Mechanical, Electrical, Plumbing &
Fire Protection Engineering Narrative
MPLCP Level of Design
December 23, 2025

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FEASIBIITY STUDY NARRATIVE
WHITINSVILLE SOCIAL LIBRARY

WHITINSVILLE SOCIAL LIBRARY
17 CHURCH STREET
WHITINSVILLE, MA 01588

FOR

OUDENS ELLO ARCHITECTURE
46 WALTHAM STREET, SUITE 4A
BOSTON, MA 02118

Bala Consulting Engineers
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Bala Project No. 60-25-310
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SECTION 1.0 – INTRODUCTION

Whitinsville plans to renovate approximately 10,750 SF of existing library space and provide an approximately 19,500 SF addition to the library building. The programming for the new library based on a conceptual plan, provided by Oudens Ello Architecture, will include a multi-purpose room, offices, staff lounge, staff work room, Innovation/Makerspace, Local History room, Conference/Meeting Rooms, Storage/IT rooms, Circulation Desk, Browsing, Adult's Room, Children's Room, Study Rooms, Book Drop, Restrooms, Electrical Room, and Mechanical Rooms.

Oudens Ello Architecture is the architectural Lead on this project.

This document is to cover the Mechanical, Electrical, Plumbing, and Fire Protection Engineering Basis of Design for the above project.

SECTION 2.0 – MECHANICAL SYSTEMS

A. Scope of Work

1. General:

The mechanical scope will include the design of heating and ventilation systems to support the library renovation and addition. There will be a separate system provided for the multi-purpose room and associated spaces for after hours use.

The scope of work will include, but is not limited to, the installation of new energy recovery ventilators, VRF Heat recovery systems with ducted indoor units, electric units heaters, split air conditioning systems, energy recovery ventilators (ERVs), and electric heaters.

B. Design Criteria

1. Codes and Standards :

a) International Energy Conservation Code (IECC) 2021
b) International Mechanical Code (IMC) 2021
c) Massachusetts State Building Code (780 CMR) – 10th Edition
d) All other applicable Federal, State or Local Codes, Regulations and Legislation
e) 2021 ASHRAE Handbook – Fundamentals
f) 2020 ASHRAE Handbook – HVAC Systems and Equipment
g) SMACNA HVAC Duct Construction Standards – Metal and Flexible

2. Cooling and Heating Loads:

a) Climatic design conditions used for peak load calculations and selection of HVAC systems are listed below for Otis ANGB, MA as tabulated in the 2021 ASHRAE Handbook of Fundamentals.

Annual Climatic Design Conditions –Otis ANGB, MA			
Cooling, Dehumidification and Enthalpy Design Conditions			Temperature
Building Envelope Load Calculations	0.4%	Dry Bulb Temperature (T_{db})	85.5 °F
	0.4%	Wet Bulb Temperature, Mean Coincident with Dry Bulb	73.4 °F
Annual Heating and Humidification Design Conditions			Temperature
Building Envelope Load Calculations	99.6%	Dry Bulb Temperature (T_{db})	8 °F

3. System Design Criteria:

The HVAC system will be designed based on the following criteria:

(1) Summer: 75°F DB, 50% RH

(2) Winter: 70°F DB (no humidification)

Filtration Requirements - MERV 13

Ventilation Rates

(1) As per International Mechanical Code 2021 section 403

Exhaust Rates

(1) As per International Mechanical Code 2021 section 403

Load assumptions

1) Lighting: 0.7 W/sqft
2) Equipment: 135 W per personal computer (PC)

Noise Criteria

The following noise criteria will be used in the architectural and mechanical design of the identified spaces. Requirements to meet these NC levels will be provided by an acoustical consultant during the detailed design phase. These NC ratings are "background" ratings (i.e. they are exclusive of noise generated by occupants and their equipment, such as freezers). These values are measured in the center of the room, 3 feet above finished floor.
(1) Private Offices Study Rooms: NC 30-35.
(2) Circulation, Reading Rooms, Kitchen: NC to 40
(3) Meeting Rooms: NC 25-30.

Pressurization:
All systems shall be designed to attain desirable pressure levels within the rooms relative to the adjacent spaces.

Pressurization areas will be maintained by a constant air volume offset between room supply, return and exhaust airflow and closed doors. Differential pressures will be maintained during occupied periods via airflow tracking control.

An allowance of excess outside air of 0.035 cfm per square foot of gross wall area will be made to provide positively pressurized (with respect to atmosphere) perimeter zones to minimize infiltration.

In addition, an allowance for infiltration of 0.17 cfm per square foot gross wall area will be made for perimeter zones during unoccupied hours.

Office spaces shall be positively pressurized to the adjacent spaces. Systems shall be designed to attain pressure levels within the rooms relative to adjacent areas. Differential pressures between adjacent spaces will be a minimum of 0.025 in. w.g.

B. Existing Conditions/Demolition

1. General:

a) Remove existing HVAC systems and associated ductwork, piping, valves, appurtenances, and controls in their entirety in the existing building. The

following is a list of known systems from a 2024 existing conditions report, however all systems shall be removed.

(1) Remove existing gas fired Burnham 703 MBH boiler associated piping, pump valves, appurtenances, radiators, and controls.

(2) Remove existing multi-split ductless air conditioning system, associated piping, and controls.

(3) Remove existing rooftop air conditioning unit, associated ductwork, grilles, diffusers, and controls.

C. **System Description**

1. HVAC System and Equipment:

a) Variable Refrigerant Flow (Heat Recovery Type) Heat Recovery System:

(1) Space heating and cooling shall be provided by three air-cooled heat pump/ heat recovery systems. Each system shall be a nominal 25 Tons . Outdoor units shall be a multi-zone inverter heat recovery type unit capable of simultaneous heating and cooling. Outdoor units shall be suitable for 3 phase power, 480 volt or 208 volt. Outdoor units shall be located on a concrete pad on grade adjacent to the building and near the area of service. Provide spring isolators and flexible piping connections at each unit.

(2) Provide branch selector boxes for simultaneous heating and cooling to various zones.

(3) Provide refrigerant piping distribution from the outdoor compressor/ condensing units to branch selector boxes and from branch selector boxes to indoor fan heating/ cooling units.

(4) Indoor fan coil units shall be horizontal ceiling concealed ducted units. Provide spring hangers.

