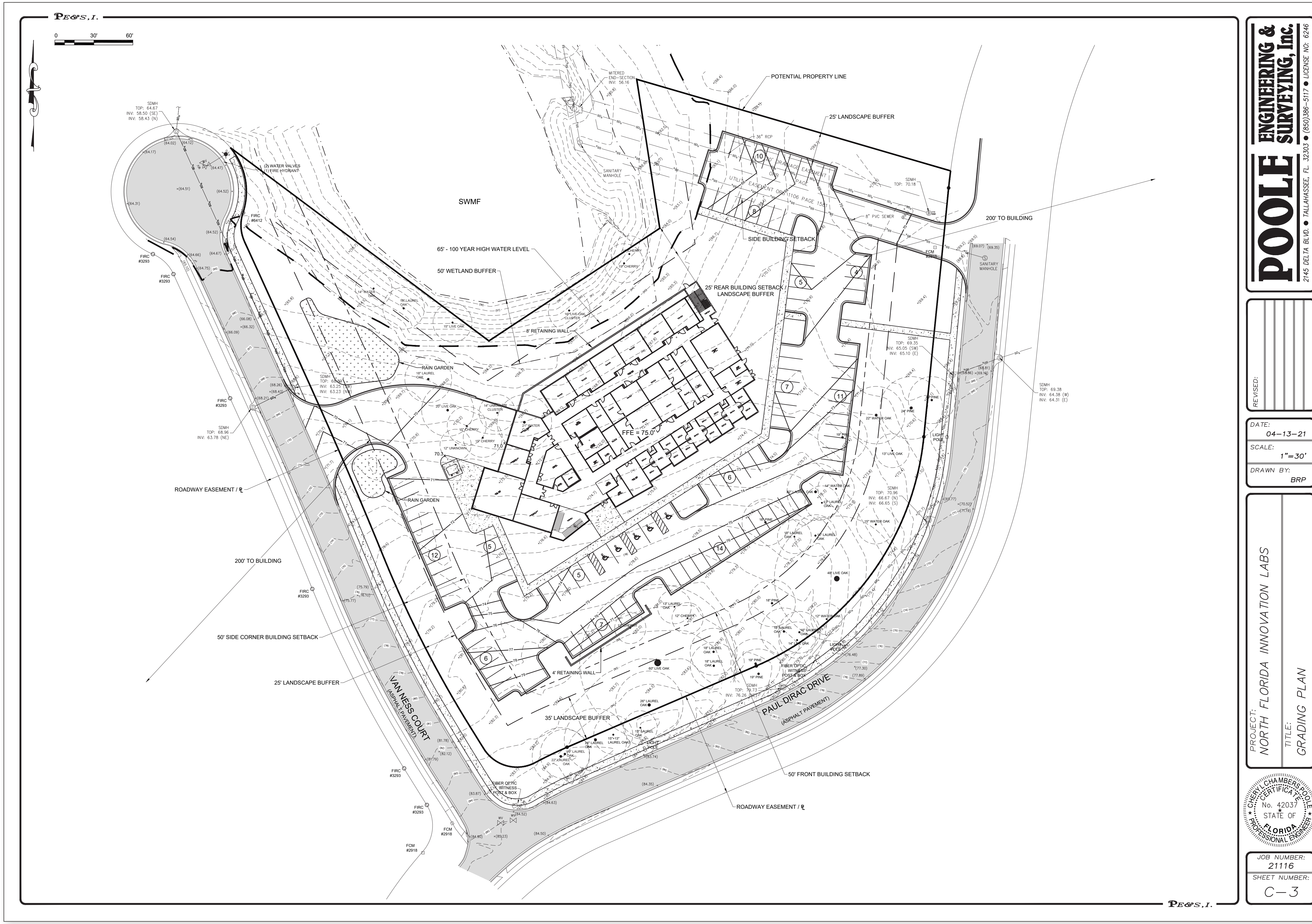
GENERALIZED SUBSURFACE PROFILE
NORTH FLORIDA INNOVATION LABS
WEST PAUL DIRAC DRIVE
LEON COUNTY, FLORIDA
SCALE: AS SHOWN
DATE: MARCH 2021
PROJ. NO.: 375-01-21-01
FIGURE NO.: 2B



