

The Center for Cartoon Studies

REQUEST FOR PROPOSALS (RFP) ARCHITECTURAL AND ENGINEERING DESIGN SERVICES



Issued: [November 15, 2024](#)

Submittals Deadline: [December 13, 2024 at 12:00 PM EST](#)

Submit Proposals via email to:

Dave Lloyd

lloyd@cartoonstudies.org

802-295-3319

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1. INTENT

The Center for Cartoon Studies (hereafter referred to as “CCS”) is issuing this Request for Proposals (RFP) for the Telegraph Renovation Project. The project entails renovating the former New England Telephone and Telegraph Company building, now vacant, located at 111 Gates St, White River Junction, VT 05001. CCS seeks to select one (1) firm to complete architectural design work, engineering design work, construction documents, and procurement of construction management services for this redevelopment project. This work will be informed by pre-design documentation already prepared for CCS: conceptual space plans, as-built plans, a preliminary architectural feasibility report, and an energy analysis report. A schematics package is attached to this RFP.

The resulting contract will terminate on October 31, 2026. However, if necessary for the project's success, CCS may choose to amend or extend the contract beyond the initial period.

Qualified Disadvantaged Business Enterprises (DBEs) are encouraged to submit proposals. CCS notifies all bidders that disadvantaged business enterprises will be afforded a full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, gender, or national origin in consideration for selection.

2. INTRODUCTION

CCS is an institution of higher education that offers courses of study that center on creating and disseminating comics, graphic novels, and other manifestations of the visual narrative. Experienced and internationally recognized cartoonists, writers, and designers teach classes. CCS programs include a two-year Master of Fine Arts Degree, One- and Two-Year Certificates in Cartooning, and annual winter and summer workshops. The school is located in the historic downtown village of White River Junction, Vermont.

CCS, recognizing the central role that socially responsible businesses can play in a community, will initiate and be responsive to innovative ways to improve the local cultural and economic quality of life.

3. GENERAL INFORMATION

Qualifications

A firm or team of firms replying to this RFP must identify in their proposal at least one Vermont Licensed Architect and at least one Vermont Registered Engineer who will participate in this project. Firms must possess experience and technical expertise in managing large development projects, designing renewable energy systems, and ensuring compliance with regulatory requirements of federally-funded construction projects.

Project Coordinator

Dave Lloyd, hereinafter referred to as “the Project Coordinator,” shall act as liaison between firms responding to this RFP and CCS.

Walk-Through

CCS will lead a site walk-through for prospective firms on Tuesday, December 3rd. To confirm your attendance and receive event information, contact the project coordinator (loyd@cartoonstudies.org).

Compliance with Federal, State, and Local Laws and Regulations

Prospective firms should be aware that a contract with CCS will be subject to and in accordance with all applicable Federal, State, and local laws and regulations.

Each firm must be registered with the Vermont Secretary of State or as a foreign firm. CCS will not select firms that are listed on the federal System for Award Management Exclusion List or the Vermont Agency of Administration’s Debarment List.

Revisions to the Request for Proposals

In the event it becomes necessary to revise any part of this RFP, revisions will be provided to all who notify the Project Coordinator that they intend to attend the site walk-through and/or that they intend to submit a proposal. Revisions will also be posted on CCS’s website. CCS shall bear no responsibility or liability due to copies of revisions lost in mailing or not delivered to prospective firms/teams due to unforeseen circumstances.

Response Deadline and Questions

The Project Coordinator must receive an email proposal meeting all requirements of Section 4 of this

RFP by the deadline noted above to be considered for selection.

CCS is not responsible for proposals that arrive after the Response Deadline indicated above in this RFP. The Project Coordinator will notify all firms whose proposals were received by the deadline.

Questions regarding this RFP shall be submitted by email only to the Project Coordinator at lloyd@cartoonstudies.org. The Project Coordinator will maintain a list of RFP questions and answers linked to the project website for firm information at cartoonstudies.org. **Questions will be accepted until 1:00 PM EST on December 6, 2024, to ensure all parties have adequate time to review the answers before the proposal submission deadline.**

Opening of Proposals

Proposals will be opened, and the names of firms that have submitted proposals will be announced on **Friday, December 13, 2024, at 1:00 PM EST at CCS (46 South Main Street, White River Junction, VT 05001).**

Performance Timeframe

Performance under the scope of work may run until October 31, 2026, unless a future contract amendment extends the contract term.

4. PROPOSAL INFORMATION

A. SUBMISSION

Proposals shall be prepared simply, providing a straightforward and concise description of the prospective firm's or team's ability to satisfy the requirements of this RFP. **Adobe PDFs are the required method of delivery.** Proposal components should be packaged as no more than 1 pdf document. Paper copies will not be accepted.

The name of the firm(s) and the title of this RFP must appear on the front page of the proposal. Each technical scope or cost proposal page must be numbered consecutively, excluding all appended material.

If two or more firms collaborate as a team, only one proposal must be prepared and submitted on behalf of the team.

Proposals shall be submitted by **12:00 PM EST, December 13, 2024**, via email at lloyd@cartoonstudies.org with the subject line "Telegraph A&E Proposal." Any responses received after this date and time will be rejected.

B. PROPOSAL RESPONSE COMMENTS

Respondents must submit complete responses to all of the information requested. Respondents who do not respond to the entire content of the RFP may be disqualified. Proposals should identify the Consultant/Contractor's planning processes, tasks, types and sources of information to be collected, and staff expected to be involved in the work.

Written proposals should include, at a minimum, the following information in the order requested:

1. Cover letter signed by a principal or CEO of the firm, expressing the firm or team's interest in working with the CCS. The cover letter shall include the primary contact regarding the proposal; physical addresses, email addresses, and telephone numbers of all firms involved in this project; Unique Entity Identifier (for more information, see sam.gov) for each firm involved in this project; size of firm(s) and number of years firm(s) have been in business; and a statement regarding the firm's or firms' financial stability and ability to complete all services.
2. A list of any actions taken by any regulatory agency or litigation involving the firm(s) or its agents or employees with respect to any work performed. Firms/teams should explain why they are not at fault in these cases or how they have taken steps to avoid their repetition. If no such actions have been taken, state that in the cover letter. **If any program element will be subcontracted, please provide the same information for the subcontracting firm(s) as well.**
3. Evidence of insurance applicable to the work. Firms and their subcontractors shall indicate that they have or are willing to obtain coverage for the following minimum insurance requirements: general liability coverage of \$1 million per occurrence and \$2 million in the aggregate; products / completed operations aggregate coverage of \$1 million; personal and advertising injury coverage of \$1 million; motor vehicle liability coverage of \$1,000,000 combined single limit; proof of workers' compensation insurance that accords with the laws of the State of Vermont; employers' liability coverage of \$1 million per accident and \$1 million per employee; and professional errors and omissions (i.e., professional liability) coverage of \$1 million per claim and \$2 million in the aggregate. Coverage shall be primary and non-contributory with any other insurance and self-insurance. CCS and the State of Vermont, its agencies, departments, officers, and employees must be listed as Additional Insured on the primary firm's insurance policy if a contract is awarded.
4. A Technical Scope and a separate cost proposal as outlined below:

Technical Scope

The Technical Scope must contain the following (**if any element of the program will be subcontracted, please provide the same information for the subcontracting firm(s) as well**):

1. List of those people in the firm(s) who will be working on the project, including names, education, professional licenses, registrations or certifications, and relevant experiential background. Please designate the Principal in Charge and the roles of other key personnel.
2. List of at least three similar projects relevant to the scope of work that the firm(s) have worked on, ideally in northern New England, including client contact information. **Please indicate whether the specific staff who worked on the reference projects are the same as staff listed in the proposal. If not, please provide additional project references that staff listed in the proposal have worked on.**
3. A detailed description of your approach for completing the scope of work outlined in section 7 of this RFP, including a description of the tasks to be performed by the primary firm, and any subcontractors, as necessary to demonstrate thorough understanding and ability to complete the project on time and in an efficient manner.
4. A detailed timeline for deliverables to be produced under this contract. Please note: complete construction documents are required no later than May 31, 2025. However, if possible, the

team would prefer to have construction documents completed before April 15, 2025, as this would place the project in a stronger position to conclude before the commencement of the 2026/27 Academic year. Construction management procurement should be completed by February 28, 2025.

Cost Proposal

CCS is seeking an Hourly Not To Exceed Contract for architectural/engineering services, construction documents, and construction management procurement. The cost proposal must be separate from the technical scope, listing the prime firm(s) and each anticipated subcontractor separately, and must include the following:

1. An estimated cost breakdown for each task identified in the proposed scope of work (see section 7 of this RFP), including an anticipated hourly rate schedule for all staff job categories. Distinguish between direct labor, fringe, indirect/overhead, fees and markups, travel, and unit costs.
2. An itemized breakdown of any proposed subcontractor costs, direct expenses, and markup rate.
3. Note that all mileage rates must match the standard reimbursement rates for businesses established by the General Services Administration. Markups may not be charged on mileage.