(5) Supply and return ductwork for ceiling concealed units shall be lined with internal acoustical insulation.

(6) Ducted units shall be provided with filter return air grilles for easy access and servicing.

(7) Each unit shall have condensate piping connected to the nearest condensate receptor. Condensate receptor provided by Div. 22.

(8) Integral condensate pumps shall be provided for all indoor units.

b) Mechanical ventilation shall be provided with by four packaged energy recovery ventilation units (ERV). ERV-1 shall be ___ CFM, ERV-2 shall be ___ CFM, ERV-3 shall be 1,700 CFM, and ERV-4 shall be ___ CFM. Refer to Appendix A – HVAC Zoning Plan where area of service is identified. Units shall include; supply fan, exhaust fan, fixed plate heat exchanger, bypass

damper, defrost control, electric heater, supply air and exhaust air filters, isolation dampers, and controls.

(1) ERV units shall be located in the ceiling plenum or in storage rooms.

(2) Outside air and exhaust air shall be connected to exterior wall louvers or gravity roof vents. Intake and exhaust terminations shall be separated by a minimum of 10'-0".

(3) Supply air shall be ducted directly to the return air of ducted VRF fan coil units.

(4) Exhaust from toilet rooms and other locations shall be connected to the energy recovery ventilation systems with sheetmetal ductwork and ceiling mounted grilles.

(5) ERVs shall be suspended using spring hangers.

(6) Provide unit with a wall mounted microprocessor controller with BACnet interface and WiFi connectivity.

c) Miscellaneous Systems:

(1) Provide electric cabinet heaters or wall heaters in the entrance vestibule and miscellaneous areas as required and indicated in Appendix A – HVAC Zoning Plan

(2) The IT Rooms, MEP Rooms, and Basement Storage Rooms shall each be provided with 1.5-ton capacity dedicated ductless multi-split heat pump air conditioning system. Provide one outdoor unit and indoor ductless unit to serve each utility space with a wall mounted wired thermostat. Provide multi-split systems (one outdoor unit connected to multiple indoor units) to serve the storage rooms.

(3) Internal acoustical duct lining may be applied as necessary to maintain acceptable noise criteria.

(4) Rubber or spring vibration isolators shall be provided for support and hanging of all indoor fan units.

(5) Commissioning of building mechanical systems as required by the Massachusetts Energy Code or per project requirements.

d) The control system shall be the standard packaged control system provided by the respective VRF system and ERV manufacturers with a graphical web-based monitoring system.

(1) Carbon dioxide sensors shall be provided for spaces with high occupant density for monitoring of space concentration. Assume one space is to be provided with CO2 sensors.

(2) VRF system controls shall include 7-day/24-hour time clock function, automatic heating/cooling changeover with independent heating and cooling set points, night setback temperature control, graphical user

interface, and digital control modules for interlocking with supplemental equipment.

(3) Cabinet and electric heaters shall be provided with standard electric controls.

(4) Space temperature sensors shall be provided for monitoring and alarm of critical spaces such as AV and IT rooms.

e) Related Work in Other Sections: The following work is not included in this Section and will be performed under other Sections.

(1) Concrete work.

(2) Cutting and patching.

(3) Installation of access panels in ceiling and wall construction.

(4) Painting.

(5) Electric power wiring for all equipment

(6) Structural supports necessary to distribute loading from equipment.

(7) Temporary light, power, water, and heat for use during construction and testing.

(8) Trenching and backfilling.

SECTION 3.0 - ELECTRICAL SYSTEMS

A. Design Criteria

1. General:

   a. This section describes the criteria and proposed electrical system design concept for the expanded Whitinsville Social Library.
   b. The electrical work, including lighting and lighting controls, fire alarm, and emergency power and distribution systems, shall be designed, installed, and tested in accordance with the requirements of the following applicable codes, standards, and approving agencies. Where requirements differ, the more stringent requirements shall govern.

2. Codes and Standards:

   The electrical system shall be designed, installed, and tested in accordance with the requirements of the following applicable codes, standards, and approving agencies. Where requirements differ, the more stringent requirements shall govern.

   b) American National Standards Institute (ANSI)/National Institute of Standards and Technology (NIST)
   c) National Fire Protection Association (NFPA)
   d) NFPA-70 – National Electrical Code (NEC) 2023 with MA amendments.
   e) NFPA-72 – National Fire Alarm Code 2013
   f) NFPA-101 – Life Safety Code 2015
   g) National Electrical Manufacturers Association (NEMA)
   h) Institute of Electrical & Electronic Engineers (IEEE)
   i) International Electrical Testing Association (NETA) Acceptance Testing Specifications
   j) Underwriters' Laboratories, Inc. (U.L.)
   k) Massachusetts State Building Code (780 CMR) – 10th Edition
   l) International Energy Conservation Code (IECC) 2021
   m) Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)
   n) American Society for Testing and Materials (ASTM)
   o) Occupational Safety and Health Administration (OSHA)
   p) ANSI/NECA 1-2015, Standard Practices for Good Workmanship in Electrical Contracting
   q) Local Building and Electrical codes
   r) All other applicable Federal, State or Local Codes, Regulations and Legislation

B. Existing Conditions/Demolition.

1. General:

   a. The existing library finishes are being demolished. All existing electrical, lighting, and fire alarm systems shall be demolished within the existing library. The existing electrical service will also be demolished, and a new electrical service will be provided to the new, larger library.

C. System Description

1. General:

a. The overall proposed power distribution is as follows:

1) New 480/277V, 800A electrical service.
2) An automatic transfer switch and new 200kW outdoor diesel generator with integral fuel tank providing standby power for selected loads throughout the building.
3) A manual transfer switch with Cam-Lok connections will be provided to provide functionality for optional connection of a portable generator when backup generator is out of service.

b. Design Criteria:

1) Load Requirements:

a) Electrical Receptacle Power – 7 W/sf
b) Lighting Loads – 3 W/sf
c) Mechanical (HVAC and Plumbing) Loads – 10 W/sf

2) Power Demand Factors/System Diversities:

a) Lighting – 125% of installed VA
b) Receptacles – 100% of first 10 kVA installed, plus 50% of balance
c) Motors – 70% of total VA installed
d) Fixed Equipment – 70% of total VA installed

3) Power Factor: Electrical systems shall be designed based upon a power factor of 0.9.