PRELIMINARY "GENERALIZED" SUBSURFACE PROFILES
DIRECTION OF SCANS
(WEST TO EAST)
ERI TRANSECT LINE ERI-11
IP-SPT-7
ELEVATION (FEET)
CLAYEY/SILTY FINE SAND
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
ERI TRANSECT LINE ERI-12
IP-SPT-7
CLAYEY/SILTY FINE SAND
PLASTIC CLAYEY/SILTY SAND
HIGHLY PLASTIC CLAY AND WEATHERED LIMESTONE
LEGEND
POTENTIAL KARST FEATURE IDENTIFIED FROM ERI SCANS
MEASURED GROUNDWATER LEVEL
FLUID LOSS
7.2
24.4
83.0
285
971
RESISTIVITY (Ohm-m)
GNE GROUNDWATER NOT ENCOUNTERED
PREPARED: F. SANDERS, E.I.
CHECKED: C. DUNKELBERGER, P.E.
REVISED: D. TALBOTT
ENGINEER: C. DUNKELBERGER, P.E.
ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.
104 NORTH MAGNOLIA DRIVE
TALLAHASSEE, FLORIDA 32301
OFFICE : (850) 386-1253
GENERALIZED SUBSURFACE PROFILE
NORTH FLORIDA INNOVATION LABS
WEST PAUL DIRAC DRIVE
LEON COUNTY, FLORIDA
SCALE: AS SHOWN
DATE: MARCH 2021
PROJ. NO.: 375-01-21-01
FIGURE NO.: 2C


POOLE
ENGINEERING & SURVEYING, Inc.
2145 DELTA BLVD. • TALLAHASSEE, FL 32303 • (850)386-5117 • LICENSE NO. 6246
REVISED:
DATE: 04-13-21
SCALE: 1"=30'
DRAWN BY: BRP
PROJECT: NORTH FLORIDA INNOVATION LABS
TITLE: GRADING PLAN
JOB NUMBER: 21116
SHEET NUMBER: C-3
POTENTIAL PROPERTY LINE
25' LANDSCAPE BUFFER
SWMF
65' - 100 YEAR HIGH WATER LEVEL
50' WETLAND BUFFER
SIDE BUILDING SETBACK
25' REAR BUILDING SETBACK / LANDSCAPE BUFFER
200' TO BUILDING
RAIN GARDEN
FFE = 75.0'
ROADWAY EASEMENT / ℄
50' SIDE CORNER BUILDING SETBACK
VAN NESS COURT
(ASPHALT PAVEMENT)
PAUL DIRAC DRIVE
(ASPHALT PAVEMENT)
35' LANDSCAPE BUFFER
4' RETAINING WALL
8' RETAINING WALL
50' FRONT BUILDING SETBACK
SANITARY MANHOLE

ALW

Meeting Minutes

Date: March 24, 2021
Time: 10:00 am
Location: Architects Lewis + Whitlock
206 W. Virginia Street
Tallahassee, FL 32301

Reference: **NFIL Innovation Labs | Schematic Design Phase Kickoff Meeting**
ALW# **19370.8**

Attendees:

Ron Miller	Executive Director of Innovation Center in Leon County
Mary Jo Spector	Research Facilities Design Director at FSU
Michael Vascellaro	RS&H
Brandon Pourch	RS&H
Cam Whitlock, AIA	Architects Lewis + Whitlock (ALW)
Kathryn Stivers	Architects Lewis + Whitlock (ALW)
Ryan Sheplak	Architects Lewis + Whitlock (ALW)
Amina Kassem	Architects Lewis + Whitlock (ALW)

The LCRDA North Florida Innovation Labs Project (NFIL) Schematic Design kickoff meeting was held virtually (by Zoom) on March 24, 2021. The Design Team presented three site plan arrangements (Options A through C) along with floor plan drawings to the group. Each site plan concept offered unique challenges and opportunities based on the building footprint and parking lot arrangement. The group discussed which elements of each option were preferred and offered input for proceeding with a combined "Option D". In addition, spatial relationships and general first thoughts were shared about the proposed building plans. The following minutes provide a general outline of what was discussed:

General Site Plan Commentary:

- Each concept needs to have sidewalks along Paul Dirac and Van Ness to promote alternative modes of transportation and pedestrian access. Possible connection to the building between the two large oak trees could be considered.
- The group preferred the loading dock circulation to be off Van Ness Ct.
- Would like to have 'backyard' and direct pick-up access to Metal Shop – could be shared with loading dock.
- Explore an option similar to Concept C with a 2-story building and more urban edge along Van Ness / Paul Dirac intersection. This alternative option would include a secured access entry at the 'urban' corner.
- 100 parking spaces based would be a target for the building capacity.
- IP to engage arborist to evaluate the two larger oak trees bordering on Paul Dirac Drive.
- Based on preliminary geotechnical recommendations, finish floor to be approximately elevation 75'. (100 year mean flood line at elevation 71'). 100-year flood and wetland setback are roughly in same location.
- Northeast easements can have parking upon them, but not building.

Site Plan A:

- 2-story concept footprint accommodates parking requirements and functional site access points.
- Upon review of site plan B, Ron Miller noted that the outdoor patio space next to the loading dock may not be desirable.

Site Plan B:

- Too much pavement associated with delivery truck maneuvering may be less desirable.

Site Plan C:

- Concept includes public focus on pond.
- Single story concept utilizes site for building, but at reduced parking capacity. Maybe useful tool to show EDA administrator to illustrate potential deviation from grant summary.
- Does turn its back on the multi modal approaches. Issue? Many other examples of hollow storefronts facing public way that comply but do not provide intended engagement.
- Increased retaining wall to the north may be budget problem.
- Reduced parking: 71 spaces instead of 100 spaces, may be a problem.
- Encroachment on large live oak, may be a problem. It is noted that the large oak is in declining condition. Suggest getting an arborist to review both large oaks for recommendations.

Building Plans:

- Would like more labs to have windows. Possible shift of storage to interior of footprint and replace with labs. Other alternate would be to move storage to ground floor near loading dock corridor.
- Storage on the second floor is a concern (ease of access) - could distribute the storage across the footprint versus one large storage room.
- Explore moving Conference Room to first floor. Replace second floor Conf Room space with office neighborhood.
- Group expressed concerns over visiting investors seeing into the loading dock area when entering the building on the way to the Conference Room (if moved on ground floor) - isolation (noise + visuals) will be necessary.
- Shift stair to be more centrally located in lobby. Stair geometry could be more gracious and interactive with the lobby space.
- Office neighborhoods should be flexible for multiple arrangement types.
- Concerns about sound isolation of metals shop to other spaces. OK to be near loading dock/receiving, but isolate from labs, offices, and conference rooms. May require structural isolation in addition to adding walls and doors in the corridors.

- Ground Floor:
  - Flex Lab 2 and Dry Lab A 7 to be combined into a large conference space.
  - Flex Lab 1 is to be replaced by a storage space.
  - Place double door between storage and shipping& receiving room and one between janitor room and men's bathroom to create a more private corridor for the area.
  - Place staircase to the east side of the lobby/ reception area.
  - Structural grid is to follow the 11'x11' grid that was initially used to lay-out the spaces.

- First Floor:
  - Chem lab A 7 to be potentially replaced with a storage space.
  - Shared work/collab space to replace the large conference room and open to the pond view.
  - Shared work/collab space is to be replaced by a dry lab and a flex lab.
  - Exhaust chase to be moved next to Cell Lab 1 and supply chase to be moved adjacent to cell lab 1.

These minutes are subject to revision and corrections from all participants. The contents herein represent the notes and recollections of the events and discussion and may not capture the true intent of the statements made by the participants. For clarification, please contact Architect's Lewis + Whitlock in a timely manner.

ALW

Meeting Minutes

Date: March 26, 2021
Time: 10:00 am
Location: Architects Lewis + Whitlock
206 W. Virginia Street
Tallahassee, FL 32301

Reference: **NFIL Innovation Labs |** Schematic Design Kickoff Meeting
ALW# **19370.8**

Attendees:

Chris Childers	Structural Engineer
Tyler Dykes	AE Mechanical Engineer
Michael Vascellaro	RS&H Laboratory Architect and Planner
Brandon Pourch	
Cam Whitlock, AIA	Principal, Architects Lewis + Whitlock (ALW)
Ryan Sheplak	Project Manager, Architects Lewis + Whitlock (ALW)
Amina Kassem	Designer, Architects Lewis + Whitlock (ALW)

The EDA/LCRDA North Florida Innovation Labs Project (NFIL) Schematic Design meeting was held virtually (by Zoom) on March 26, 2021. The following was discussed:

Site Plan Concept C:

- Generator, Mechanical and Electrical rooms could possibly sit on the west edge of the building.
- South Edge of the building could be possibly partially buried.
- Breakroom can be where the staircase previously was.
- Conference room works fine close to the entrance.
- One hour rating around storage rooms on second floor allows the occupants to store the chemicals that they might need.
- Screened wall could be articulated in different materials so that the zones could read on the building block.
- Next step is to see if option D works fine with the site but that should not disregard option A because it lines up with the site and causes less complications to the site.
- BOD's could be ready by April 1st.
- Option D has the labs placed on the east and west facades which means they will be exposed to direct sunlight which is not really desirable.
- Having the labs on the north and south facades would need to have sun shading on the south façade.
- Using one of the existing stairs is to get to the roof is more efficient than having one that goes from second floor to the roof.

Provided by Tyler Dykes:

- AEI will provide Basis of Design (BOD) narratives by April 2nd to include system concepts, design criteria, and code/standard references, for inclusion with the ASD deliverable. AEI standard format will be acceptable. No MEPFP drawing content will be required.

- ALW is working through four options for deploying the program ahead of March 31st meeting with client. AEI BOD narratives will be general enough to be interchangeable between all four concepts.
- ALW to identify where to locate fire riser other than within stairs; I checked our file following the call and confirmed that we originally assumed that a fire pump would not be required.
- Roof access will be provided by extending one of the previously planned stairwells to the roof level.
- The space labeled on Michael's "Option C" layout can be used for the second-floor electrical room and the elevator controller room, if required. The group acknowledged that the electrical room needs to be stacked over the first-floor electrical room and that the plan can accommodate.
- IT rooms are not intended to house racks for users' systems; assume these will be place in tenant spaces if required. This needs to be confirmed and documented with Ron.
- AEI to confirm with Ron that individual tenant metering will not be required and that lease agreements will include utility costs accordingly.

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ALW

Meeting Minutes

Date: March 31, 2021
Time: 10:00 am
Location: Architects Lewis + Whitlock
206 W. Virginia Street
Tallahassee, FL 32301

Reference: **NFIL Innovation Labs | Schematic Design Review Meeting**
ALW# **19370.8**

Attendees:

Ron Miller	Executive Director of Innovation Center in Leon County
Mary Jo Spector	Research Facilities Design Director at FSU
Tyler Dykes	Affiliated Engineers
Michael P. Vascellaro	RS&H
Cam Whitlock, AIA	Architects Lewis + Whitlock (ALW)
Kathryn Stivers	Architects Lewis + Whitlock (ALW)
Ryan Sheplak	Architects Lewis + Whitlock (ALW)

The EDA/LCRDA North Florida Innovation Labs Project (NFIL) Schematic Design meeting was held virtually (by Zoom) on March 31, 2021. The following was discussed:

1. Reviewed Site Options A and D: Determined that due to existing grades, Option A is the preferred Option to move forward.
2. Level 1 and Level 2 floor plans were reviewed.
   The following comments were made:
   - Plan changes from last week were viewed as generally favorable.
   - Conference room proximity to shops will require careful attention to provide desired sound separation.
   - MJS noted that there is a need for the 'common lab' to be located on the 2nd floor.
   - Autoclave room to be reduced to 3 modules vs. 4.
   - Office suite location on second floor discussed relative to adjunct labs. MV noted that the offices are vertically grouped with the offices on 1st floor for better utility zoning and exterior development opportunities. It was also noted that the labs in question are likely to be more electronics based, and therefore more compatible with the offices.
   - TD questioned owner intent for tenant IT racks. It was agreed that tenant IT racks will be housed in tenant space.
   - TD questioned utility metering for tenant spaces. RM confirmed that there will not be individual tenant metering. Utilities will be included in tenant membership fees/rent.
   - BP questioned open stair and vertical atrium in lobby relative to life safety code requirements for rated stairs. ALW to review. RM noted that open nature of entry and common spaces is desirable for financial vitality of facility and ability to showcase tenants.
   - RM questioned size and capacity of elevator to serve 2nd floor labs. ALW to follow up.
   - Lab corridors confirmed to be 8' wide. Discussed door swing at labs and whether door should swing into or out of labs. No change was made at this time.
   - Discussed desire to have views into labs with either windows or door lite.