Notice of Applicable Federal Requirements

Made in America Requirements:

Made in America laws are applicable to this project. In accordance with the policy of the United States Government, consistent with applicable law, use, terms and conditions of Federal financial assistance awards and federal procurements, recipients must maximize the use of goods, products, and materials produced in, and services offered, in the United States. Whenever possible, the recipient shall procure goods, products, materials, and services from sources that will help American businesses compete in strategic industries and help America's workers thrive. See the January 25, 2021 Executive Order on Ensuring the Future is Made in All of America by All of America's Workers and 2 CFR 184 for more information.

"Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to Federal financial assistance awards or Federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured goods offered in the United States. Made in America Laws include laws requiring domestic preference for maritime transport, including the Merchant Marine Act of 1920 (Public Law 66-261), also known as the Jones Act, and domestic content preference for infrastructure programs including the Build America, Buy America Act (BABAA) enacted on November 15, 2021 (E.O. 14005 "Ensuring the Future Is Made in All of America by All of America's Workers"). BABAA sets forth a domestic content procurement preference for infrastructure programs funded with Federal dollars. Federal agencies providing Federal financial assistance for infrastructure projects must implement the BABAA preferences set forth in 2 CFR part 184. "Infrastructure" in the context of BABAA includes the structures,

facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. The Buy America preference applies to the iron and steel, manufactured products, and construction materials used for the infrastructure project under an award. The requirements of this section must be included in all subawards, contracts, and purchase orders under Federal awards.

Other Federal Requirements

Work under this contract must comply with all applicable federal, state, and local requirements as set forth in legislation and grant funding requirements, including but not limited to:

1. the provisions of 2 CFR 200, Appendix II
2. consideration of small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms as follows: These business types are included on solicitation lists;
 - a. These business types are solicited whenever they are deemed eligible as potential sources;
 - b. Dividing procurement transactions into separate procurements to permit maximum participation by these business types;
 - c. Establishing delivery schedules (for example, the percentage of an order to be delivered by a given date of each month) that encourage participation by these business types;
 - d. Utilizing organizations such as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce and
 - e. Requiring a contractor under a Federal award to apply this section to subcontracts.
3. Northern Border Regional Commission's bonding requirements:
 - a. A bid guarantee from each bidder equivalent to five percent of the bid price. The "bid guarantee" must consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of the bid, execute such contractual documents as may be required within the time specified.
 - b. A performance bond on the part of the contractor for 100 percent of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.
 - c. A payment bond on the part of the contractor for 100 percent of the contract price. A "payment bond" is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided under the contract

Cost Liability

CCS assumes no responsibility and no liability for costs incurred relevant to the preparation and submission of proposals or any other costs prior to the issuance of a contract.

5. SELECTION CRITERIA

The following table provides the relevant evaluation criteria

<u>Selection Criteria</u>	<u>Maximum Points</u>
1. Proposal provides all required information as specified in Section 4 of the RFP.	10
2. Proposal is clear and easy to understand.	5
3. Demonstration of familiarity with the site, scope needs, and overall project.	20
4. Demonstration of successful prior experience with similar projects, especially federally-funded projects	15
5. Demonstration that personnel have the requisite qualifications, expertise, and experience to complete the scope of work	10
6. Description of approach is clear, logical, and sufficiently detailed.	15
7. Proposed project timeline is efficient and will meet project team’s needs	10
8. Costs are reasonable based on comparison with other firms and other available market information	15
TOTAL POINTS	100

6. PERFORMANCE EXPECTATIONS

Conflicts of Interest

Prior to executing a contract or subcontract for services, firms must disclose any potential conflicts of interest.

Ownership of Material

All rights, titles to, and ownership of the data, material, and documentation resulting from this project and/or prepared for CCS pursuant to this contract shall remain with CCS and the government agencies funding this project.

Access to and Retention of Records

In addition to terms stated elsewhere in this RFP, CCS shall have access, upon demand, to any books, documents, papers, and records of the successful firm or team that are directly pertinent to this contract for the purposes of making audit examinations, excerpts, and transcriptions. The selected firm or team shall insert identical access rights for these parties into any subcontractor agreement under this contract. CCS shall reserve this right for the contract term plus 3 years.

Maintaining Expenditure Record

The successful firm or team will establish and maintain an accounting system to accurately identify receipts and expenditures of funds under this project and utilize generally accepted accounting

principles. The firm/team shall track all costs, expenses, and billing and provide this information with their invoices to CCS. Firms shall be prepared for audit and compliance visits at their offices.

7. PROJECT SCOPE

Work to be Contracted Pursuant to this RFP

The firm or team of firms will be required to complete the following work:

1. Schematic Design Phase Services
2. Design Development Phase Services
3. Construction Documents that are bid-ready and include cost estimates
4. Regular communication with the project team to request their input on designs and keep team members apprised of progress
5. Coordination with federal and state agencies funding this project to ensure compliance with all applicable regulations
6. Identifying and coordinating all required permits, creating a list and schedule, and managing that process on behalf of CCS.
7. Oversee and coordinate procurement of construction management services for this project. Prepare a summary for all proposals to assist CCS in selecting a construction management contractor.

Scope of Renovations for the Telegraph Building

The Project

The Center for Cartoon Studies Telegraph Building vacated the space in 2021 and used it as a storage facility while environmental tests were ongoing. CCS plans to renovate the 8,500+ s.f. building (approximately 5,800 s.f. of conditioned space and an unconditioned basement storage area). The proposed building comprises classroom areas, meeting areas, offices, and a 24/7 dry work lab. The building was built in 1925, and CCS has received Section 106 clearance. The building is not considered historic or a contributing property to the historic district.

Ownership

Consolidated Communications of Vermont Company, LLC currently owns the building. CCS is currently completing the subdivision of the property, a prerequisite for transfer of ownership. Upon the property's acquisition, CCS can proceed with developing the Telegraph Building. The CCS will be the Owner of the project.

Project Goals

The building will require a complete upgrade of utilities, including plumbing, electrical, HVAC, telecommunications, fire safety, etc.. In addition, the project received funding for energy efficiency. The engineering scope should incorporate recommendations cited in the energy analyses report in the appendix.