c. A new electrical service will be provided to the site. Based on expected electrical loads, an 800A, 480/277V, 3-phase, 4-wire electrical service is proposed. New power distribution equipment shall be provided as follows:

1) The electrical service shall originate from an existing utility pole and be routed via new underground electrical conduits to a new proposed 500 kVA pad mounted transformer. The conduits on the secondary of the transformer shall be routed underground to a new 800A fused service switch. A CT cabinet and meter pan will be provided.
2) The main distribution panel (“DP”) for the building shall be a 1200A, 480/277V, 3-phase, 4-wire distribution panelboard with an 800A main circuit breaker. The DP shall feed/be connected to the PV system, two (2) 225A, 480Y/277V panels (“LPH”), and two (2) 150kVA transformers that will supply 208/120V loads. Panel DP shall be located in the basement electrical room.
3) The disconnects (200A) and meter for the PV system shall be mounted on the building exterior.
4) The two LPH panels shall be 480/277V, 225A (1x MLO and 1x MCB type). One panel shall be located in the basement electrical room, while the other shall be located in a second floor closet in

the new addition. Both LPH panels shall feed lighting and miscellaneous mechanical/plumbing loads.

5) Panel DP shall feed two (2) 150 kVA, 480-208/120V transformers. One will be located in the basement electrical closet via a 225A circuit breaker, while the second will be located in the second floor electric closet.

6) Each of the 150kVA transformers shall feed a 2-section, 208Y/120V, 500A panelboard with a 500A main circuit breaker. Each section of the panelboard shall be 84 poles and shall feed receptacle and miscellaneous equipment loads throughout the facility.

7) With the exception of the electrical utility transformer, the standby generator manual transfer switch, and the PV disconnect switches, all other electrical equipment will be located either in the main electrical room in the basement, or in the second floor electric closet of the new addition (main electrical room will be a minimum 216sf in the basement and the second floor electric closet will be a minimum of 120sf).

2. Power:

a. Install all wiring in conduit, except as otherwise specified below.

1) Conduit shall be as follows:

a) Interior use: Electrical Metallic Tubing (EMT).
b) Interior use, concealed locations: MC-cable permitted as noted below
c) Exposed in damp or wet locations: Rigid Galvanized Steel Conduit or Intermediate Metal Conduit.
d) Buried: Sched 80 PVC
e) All conduits shall be UL listed and approved for intended use.

b. Minimum conduit size shall be 3/4".

c. Provide ground wire, sized per National Electrical Code requirements, in all branch circuit and feeder raceways.

d. Metal Clad Cable - In hung ceilings, dry wall, or other furred spaces, metal-clad MC cable with separate insulated ground shall be permitted. Metal Clad Cable is not permitted in exposed areas of the building.

e. Building wire shall be rated 600-volt, type THHN/THWN insulation suitable for interior and exterior use. Conductors shall be soft-drawn copper of not less than 98% conductivity. Underground feeders shall be XHHW insulation. Conductors shall be sized and run as indicated or as required to suit the actual installation.

f. No wire smaller than #12 AWG shall be used. Conductors shall be continuous from outlet to outlet and from terminal board to point of final connection, and no splice shall be made except within outlet or junction boxes. All conductors shall be of the sizes as indicated. All wires #8 AWG and larger shall be stranded. The Contractor shall make wiring connections to all electrical equipment requiring electric service.

g. Connection to vibrating equipment (motor-driven equipment): Flexible Metallic Conduit, except use Liquidtight Flexible Metallic Conduit in damp or wet locations and in mechanical equipment rooms. Flexible conduit

shall be installed in short lengths (minimum 18-inches, maximum length 6-feet).

h. Connections to light fixtures and other devices mounted in suspended or lay-in tile ceilings: Armored Cable, type as specified above. Flexible connections to light fixtures shall be a minimum of 6-feet in length.

i. All conduit penetrations through walls shall be oversized by 1/2". Provide fire caulk where penetrations occur in fire-rated walls.

j. Receptacles shall be rated 20 Ampere, 125 Volts, duplex, three-wire with third pole grounded, NEMA configuration 5-20R.

k. GFCI receptacles will be shown and circuited in areas required by NEC.

l. Circuiting will be documented for owner/architect supplied equipment. Equipment cut sheets shall be provided by owner/architect.

m. Provide dedicated circuits, sized as per NEC, for any required appliance equipment. All electrical connections shall be coordinated per the manufacturer's recommendations.

n. Heavy duty disconnect switches will be utilized where required, fusible or non-fused, per application.

o. Thermal manual motor starter switches shall be provided for OL protection and local on/off control of fractional hp motors.

3. Energy Monitoring

a. In accordance with Massachusetts Energy Code, submetering shall be provided to measure, monitor, record, and report energy consumption data. Submetering shall be provided for all branch circuits throughout the facility, and divided in energy use categories. Categories shall be HVAC, interior lighting, exterior lighting, plug loads, process loads, and miscellaneous loads. Submetering CTs will be optimized to the extent possible, e.g. monitoring only the main lugs of a panel that is comprised completely of interior lighting. Submetering will be connected to the network via BACNET. Basis of design shall be SATEC BFM II.

4. Lighting:

a. All interior light fixtures will be LED with 0-10V dimming drivers as the basis of design.

b. Emergency lighting shall be provided throughout the space area along the path of egress and shall be via battery backup. Exit signs shall be internally illuminated LED.

c. All interior light fixtures shall be 277V. All light fixtures shall be connected to panel LPH, except for any specialty fixtures which may require 120V power.

d. Outdoor lighting will be LED-type controlled by photocell and time clock.

e. Lighting levels (maintained) shall be as follows:

1) Offices/workrooms – 50 fc
2) Meeting rooms – 50 fc
3) Corridors/lobby reception – 10 fc
4) Toilets – 20 fc
5) Reading/book areas – 30 fc
6) Utility spaces – 15 fc

5. Lighting Controls:

a. Lighting controls shall meet Massachusetts Stretch Energy Code, the amended version of IECC 2021.
b. A low voltage lighting control system shall be provided.
c. Corridor/transitional area lighting shall be switched at appropriate locations.
d. Vacancy sensors will control lighting in meeting rooms and offices.