3. Reviewed 2 module and 4 module chem lab equipment layouts:
   - RM - can water purification system be accommodated? MV - yes, on wall by sink. Assume high purity water system installed in building. TD - recommends being selective about water distribution.
   - MJ - separate electrical panels for 2- module labs? MV - locate behind door in 2 module labs.
   - MJ - does not prefer storage closets outside labs. MV - could be cylinder storage or communication racks.
4. 2 / 4 module Biological Labs:
   - RM - overhead utilities? Yes, for central island in 4-module labs. Surface raceways around perimeter
   - MJ - individual tenants will provide biosafety cabinets in labs. MEP. Utilities to be designed to support future biosafety cabinets.
   - Bio labs not built out with fume hoods, to be designed for future 4 or 6' hood.
5. Flex and Dry Labs:
   - No sink in 2 module dry labs.
   - RM - distinction between dry labs and flex labs: Flex labs have unfinished floor and ceilings while Dry labs have finished floor and ceilings:
     1. Flex labs are spaces for tenants to build things and light assembly. Intent is for open floor space.
     2. Include snorkels.
     3. Plan for owner provided equipment, limited built in tops.
     4. Provide overhead utilities.
     5. MV - provide capacity for future hood capacity? No, provide in a common space. Do not plan for plumbing and HVAC in Flex Labs.
     6. Provide sink in flex labs, not in dry labs.
     7. Dry labs to have recirculated air.
     8. Need to recirculate air in Flex labs discussed. Plan for one pass air - 4 air changes per hour.
     9. Interconnecting door between dry lab and flex lab creates HVAC challenge. Remove interconnecting door between dry lab and flex labs.
     10. RM - Will there be air crossover with offices?
         - TD - Labs to be negative pressure.
         - Offices to be zoned separately for night-time shutdown.
6. MV - not sure how to approach machine shop with not having a vendor on board:
   - TD - Possible to provide overhead utility raceway for future connections.
   - Utility raceways provided along walls as well.
   - RM - need roll up door from dock to metal shop.
7. RM - suggest having connecting doors for 2-lab dry lab modules.
8. Minutes from AEI:
   - Ron confirmed that tenant utility metering is not required.
   - IT rooms are not intended to house users' racks.
   - The group discussed the need for a second-floor electrical room.
   - Electrical panels for 2-module labs may need to be located behind entry doors; cannot be fed from panels for 4-module due to the ratio of 2-module to 4-module labs.
   - Closets at lab entries may be used for cylinders or users' IT racks as required; this will trigger the need for gas piping and/or power/data inside closets.
   - Biology labs will allow for the future addition of one 6'0" hood or a Type II Class B2 biosafety cabinet in the 4-module variety; the 2-module variety will allow for the future addition of one 4'0" hood or a B2 biosafety cabinet.
   - Biosafety cabinets will not be ducted other than future B2 cabinets noted above.
   - Dry labs and flex labs will not be designed for flipping to wet labs at any point in the future, based on the number of wet labs already planned for the second floor.

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- Dry labs and flex labs will be provided with snorkels on Day 1 but no provisions for fume hoods to be added in the future.
- Dry labs will be provided with recirculated air and not one-pass HVAC; flex labs will be provided with one-pass air for odor control but at a reduced rate of four (4) air-changes-per-hour.
- Flex labs will have exposed ceilings; dry labs will have typical ceilings.
- Peninsulas in 4-module labs will be provided with overhead service panels; cord reels are not required.
- One-pass air will be required in the machine shop for purposes of odor control and dust collector makeup air.
- Overhead plug-on busway in H-pattern along with wall-mounted busway, all with disconnects, will be provided for flexibility in machine shop.
- Overhead plug-on busway in T-pattern and wall-mounted busway, all with disconnects, will also be provided in the fabrication lab. Single-pass air will not be provided.
- Corridors outside of labs will be zone on the lab air handling system to maintain pressurization 24/7; office/admin spaces will be designed with recirculating HVAC that will shut down at night.