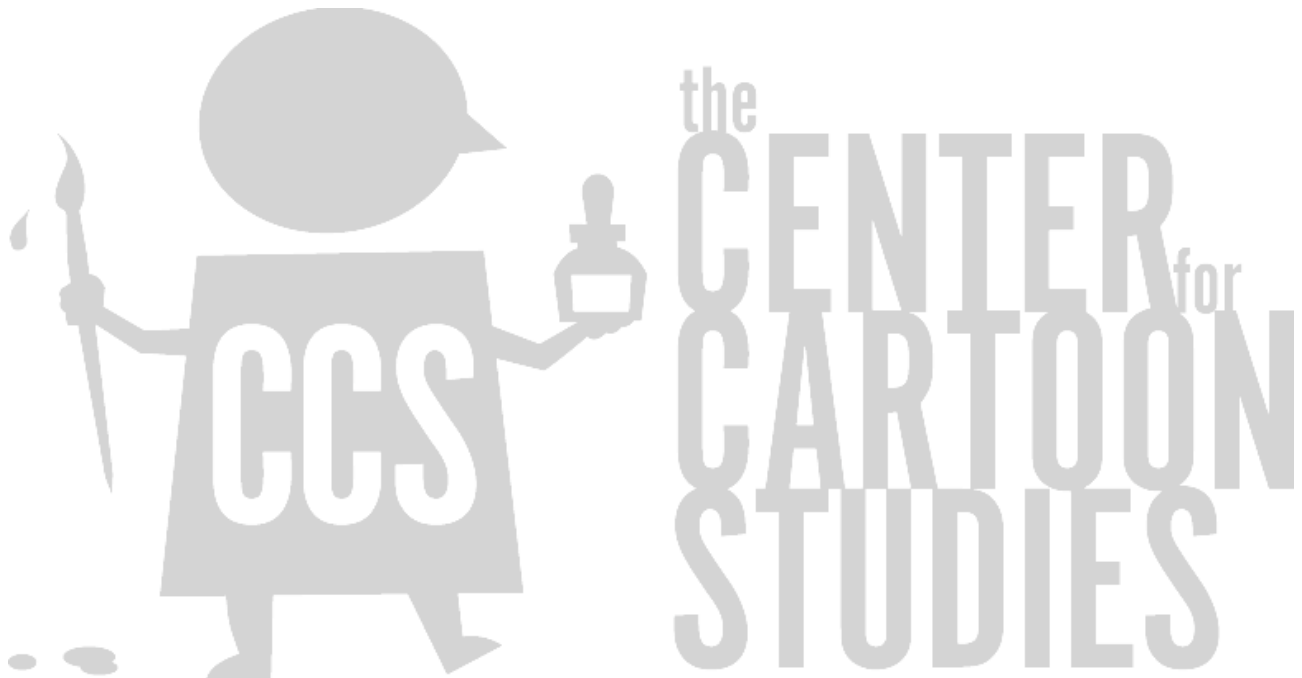
Phasing

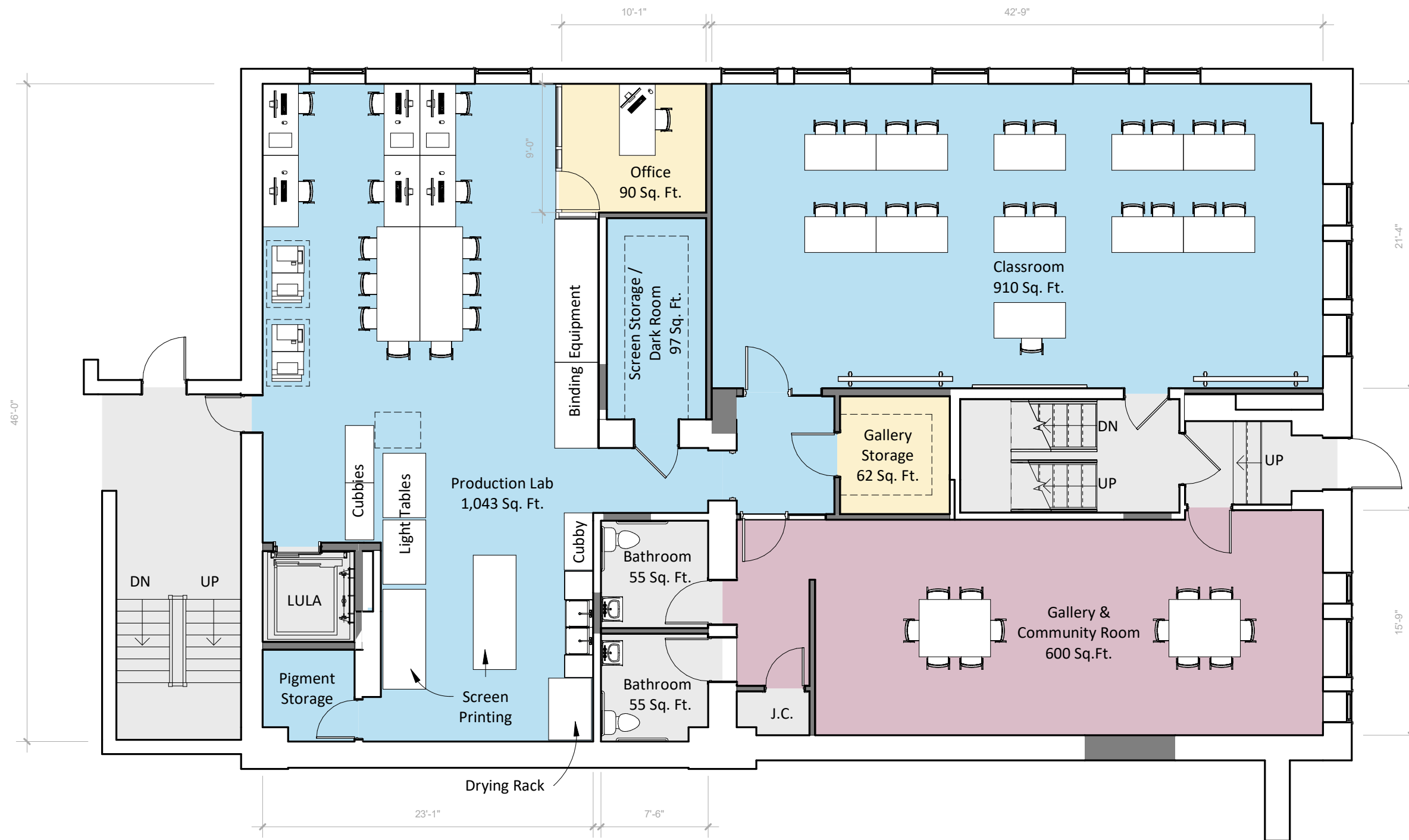
It is anticipated that the Project will be constructed in two phases. Phase I would include the entire first floor, including the classroom, restrooms, the production lab, the archive area, and its lobby and entrance/exists (right-hand wing in drawing A102, including the Community & Gallery Room); Phase II would include the remainder of the building. ARCHITECT/ENGINEERING SERVICES REQUESTED UNDER THIS R.F.P. SHOULD INCLUDE BOTH PHASES THROUGH CONSTRUCTION DOCUMENTS.

8. PROCUREMENT SCHEDULE: SUMMARY OF KEY DATES

- RFP Release Date: **November 15, 2024**
- Mandatory Walk-thru: **1:30 PM, December 3, 2024**
- RFP Questions Due: **1:00 PM, December 6, 2024**
- Answers/Addendum Posted: **December 9, 2024**
- Proposals Due: **12:00 PM December 13, 2024**
- Selection/Notification of Successful Firm: **On or before December 20, 2024**

9. APPENDIX: SCHEMATICS, REPORTS





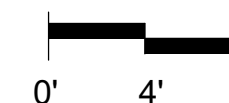
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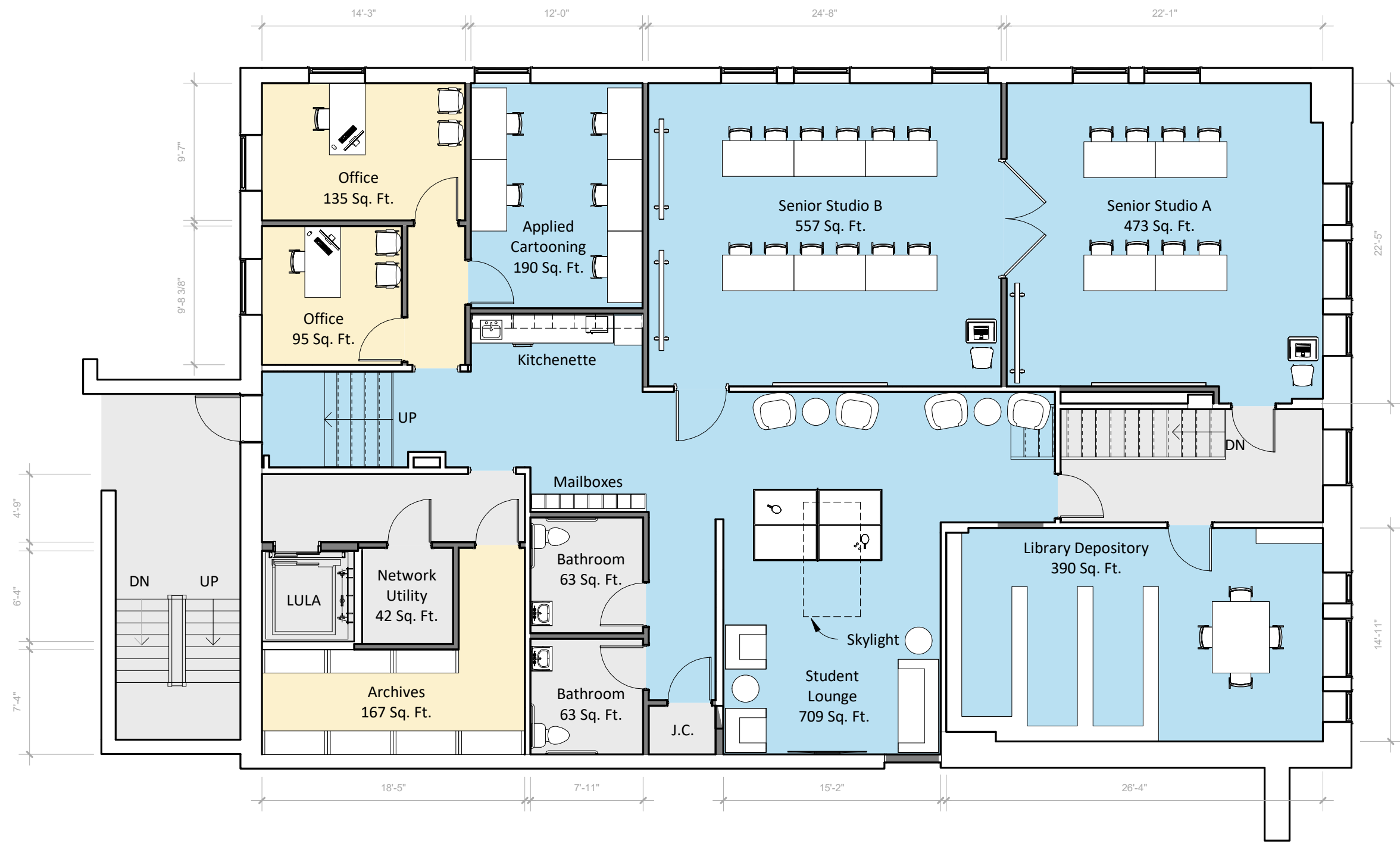
- Staff Spaces
- Student Spaces
- Public Programming
- Service Spaces

Wall Types:

- Existing Walls
- New Walls

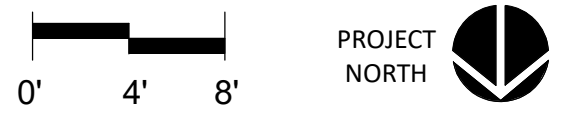
① First Floor Plan - SD
1/8" = 1'-0"

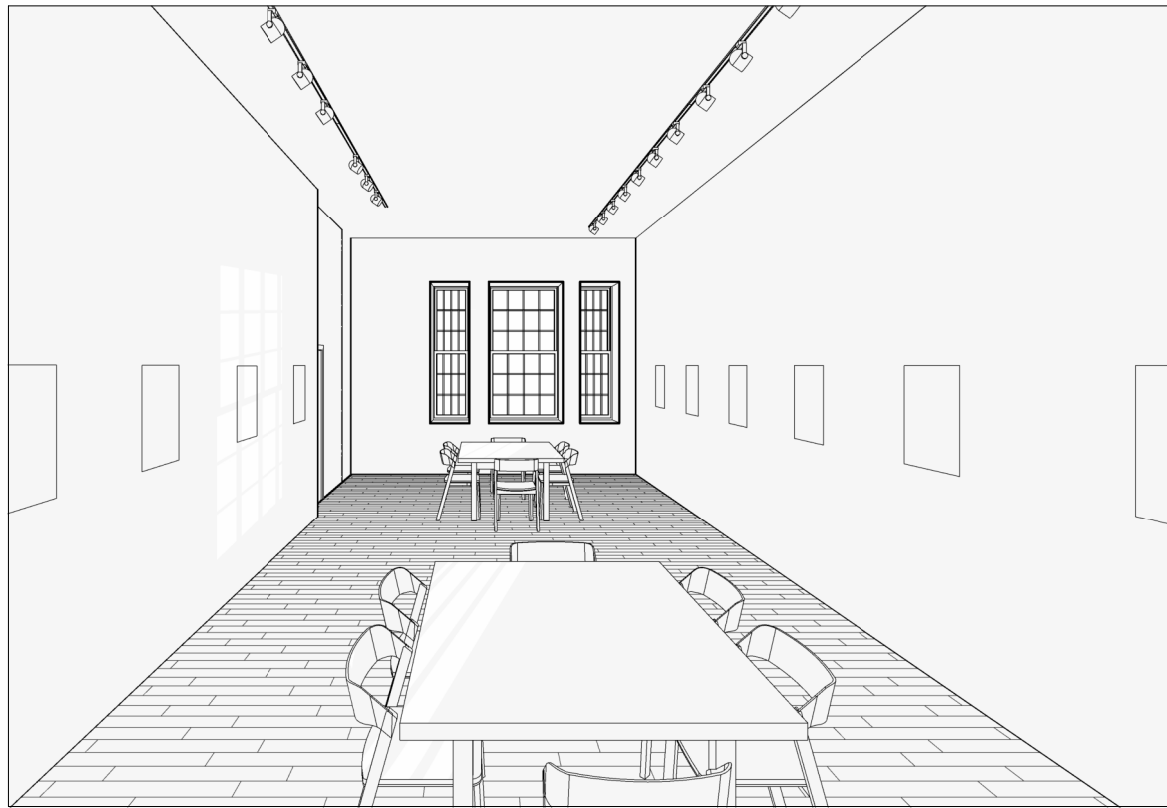




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① Second Floor Plan - SD
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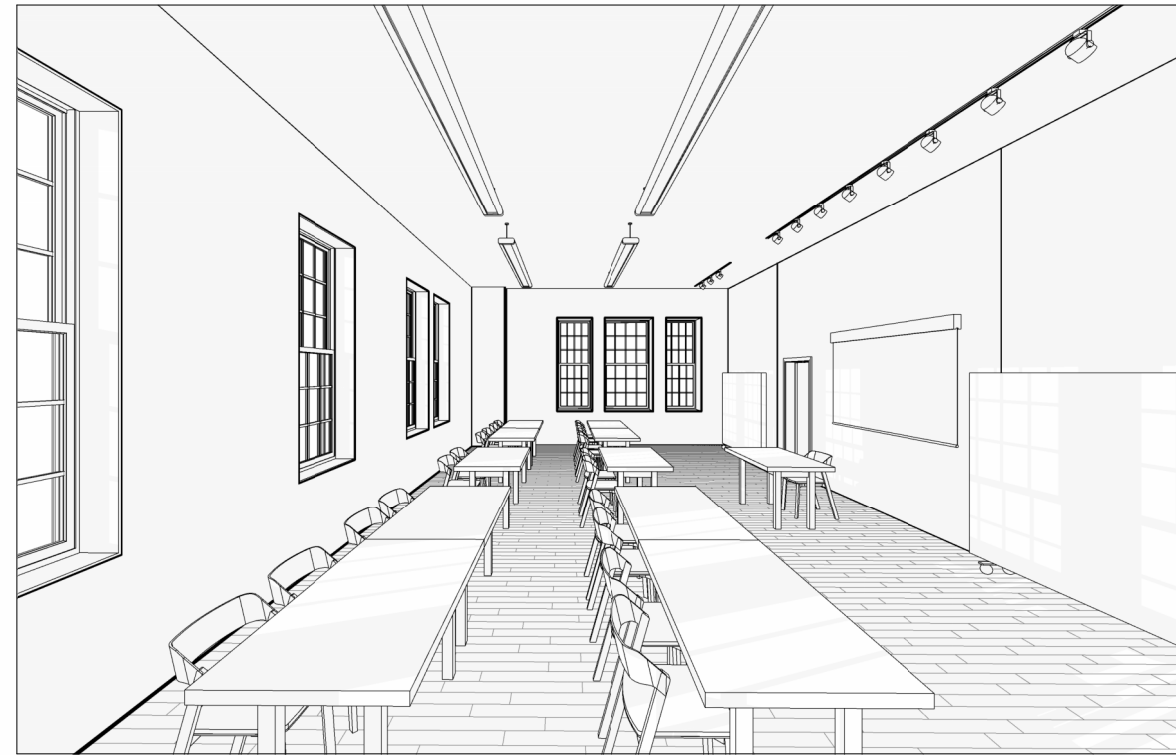
Gallery & Community Space