6. Emergency/Standby System:

a. All emergency light fixtures and exit signs provided under this project shall be provided with battery backup.
b. A new outdoor generator with sub-base fuel tank shall be provided to provide standby power to the entire facility. The generator shall be 200kW, 480Y/277V in an acoustical enclosure, and shall be located adjacent to the building in close proximity to the basement electrical closet. The generator shall be equipped with a 100kW integral load bank and shall power the building via a 400A manual transfer switch (MTS).
c. The standby side of the MTS shall have Cam-Lok connections for connection of a portable generator.
d. A 400A, 4-pole, 22kAIC, open transition automatic transfer switch (ATS) shall be provided inside the building's main electrical room. The normal feed shall be from main distribution panel, and the standby feed shall be from the outdoor generator.
e. Downstream of the generator ATS, a 400A, 3p4w 480Y/277V branch circuit panelboard will be provided. This will panel will distribute power to a standby 208Y/120V, 225A 3p4w MCB branch circuit panelboard via a 75kVA delta-wye step-down transformer. The 400A panel will also distribute power to the second floor electric closet. The second floor electric closet shall house a 225A, 480/277V 3p4w MCB standby panel, a 75kVA step-down transformer, and a 225A, 208/120V 3p4w MCB standby panel.
f. Deduct alternate: Provide only the manual transfer switch to provide backup power during extended power outages to the entire building using only a roll-up generator. Do not provide the standby generator, the load bank, the automatic transfer switch, or the standby-related distribution (two (2) 480V branch panels, two (2) 208V branch panels, two (2) 75kVA step-down transformers, along with all associated standby feeders)

7. Lightning Protection System

a. Provide a UL Master Label lightning protection system.

8. Grounding

a. The grounding system shall be designed and installed in accordance with NEC article 250.

9. Fire Detection and Alarm System

a. Provide a new manual and automatic emergency voice/alarm communication fire alarm system with all required components, including fire alarm control panel, remote annunciator, master box, knox box, beacon, bidirectional amplifier (BDA) system, and initiation and notification devices.

b. Fire alarm NAC circuit power supplies will be provided as needed.
c. All fire alarm devices and cable sizes and types shall be sized according to manufacturer's recommendations.
d. Low voltage fire alarm system wiring shall generally be Type-MC fire alarm red flexible armored cable, specifically designed and manufactured and listed for fire alarm use.
e. The fire alarm system shall provide automatic shutdown of building HVAC systems as code required.
f. Upon completion, provide complete testing and certification of the system for final acceptance by owner and AHJ.

10. Photovoltaic (PV) Array System

a. A PV array with a combined area of 7,000 sf shall be provided on the roof.
b. The building distribution panel shall be adequately sized to handle the PV load – approximately 80kWac, and will include a 150A circuit breaker for back-feeding power to the building from the PV system.
c. A disconnect switch for PV disconnecting means shall be located on the building exterior.

11. Equipment

a. Connections will be made to mechanical motors and other equipment.

12. Convenience Power

a. Receptacles will be provided in occupied spaces.
b. Duplex receptacles for cleaning will be provided in corridors at 50 foot on center and in other large spaces.
c. Single heavy duty NEMA 5-20R and 5-30R receptacles will be provide for special equipment.

13. Telecommunications

a. Provide two 4" underground service conduits for telecommunications service cables.
b. Empty conduits and outlet boxes shall be provided for telephone and data system wiring and jacks.

14. Seismic Restraints

a. Electrical components and systems shall be designed to resist seismic forces as determined in accordance with building code.

15. Testing

a. Independent testing company shall provide acceptance testing of work of this section.

16. Work by Others:

a. Concrete work
b. Painting

c. Cutting of masonry
d. Scaffolding above 8 feet
e. Telephone equipment and cable
f. Temperature control wiring
g. Motors
h. Flashing
i. Excavation

17. Guarantee

a. Work of this section shall be guaranteed for period of one year.

SECTION 4.0 - PLUMBING SYSTEMS

A. Applicable Codes

1. Codes and Standards:

All plumbing systems shall be designed in accordance with the following:

- National Fire Protection Association (NFPA)
- Massachusetts State Building Code (MSBC)
- International Energy Conservation Code (IECC) 2021
- Massachusetts State Building Code (780 CMR) – 9th Edition
- Massachusetts Plumbing and Fuel Gas Code 248CMR
- All other applicable Federal, State or Local Codes, Regulations and Legislation

B. Existing Conditions

1. Domestic Water System:

a. The existing building is currently supplied with a 1” water service which enters into the basement level from the utility main in the street. The service includes a main shut off valve, a 1” water meter and a 1’ pressure reducing valve. None of the service piping includes insulation. No leaks or deficiencies were noted otherwise, and the existing system appears to be in fair to good condition.
b. The existing service would not be adequate or code compliant to support the prosed fixture loading planned for the new addition to the building. The existing service shall be removed in its entirety.
c. A new 2” domestic water service to enter via a service entry room located along an exterior wall. This room to be shared with the fire protection service entrance and all equipment and a Janitor’s closet. This space may also be used to locate a water heater to be hung from the wall or ceiling structure within the room.

2. Domestic Hot Water System:

a. Domestic hot water serving the entire building is currently provided by a low boy style electric 50 gallon water heater located in the basement. The water heater is indicated as being installed in 2018. There is no temperature gauge on the hot water system piping and there is no mixing valve to limit delivered temperature to the system. to all fixtures and appliances requiring hot water by electric resistance, storage type water heaters or instantaneous, tankless water heaters as required. Type of water heating equipment will be determined based on building programming and fixture locations. There is no recirculation system and associated piping and equipment.
b. Storage type water heaters will be provided with thermostatic mixing valves, circulation system and pumps as required to provide hot water to all fixtures in conformance with applicable energy codes. A drain pain and leak detection system with alarm and water shut off system will also be provided for storage type water heaters. Leak detection systems shall

include remote monitoring alarming capabilities interfaced with the BMS system.

3. Sanitary Waste and Vent System:

   a. The proposed building is to be provided with a new 4-inch sanitary building sewer to be connected to the site utilities 10'-0" from the building. Sanitary systems beyond 10'-0" will be indicated on the Civil Drawings. It is anticipated that from the building service, all new underground sanitary piping will be extended by gravity to satisfy the project scope and is to accommodate the sanitary requirement for all new fixtures planned.

4. Natural Gas System:

   a. The existing natural gas system serves existing heating equipment. It is anticipated that the project is proceeding with no requirements for gas fired equipment therefore no natural gas service is being planned for the proposed building. The existing gas system shall be removed in its entirety.