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ALW

Meeting Minutes

Date: April 7, 2021
Time: 11:00 am
Location: Architects Lewis + Whitlock
206 W. Virginia Street
Tallahassee, FL 32301

Reference: **North Florida Innovation Labs | Schematic Design Wrap-up Meeting**
ALW# **19370.8**

Attendees:

Ron Miller	Executive Director of Innovation Center in Leon County
Mary Jo Spector	Research Facilities Design Director at FSU
Michael P Vascellaro	RS&H
Brandon Prouch	RS&H
Tyler Dykes	AEI
Cam Whitlock, AIA	Architects Lewis + Whitlock (ALW)
Kathryn Stivers	Architects Lewis + Whitlock (ALW)
Ryan Sheplak	Architects Lewis + Whitlock (ALW)
Amina Kassem	Architects Lewis + Whitlock (ALW)

The EDA/LCRDA North Florida Innovation Labs Project (NFIL) Schematic Design Wrap-up meeting was held virtually (by Zoom) on April 7, 2021. The following was discussed:

1. Reviewed the building plan and infrastructure and discussed having larger lab working spaces. This could possibly be achieved by opening a few lab spaces to each other providing a larger flexible space.
2. Discussed the need to go with a two-story building instead of a one-story building and was granted this flexibility by the EDA (Asa Williams).
3. Floor Plan Changes:
   First Floor:
   - Break room was shifted towards the north edge of the building to allow for views towards the pond with direct access to patio. The shift is considered favorable by the group.
   - Based on the previous meeting, a Printing Room was added to act as a vestibule to the Admin Office. RM prefers if the printing room is not part of the entrance to the Admin's Office and would like the office to have more space and privacy. ALW to explore alternative layout to separate the doorway from the print room. Adjacent lab would reduce to a two-module arrangement.
   - Dry Lab B1 was moved towards the south edge of the building.
   - Lobby is kept highly transparent. Staircase back wall could be possibly used for graphics, signage, or a video screen wall to share tenant projects. This could also be applied to the elevator wall since it is facing the main entrance of the building.
   - Wall beneath staircase could possibly be glass so it can give transparency to the conference room.

   Second Floor:

   - Autoclave Room is back to its three-module with added second floor Elect Rm.

   - Group discussed possibility of the roof of loading dock to be structural adequate to allow for future building expansion, or it could be built as 'shell space' to serve as a storage, if the budget allows (not likely).
   - Discussed building skin: louvers and shading devices could possibly be applied to protect from excessive direct sunlight.
4. Exterior Building Design (3D Views):
   1. Discussed transparency of the building. This was an inside-out process where the interior space was informing the façades and window locations.
   2. South-West facing façade is shown as rather opaque because it gets direct sunlight. Possible windows and shading devices could be addressed as the project progresses.
   3. Exterior materials are to be discussed in future meetings. Currently shown as combination of metal wall panels and synthetic stucco.
   4. Lobby/Staircase space can become an attraction point by providing aesthetic lighting and having a transparent façade. MJS is concerned about having an open staircase and whether it needs separation doors or fire-rating (ALW to confirm). MJS favors having the glass for the collaboration spaces and the conference room.
   5. MJS - Benches outside of the collaborative spaces' windows are not necessary and would be better served as landscape screens or plantings to screen parking from view.
   6. Group discussed the patio's materiality and construction type. Steel structure and concrete slab over metal decking would be a long-term option, but this is to be discussed as the project moves forward.
   7. Large trees could be planted next to the patio to shade patio.
   8. Transparent façade allows for a lot of daylight for the labs. Windows are at a height that allows for equipment preservation.
   9. Maintain windows in the Stair 2 because it will be heavily used as a second access-controlled entry.
5. Discussed additional items:
   - Co-working spaces often need storage spaces such as lockers where tenants can keep their personal items safe. Could be located in 'Extra Office' space or along one of the side walls. Could also be a free-standing furniture component.
   - RM suggested would like to maintain windows into Admin Office. This could possibly be aligned with the rain chain on the main entry façade.
   - Discussed building roof drainage. MJS suggested that internal roof drains with overflow scuppers along perimeter is a better option, long-term. Roof would need to follow code and have roof for maintenance.
   - Group discussed potential for Loading Dock to possibly to be mono slope that slopes down a gutter and downspouts.

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INNOVATION PARK of Tallahassee

+

RS&H

AEI Affiliated Engineers

ALW Architects Lewis + Whitlock

In association with,

BNI Bliss & Nyitray, Inc. Structural Engineers

EGS Environmental and Geotechnical Specialists Engineers and Scientists www.egs-us.com

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