Production Lab

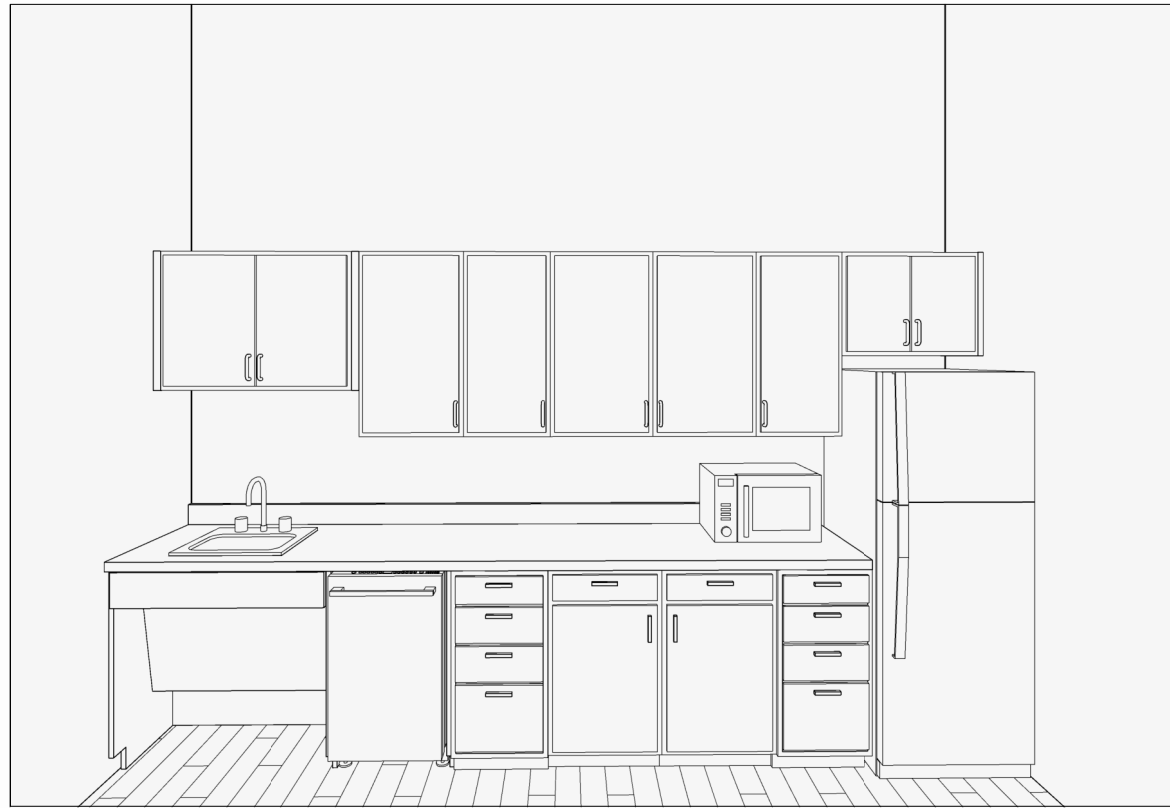


Production Lab

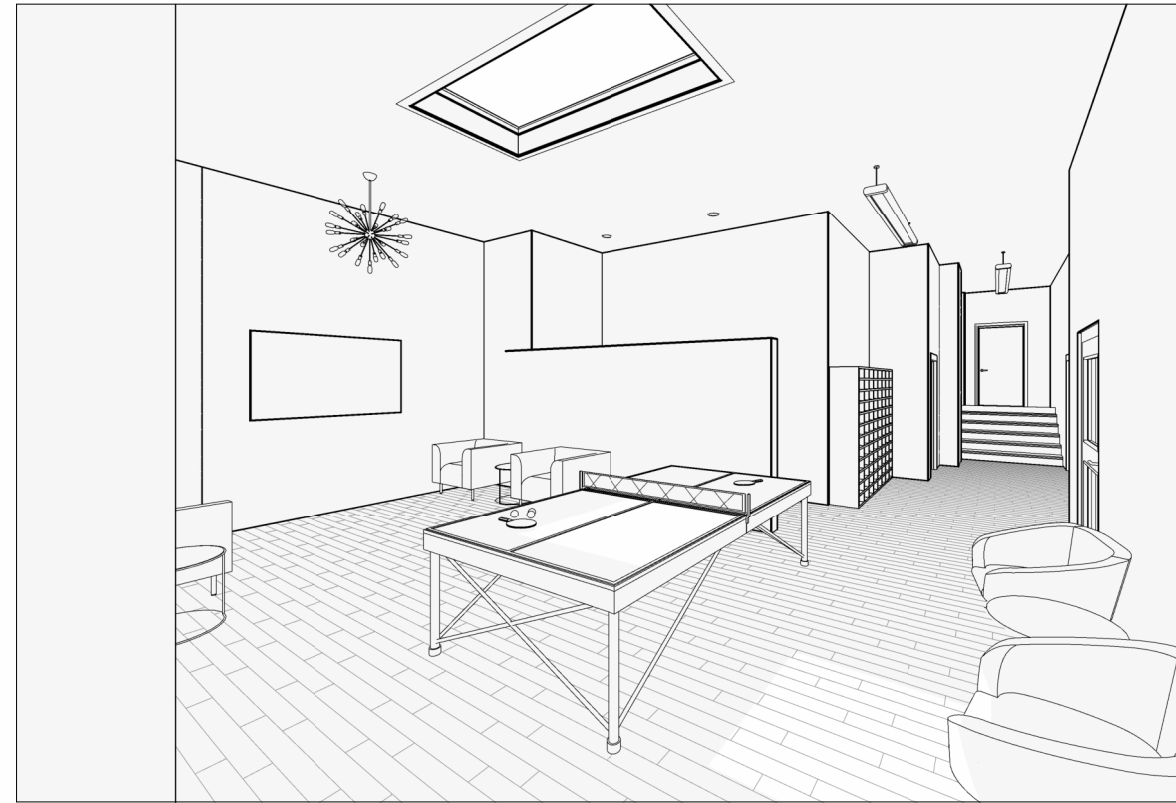


First Floor Classroom

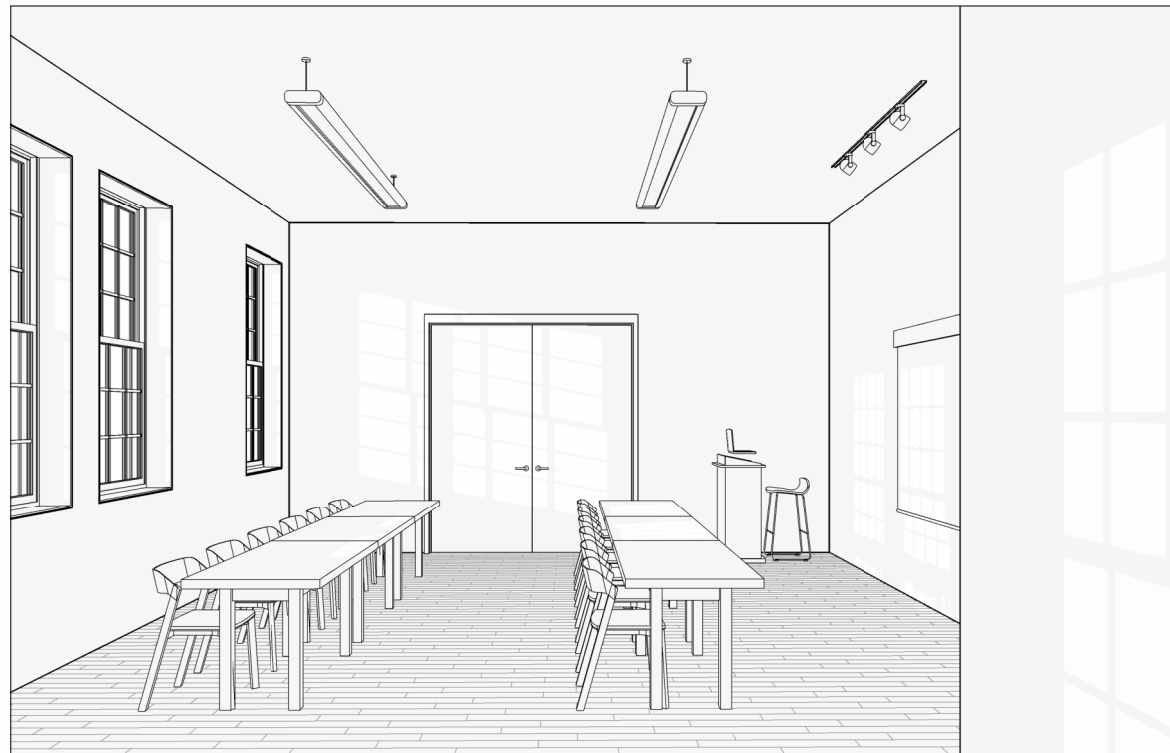




Kitchenette



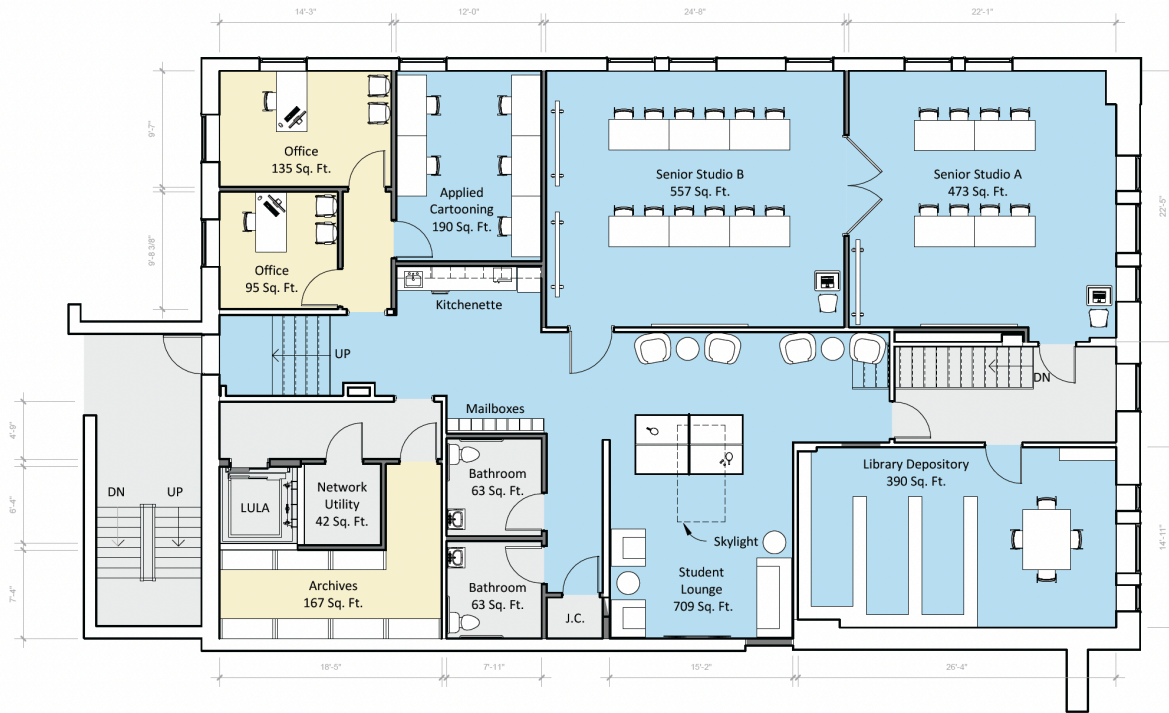
Student Lounge



Senior Studio B



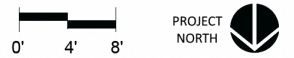
Senior Studio A

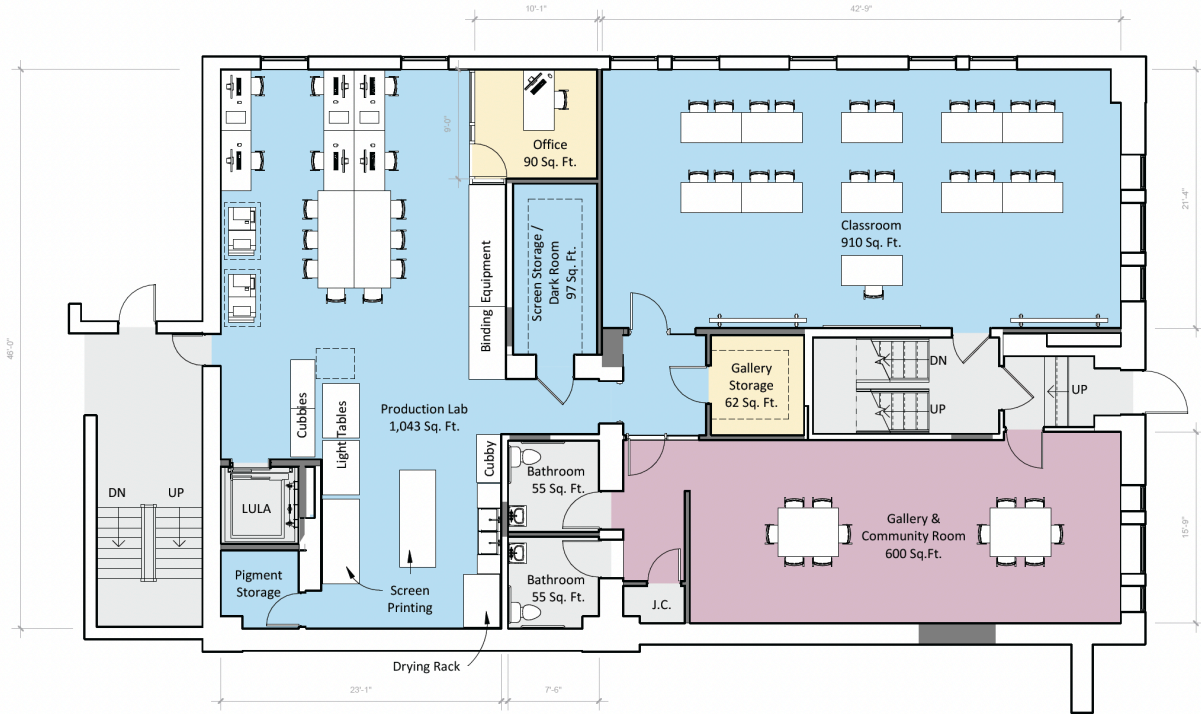


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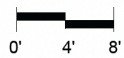
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① Second Floor Plan - SD
1/8" = 1'-0"





① First Floor Plan - SD
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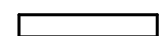


GENERAL DEMOLITION NOTES:

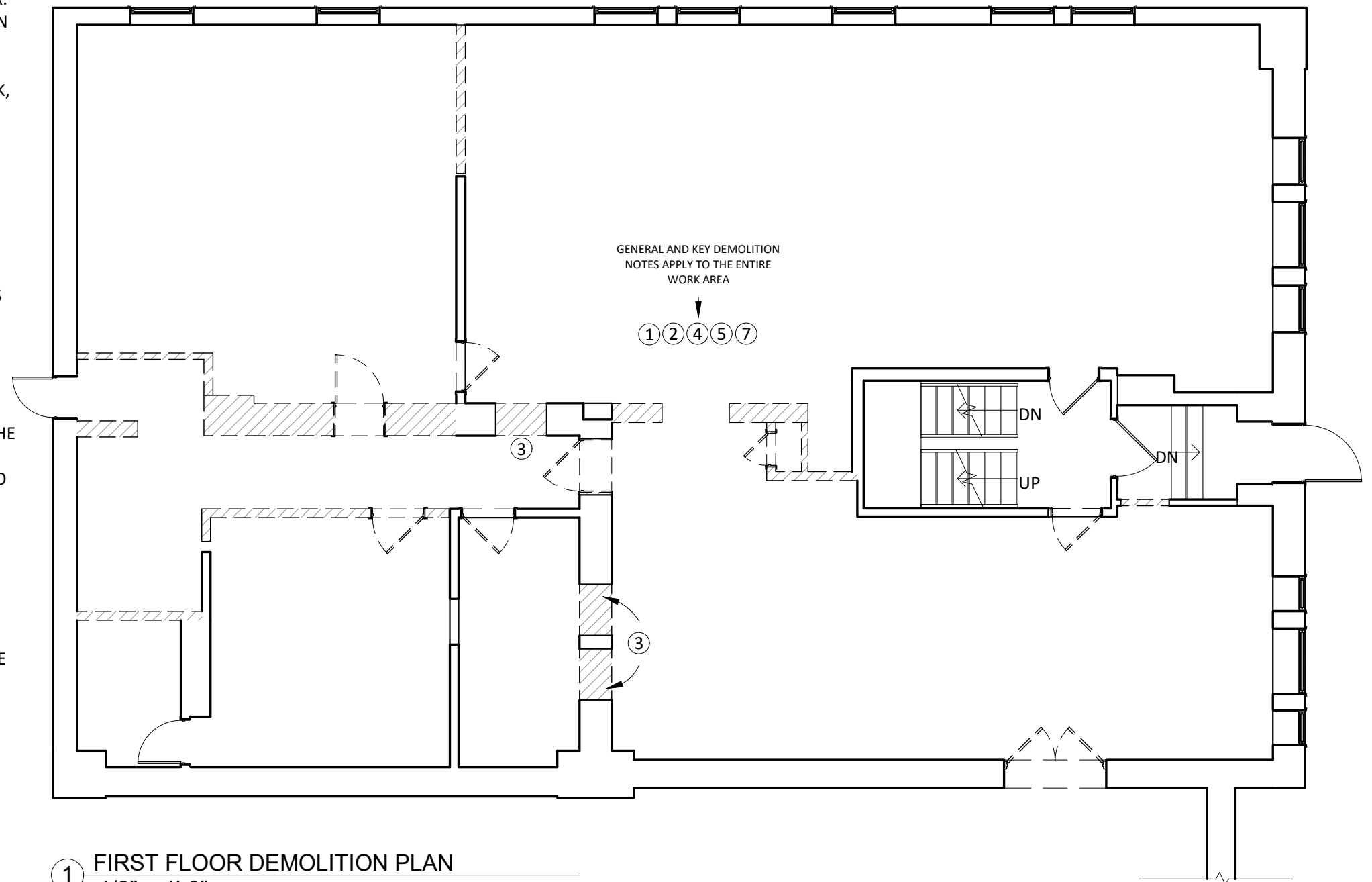
- A. EXTENT AND SCOPE OF DEMOLITION IS NOT LIMITED TO THE ARCHITECTURAL DRAWINGS. COORDINATE WITH SITE, MECHANICAL AND ELECTRICAL CONTRACTORS FOR DEMOLITION WORK IN THEIR RESPECTIVE TRADES AND COORDINATE THEIR WORK FOR AREAS THAT WILL BE AFFECTED.
- B. COORDINATE EXTENT OF EXISTING FIRE PROTECTION SYSTEM REMOVAL TO ACCOMMODATE NEW WORK WITH FIRE PROTECTION DESIGN BUILD CONTRACTOR.