5. Roof Drainage:

   a. It is assumed that no interior roof drainage system will be required. Roofs will be sloped to exterior gutters and downspouts (if required) to be picked up on the Site Utility Plans.

6. Plumbing Fixtures:

   a. Plumbing fixtures will be provided as shown on the architectural drawings and will include at a minimum all required toilet room fixtures, a service sink, a drinking fountain and a kitchenette sink for staff break room.
   b. Plumbing fixtures will be selected by the architectural interior design team and scheduled by the engineer in the plumbing drawings.
   c. Where required plumbing fixtures will be provided in quantities and locations as required by the applicable building and plumbing code.
   d. Where required plumbing fixtures will be located and installed to meet ADA compliance.
   e. Floor drains will be provided as required. Floor drains will be provided with electronic or mechanical trap priming devices as required.

C. Proposed Scope

1. General:

   a. To accommodate the various plumbing fixtures on the architectural drawings and as noted above, new plumbing piping systems will be provided to supply all fixtures.

2. Domestic Water:

a. To accommodate the proposed project scope, a new 2-inch water service is anticipated to be required. The service will supply all building domestic cold and hot water, irrigation and mechanical systems makeup water requirements.
b. A new 2" domestic water service shall be provided. Domestic service for plumbing scope shall begin at 10'-0" outside the building foundation. Domestic service beyond that point shall be provided for in the civil documents. The new service shall enter into the existing or new basement level water service/mechanical room. The proposed service shall include a main service shut-off valve and a utility water meter compliant with the local water department requirements. Immediately after the water meter, the building water main will be provided with a main backflow preventer if determined to be the requirement by the local public works department. The domestic cold water main shall be distributed throughout the building as required to serve all domestic water requirements for all new fixtures and equipment planned.
c. This water service room shall be shared with the fire protection service entrance and all associated equipment. A Janitor's closet shall be located nearby this room. The janitors closet space may also be used to locate a water heater to be hung from the wall or ceiling structure within the room.
d. Domestic cold water system piping shall be Type L hard drawn copper tubing with wrought copper fitting joined by tin antimony solder or press fittings.
e. The entire domestic water piping system shall be sloped and be drainable for maintenance or repair as required.
f. All branch piping to fixtures or groups of fixtures shall be taken of the top of the water mains wherever practicable.

3. Domestic Hot Water:

a. The existing water heater may be reused subject to owners' discretion. Storage type electric hot water heater shall be provided with thermostatic mixing valves, circulation system and pumps as required to provide hot water to all fixtures in conformance with applicable energy codes. A drain pain and leak detection system with alarm and water shut off system shall also be provided for all storage type water heaters. Leak detection systems shall include remote monitoring alarm capabilities compatible with and interfaced with the BMS system as applicable.
b. Domestic hot water system piping shall be Type L hard drawn copper tubing with wrought copper fitting joined by tin antimony solder or press fittings.
c. The entire domestic water piping system shall be sloped and drainable for maintenance or repair as required.
d. All branch piping to fixtures or groups of fixtures shall be taken off the top of the water mains wherever practicable.

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4. Sanitary Waste and Vent:

a. New sanitary waste and vent piping systems shall be provided to accommodate sanitary waste flows from all fixtures, equipment and

drains as indicated on the drawings and noted above to run by gravity to the building sanitary sewer.

b. A sewage ejector pump system is anticipated to be required to serve fixtures and floor drains from the lower-level water/fire service entrance room of the building and any other plumbing drains on this level, to elevate the waste to a point of gravity flow from the building.

c. New Vent piping system shall be extended from all new fixtures and pump chambers and extend to atmosphere through the roof.

5. Miscellaneous:

a. Provide all required plumbing accessories for each system to accommodate the project scope requirements.

b. All multiple fixture toilet rooms (≥2 flush valve fixtures) will include hose bibs and code required floor drains.

c. Janitors' closets shall include floor mounted janitors sink, wall mounted faucet with vacuum breaker threaded spout and a floor drain as required.

d. Wall hydrants shall be provided around the perimeter of the building. Wall hydrants shall include vacuum breaker hose connections.

e. Floor drains shall include trap primers wherever trap water may evaporate.

f. Back flow prevention devices shall be provided for exterior irrigation systems, HVAC makeup water and where ever the possibility of contamination may occur in conformance with the MA. Code.

g. Appliances such as refrigerators and clothes washers shall be provided with recessed water supply and waste boxes as required. Supply waste boxes shall include water hammer arrestors as required.

h. Water hammer arrestors shall be provided on water lines serving all automatic or solenoid activated valves, fixtures or equipment. Water hammer arrestors shall be located on the supply pipe at or downstream beyond the automatic valve.

SECTION 5.0 - FIRE PROTECTION SYSTEMS

A. Applicable Codes

1. Codes and Standards:

The Fire Protection systems shall be designed, installed, and tested in accordance with the requirements of the following applicable codes, standards, and approving agencies. Where there are differing requirements, the more stringent of the requirements shall be followed.

All wet sprinkler systems shall meet applicable codes, as well as any requirements set forth by the authority having jurisdiction and the Owner's insurance carrier in order meet the buildings requirements.

- National Fire Protection Association (NFPA)
- Massachusetts State Building Code (MSBC) – 9th Edition
- International Energy Conservation Code (IECC) 2021
- All other applicable Federal, State or Local Codes, Regulations and Legislation

All fire protection system components shall be Underwriter's Laboratory (UL) listed and approved by the Owner's insurance carrier.

Where codes differ, the more stringent requirements will be followed.

B. Design Criteria

1. Regulations. All fire protection systems shall be installed in accordance with applicable NFPA regulations as well as any requirements set forth by the local authority having jurisdiction.
2. Complete Sprinkler System. The building is to be protected by an automatic sprinkler system, including all combustible concealed ceiling cavities. The primary sprinkler systems shall include a wet sprinkler system to protect all areas of the building within the conditioned envelope. A dry sprinkler system shall be provided to protect all unheated areas of the building that will not be within the conditioned envelope of the building.
3. Design Densities. The sprinkler system distribution piping and head spacing shall be in accordance with light hazard provisions of 0.10 GPM per square foot over 1500 square feet for toilet room type areas and other light hazard type spaces and shall be in accordance with ordinary hazard provisions of 0.15 GPM per square foot over 1500 square feet for mechanical equipment rooms, storage rooms and similar areas.
4. Sprinkler Heads. Sprinkler head types shall be concealed in locations with ceilings and upright in areas without ceilings unless otherwise required by the local AHJ or requested by the owner.
5. Sprinkler Piping. Sprinkler piping 2" and smaller shall be schedule 40 black steel with threaded joints. Sprinkler piping 2-1/2" and larger shall be schedule 10 black steel with roll groove joints.