- C. COORDINATE EXACT LOCATION OF ALL DEMOLITION WORK WITH THE DEMOLITION AND NEW CONSTRUCTION DRAWINGS. CONTRACTOR SHALL NOTIFY THE ARCHITECT/OWNER OF ANY DIMENSIONAL DISCREPANCIES, CONDITIONS REQUIRING MODIFICATIONS, OR ADDITIONAL UNANTICIPATED DEMOLITION WORK, BEFORE PROCEEDING WITH THE RELATED WORK.
- D. NOTES REFERENCE GENERAL ELEMENTS FOR DISPOSAL OR SALVAGE; VARIOUS OTHER ITEMS MAY EXIST AND REQUIRE REMOVAL TO ACCOMMODATE THE LEVEL OF FINISHES FOR THE NEW CONSTRUCTION.
- E. COORDINATE PHASING OF DEMOLITION WORK WITH OWNER AND UTILITY COMPANIES PRIOR TO COMMENCING.
- F. COORDINATE WITH OWNER AND SCHEDULE IN ADVANCE INTERRUPTIONS OF ELECTRICAL, MECHANICAL, FIRE PROTECTION, PLUMBING, COMMUNICATION AND OTHER SERVICES WHICH MAY AFFECT FACILITY OPERATIONS OR OTHER BUILDINGS NEARBY.
- G. CONTRACTOR SHALL MAKE AVAILABLE TO THE OWNER ANY MATERIALS OR EQUIPMENT LISTED FOR DEMOLITION, DISPOSAL, REMOVAL, ETCETERA. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL SALVAGEABLE ITEMS.
- H. CONTRACTOR SHALL DISPOSE OF DEMOLITION MATERIALS IN A LEGAL AND ACCEPTABLE MANNER OFF-SITE. RECYCLE OR REUSE MATERIALS AND WASTE TO THE GREATEST EXTENT POSSIBLE.
- I. WHEN DEMOLITION IS FINISHED, THE AREA OF WORK SHALL BE CLEAN & READY TO RECEIVE NEW WORK PER MANUFACTURERS REQUIREMENTS.

DEMOLITION PLAN KEY NOTES:

- 1. REMOVE DOOR(S), FRAME AND HARDWARE IN THEIR ENTIRETY TO ACCOMODATE REFRAMING AND INFILLING OF THE OPENING
- 2. REMOVE WALL FROM FLOOR TO CEILING TO ACCOMODATE NEW WORK
- 3. REMOVE PORTION OF WALL TO ACCOMODATE NEW OPENING
- 4. REMOVE EXISTING VINYL COMPOSITION TILE AND CARPET FLOOR FINISH, SUITABLE TO ACCEPT NEW FLOORING FINISH
- 5. REMOVE EXISTING WALL FINISH
- 6. REMOVE EXISTING ACT AND MATERIAL ABOVE CEILING TILES ADHERED TO THE CEILINGS ABOVE THE ACT
- 7. REMOVE ALL CEILING MOUNTED DEVICES AND ASSOCIATED HANGERS THROUGHOUT THE CEILING

WALLS

-  EXISTING WALL OR COMPONENT TO REMAIN, UNLESS NOTED OTHERWISE
-  WALL OR COMPONENT TO BE REMOVED
-  NEW WALL OR COMPONENT



① FIRST FLOOR DEMOLITION PLAN
1/8" = 1'-0"

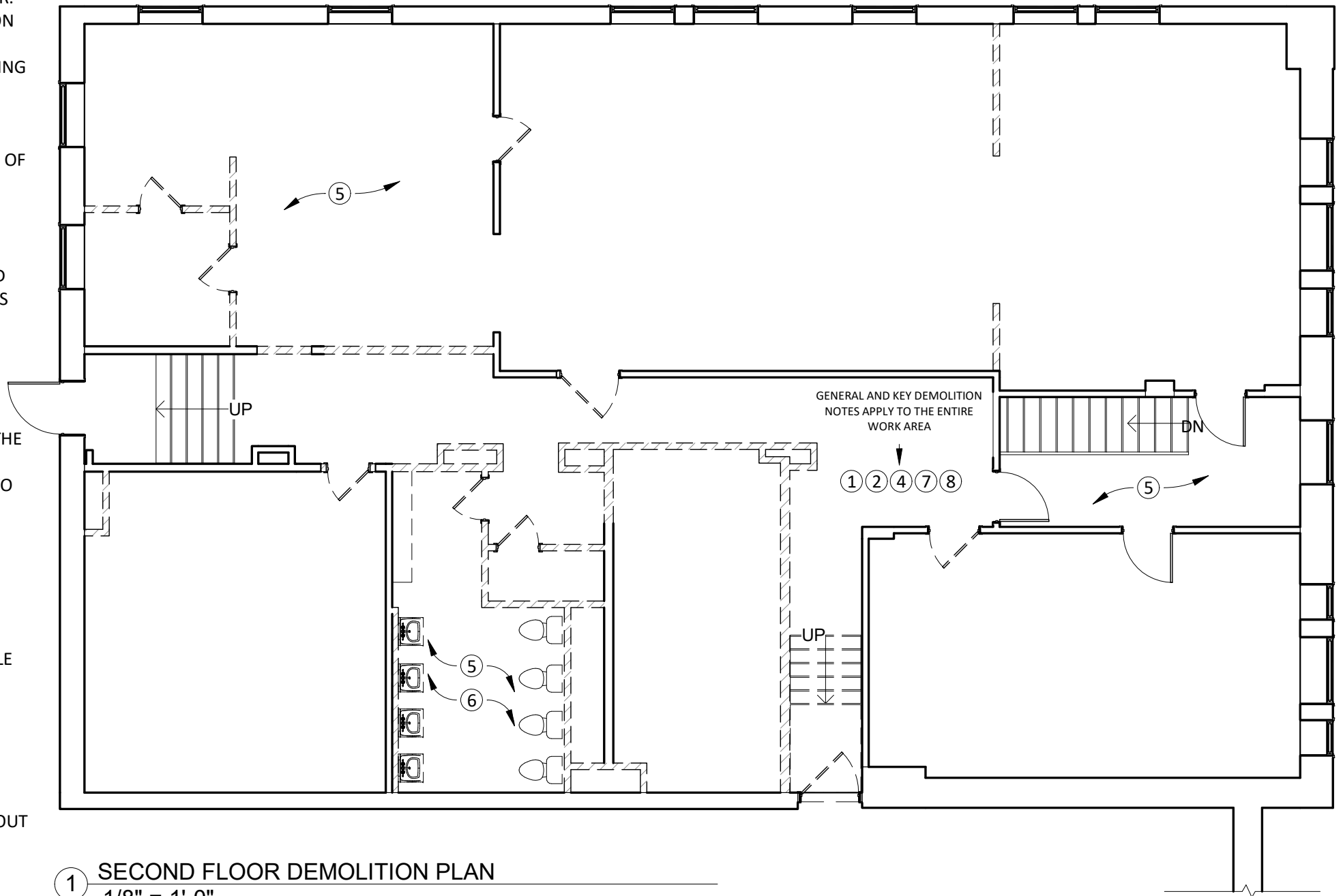


GENERAL DEMOLITION NOTES:

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- 4. REMOVE EXISTING VINYL COMPOSITION TILE AND CARPET FLOOR FINISH, SUITABLE TO ACCEPT NEW FLOORING FINISH
- 5. REMOVE EXISTING WALL FINISH
- 6. REMOVE EXISTING PLUMBING FIXTURES, CAP OR REMOVE ALL PIPING TO ACCOMMODATE NEW WORK
- 7. REMOVE EXISTING ACT AND MATERIAL ABOVE CEILING TILES ADHERED TO THE CEILINGS ABOVE THE ACT
- 8. REMOVE ALL CEILING MOUNTED DEVICES AND ASSOCIATED HANGERS THROUGHOUT THE CEILING