C. Proposed Scope

1. Sprinklers Systems and piping will be provided to suit all architectural ceiling and wall configurations as required to provide a completely sprinklered building.

2. Fire Protection Service from Street to building based on coordination with Civil Engineer and available site utilities.
3. Water Flow Test Information and building configuration are required to facilitate the coordination process noted above. Flow test data will be required to perform hydraulic calculations required for fire protection system design.
4. Fire Protection Service to enter the building via a service entry room located along an exterior wall. The fire service room shall share space with the domestic water service entrance.
5. Fire Service Room to include the service entrance, main system shut off valve, backflow preventer, system alarm check valves and all accessories and will be combined with the domestic water service entry equipment and a Janitor's Closet. Space requirement on that basis is anticipated to be 11 feet by 6 feet.
6. Exposed Sprinkler System. All areas with exposed sloped ceilings shall be protected with a system of exposed sprinkler mains, branches and sprinklers.
7. Concealed Sprinklers. All areas with concealed ceiling spaces shall be assumed to be within the buildings conditioned envelope and as such a dry system is not anticipated to be required.
8. Fire Department Connection. The building will include a fire department inlet connection located along an exterior front facing wall and located within 100 feet of a fire hydrant

SECTION 6.0 – APPENDIX

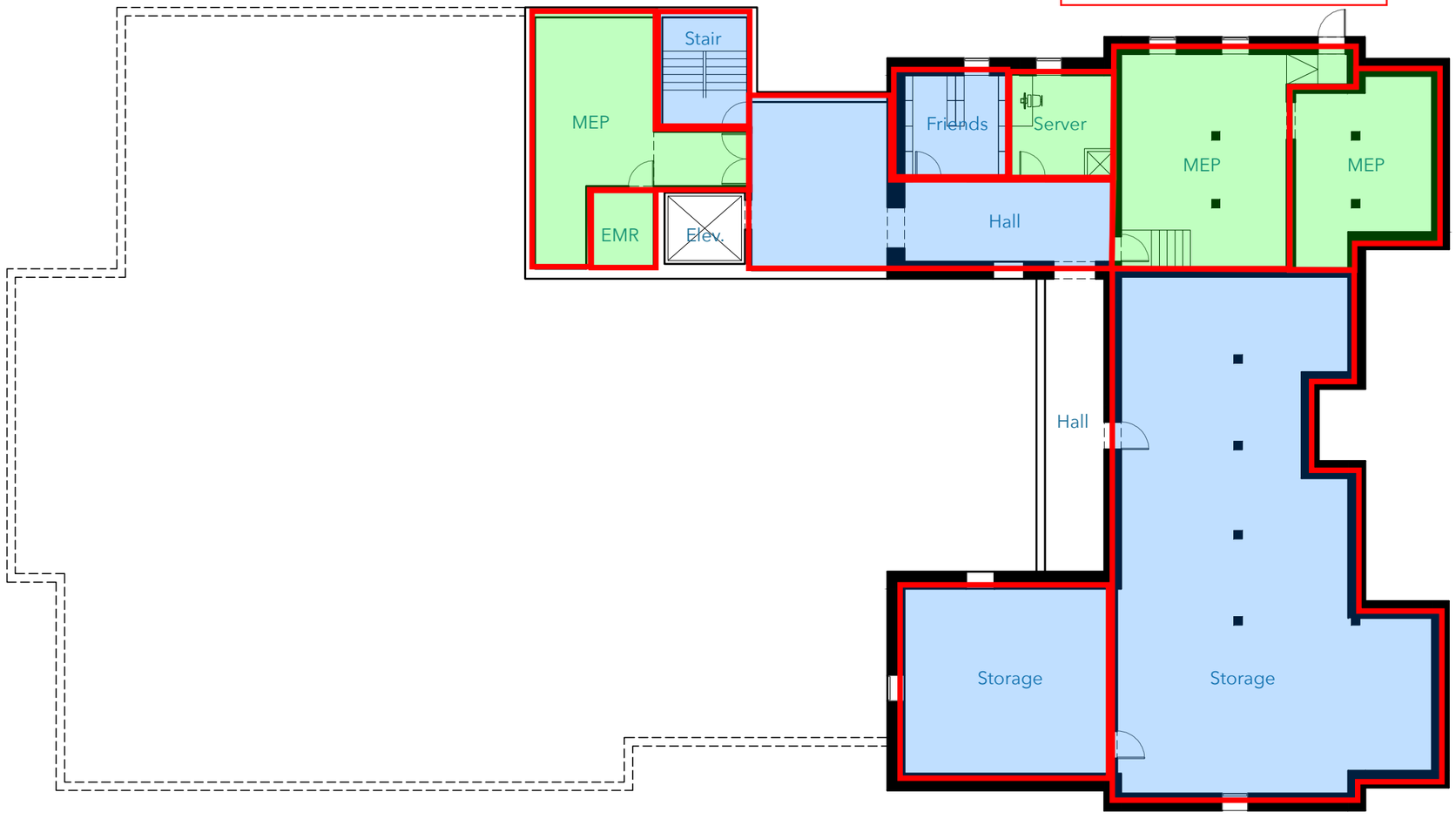
Whitinsville Social Library
Building Plan

Oudens Ello Architecture
December 3, 2025

HVAC ZONING PLAN KEY:

- VRF ZONE
- SPLIT HEAT PUMP
- HEATING ONLY
- EXHAUST FROM ERV ONLY

VENTILATION TO VRF ZONES PROVIDED BY ERV-1



Basement

Whitinsville Social Library

Building Plan Refinements per MBLC feedback

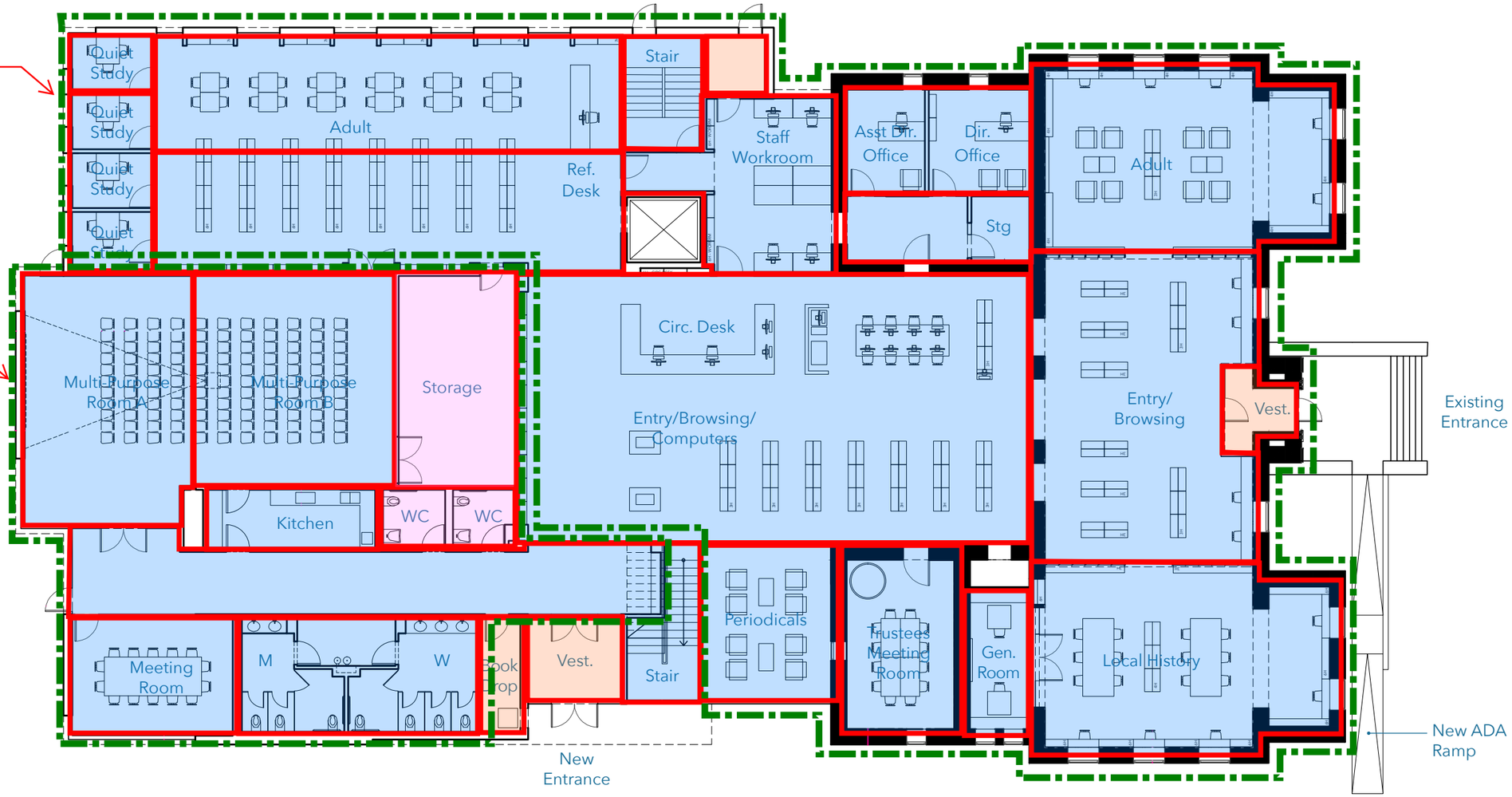
Oudens Ello Architecture
November 19, 2025

HVAC ZONING PLAN KEY:

- VRF ZONE
- SPLIT HEAT PUMP
- HEATING ONLY
- EXHAUST FROM ERV ONLY

VENTILATION TO THIS AREA PROVIDED BY ERV-3

VENTILATION TO THIS AREA PROVIDED BY ERV-2



First Floor Plan

Whitinsville Social Library

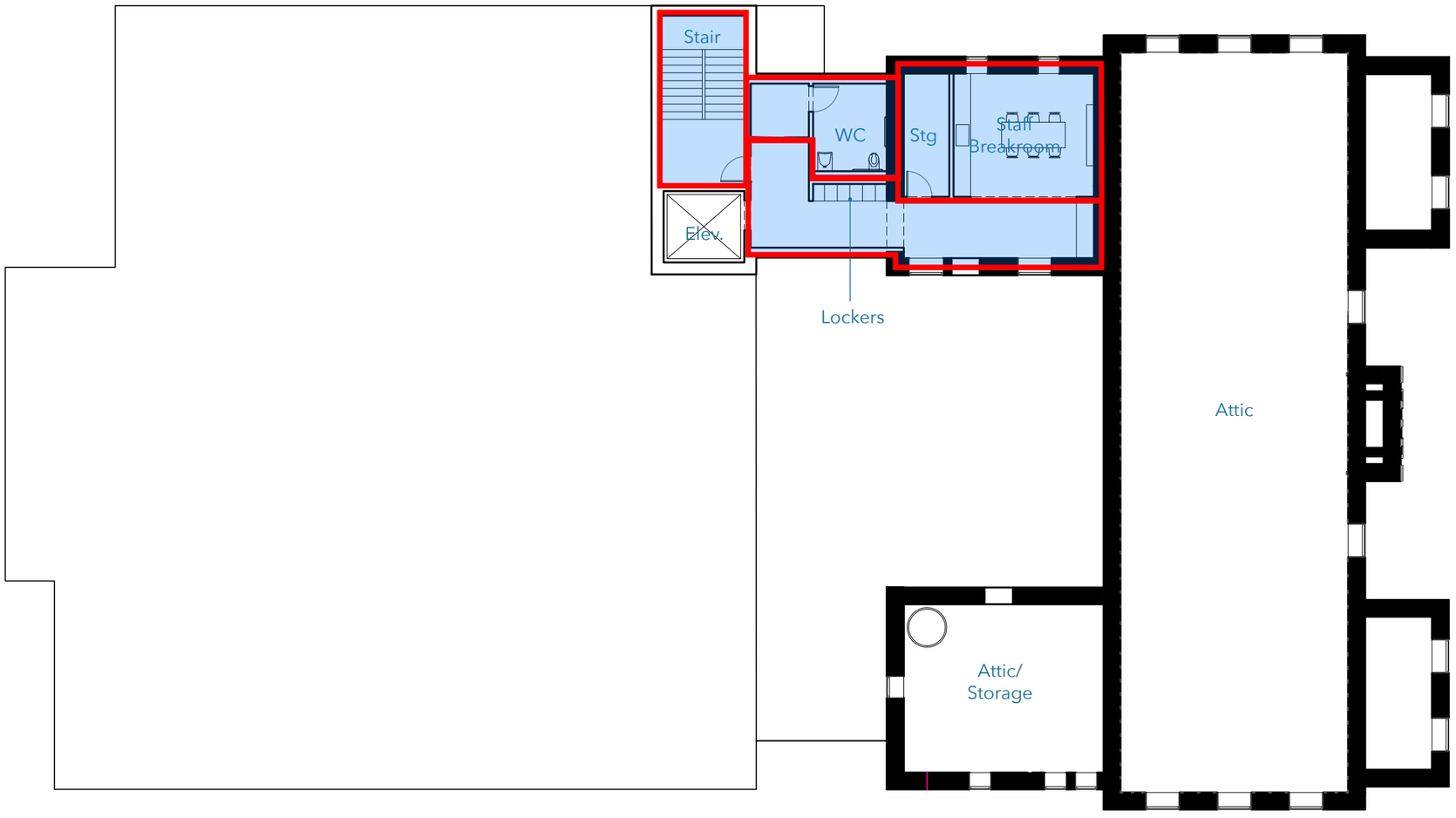
Building Plan Refinements per MBLC feedback

Oudens Ello Architecture
November 19, 2025

HVAC ZONING PLAN KEY:

- VRF ZONE
- SPLIT HEAT PUMP
- HEATING ONLY
- EXHAUST FROM ERV ONLY

VENTILATION TO VRF ZONES PROVIDED BY ERV-4



Second Floor Plan (Existing)

Whitinsville Social Library

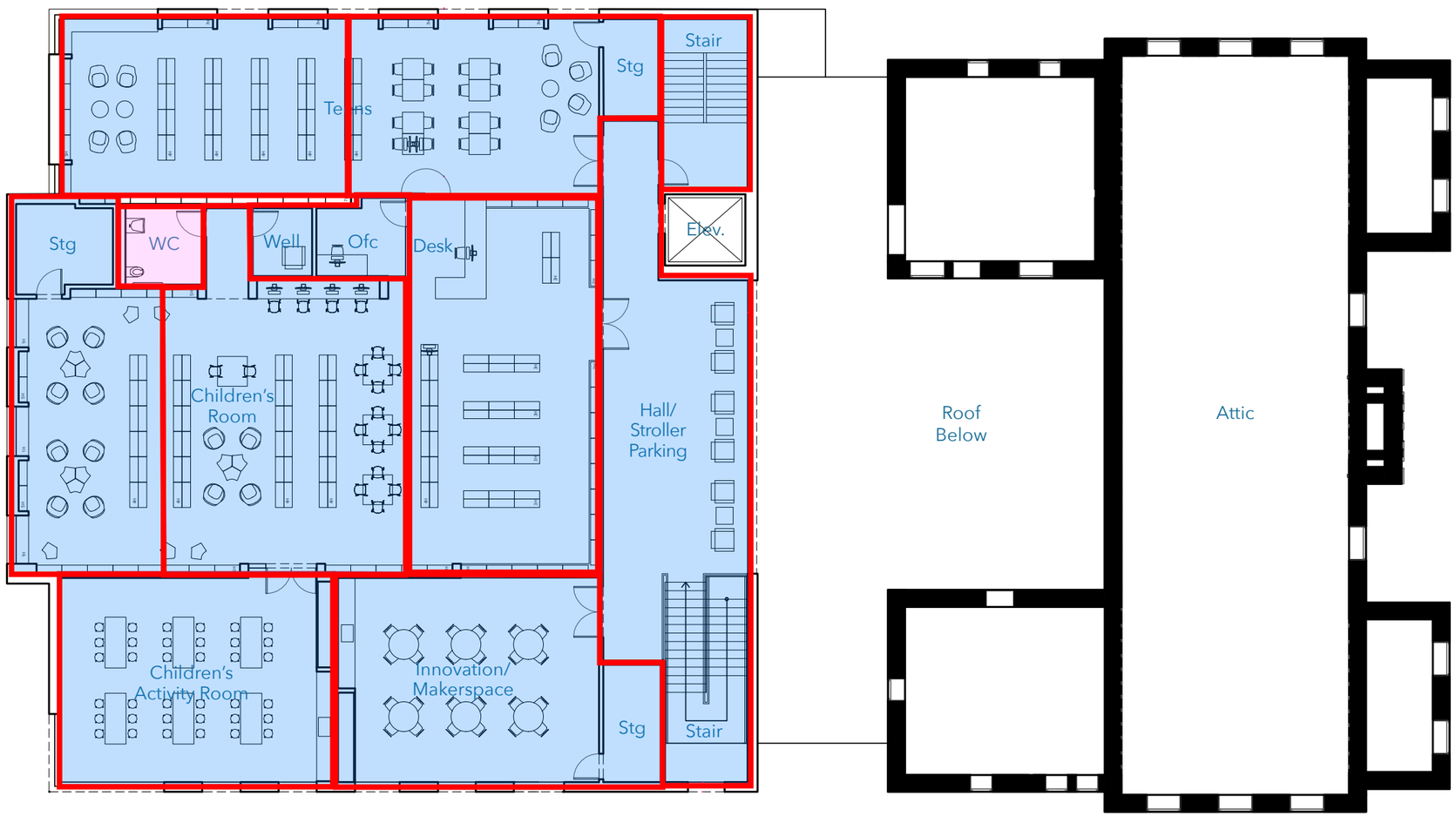
Building Plan Refinements per MBLC feedback

Oudens Ello Architecture
November 19, 2025

HVAC ZONING PLAN KEY:

- VRF ZONE
- SPLIT HEAT PUMP
- HEATING ONLY
- EXHAUST FROM ERV ONLY

VENTILATION TO VRF ZONES PROVIDED BY ERV-4



Second Floor Plan (New)