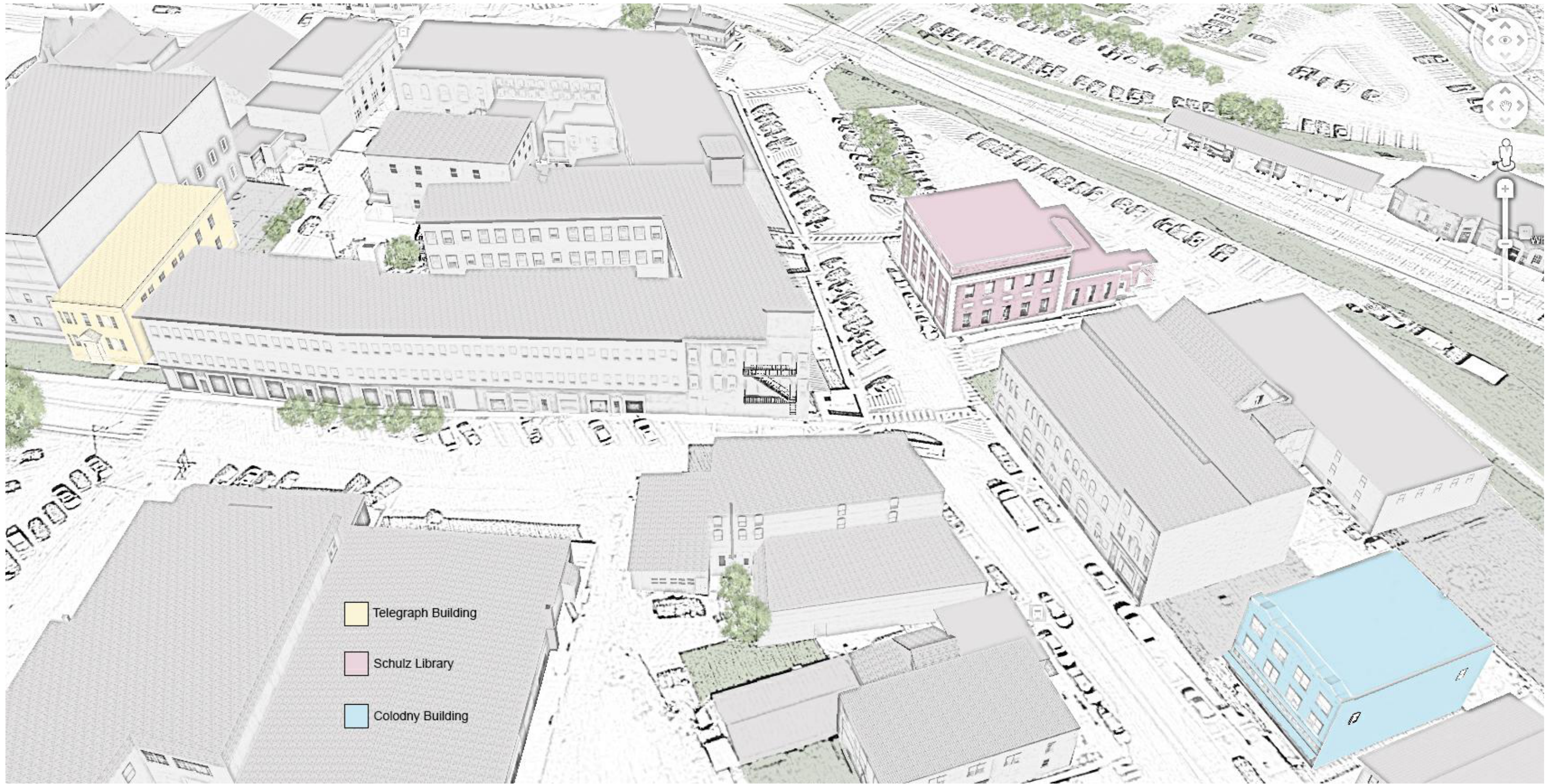


1 SECOND FLOOR DEMOLITION PLAN
1/8" = 1'-0"

WALLS

-  EXISTING WALL OR COMPONENT TO REMAIN, UNLESS NOTED OTHERWISE
-  WALL OR COMPONENT TO BE REMOVED
-  NEW WALL OR COMPONENT



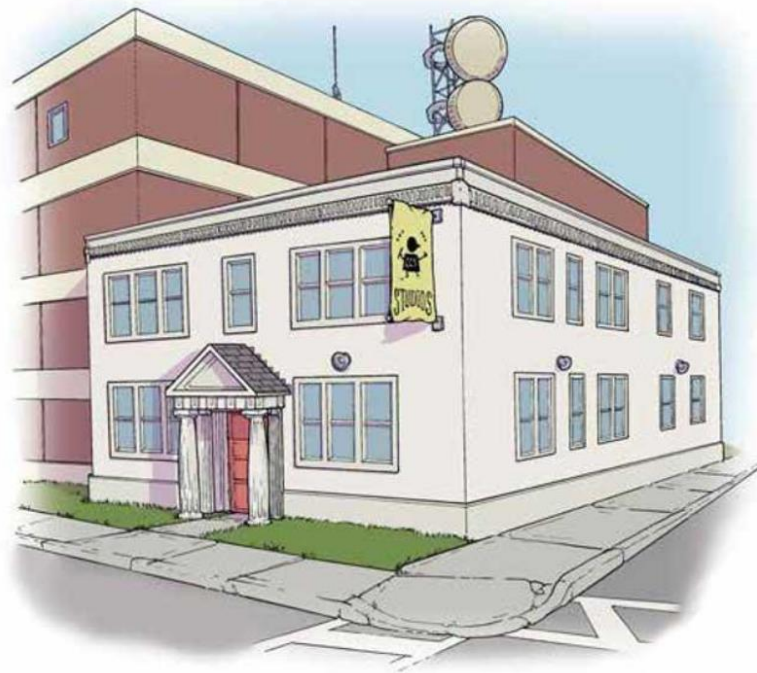


The Center for Cartoon Studies Campus Map

The Center for Cartoon Studies (CCS) Former Telegraph Building

111 Gates Street, White River Junction, VT 05001

Energy Analysis Report Progress Set



Progress Set
June 6, 2022
BVH #22.6201.0097



CCS – Former Telegraph Building

Executive Summary

A full building energy analysis of the CCS Existing Former Telegraph Building has been developed using Cove.Tool energy simulation software. The objective of the energy analysis was to quantify and compare the difference in annual energy consumption between different building renovation options in order to determine the most logical and cost effective path for this exiting building to becoming a net-zero building. The baseline building is designed in accordance with ASHRAE 90.1-2019 Appendix G to bring the building up to all code minimum requirements. This baseline system includes a fossil fuel burning packaged rooftop unit with packaged DX cooling long with a fossil fuel burning domestic hot water heater. The proposed building renovations incorporates higher efficiency all electric VRF cooling and heating, electric domestic hot water, and 3,300 ft² of mono-crystalline silicon PV panels, along with other energy saving measures in order to achieve net zero. Both options break out the savings achieved by upgrading the existing antiquated envelope to code minimum values (ie. windows, walls, and roof).

The CCS Telegraph Building was modeled with approximately 5,800 ft² of conditioned space, and did not include the unconditioned basement storage area. The proposed building is comprised of classroom areas, meeting areas, offices, and a 24/7 dry work lab. Because the building design is still in an early stage, a number of assumptions were made during this analysis. Major assumptions are listed and described in the following sections of this report. The summary of the findings from the multiple energy models are as shown below:

Table 1: CCS Telegraph Building Energy Analysis Results Summary

Option #	Renovation Options	EUI (kBtu/ft ² /yr)	Emmissions (Tonne CO ₂ /yr)	Electricity Consumption (kWh)	Electricity Cost (\$)	Propane Consumption (MMBtu)	Propane Cost (\$)	Total Energy Cost (\$)	Annual Energy Cost Savings (%)	Total Energy Consumption (kWh)	Total Energy Consumption Savings (%)
1	Baseline RTU (old envelope)	74.6	15.3	59,329	\$8,306	265	\$1,555	\$9,861	-	127,336	-
2	Baseline RTU (new envelope)	44.2	6.7	54,921	\$7,689	118	\$692	\$8,381	15.0%	75,377	40.8%
3	VRF w/ DOAS (new envelope)	31.5	1.4	64,629	\$9,048	0	\$0	\$9,048	8.2%	53,683	57.8%
4	VRF w/ DOAS and PV	0	0	0	\$0	0	\$0	\$0	100.0%	0	100.0%

Note: "Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool." (*Text from ASHRAE Standard 90.1-2010, Appendix G*)

Energy Rates

Energy rates for electricity and propane are based on information found from the United States Energy Information Administration’s website, based on the latest utility rate data for Commercial usage during design. The energy rates listed below were used in determining the annual energy costs for both the baseline and proposed design case energy simulations.

Table 2: White River Junction, VT Utility Rates

Utility	Rate	Unit
Electricity	\$0.17	\$/kWh
Propane	\$0.02	\$/kWh

Operating Schedules

- Schedules are modeled identically between the Proposed and Baseline models, except where noted otherwise.
- The building is designed around different space and usage types:
 - General occupancy is modeled from 7 am to 5 pm, with reduced use after hours for the 24/7 lab.
 - The building is modeled with no occupants on weekends, other than the 24/7 lab.
- Lighting and plug load schedules follow the associated space’s occupancy schedule. Lighting and plug loads are set to minimal levels on weekends to reflect emergency lights and computers/equipment left on overnight.

Baseline and Proposed Model Comparison

The modeled energy efficiency measure descriptions are listed below in Table 3.

Table 3: Baseline and Proposed Model Comparison

Energy Efficiency Measure	Baseline Model (RTU w/ old envelope)	Baseline Model (RTU w/ new envelope)	Proposed Model (VRF w/ new envelope)
HVAC System	<p>This baseline HVAC system is based on the 2020 Vermont Commercial Building Energy Standards (CBES). The baseline system uses a constant volume packaged rooftop air conditioner (RTU) with DX cooling and a propane furnace for heating.</p> <p>Demand Control Ventilation is modeled for all densely occupied spaces requiring these capabilities per 90.1-2019 section 6.4.</p> <p>(1) 22.5-ton packaged RTU -Manufacturer: Trane -Model: Voyager 2 -Constant Volume -DX cooling/propane heating -2-stage scroll compressors -300 MBH furnace (Stainless Steel) -100% Economizer and DCV -Packaged Controls -208V/3 phase</p>	<p>This baseline HVAC system is based on the 2020 Vermont Commercial Building Energy Standards (CBES). The baseline system uses a constant volume packaged rooftop air conditioner (RTU) with DX cooling and a propane furnace for heating.</p> <p>Demand Control Ventilation is modeled for all densely occupied spaces requiring these capabilities per 90.1-2019 section 6.4.</p> <p>Estimated Equipment Specs: (for budgetary purposes only)</p> <p>(1) 17.5-ton packaged RTU -Manufacturer: Trane -Model: Voyager 2 -Constant Volume -DX cooling/propane heating -2-stage scroll compressors -250 MBH furnace (Stainless Steel) -100% Economizer and DCV -Packaged Controls -208V/3 phase</p>	<p>The proposed model is based on a VRF multi-zone system and a dedicated outdoor air system (DOAS) DX cooling and a heat pump for heating, along with an energy recovery core.</p> <p>Demand Control Ventilation is modeled for all densely occupied spaces requiring these capabilities per 90.1-2010 section 6.4.</p> <p>Estimated Equipment Specs: (for budgetary purposes only)</p> <p>(1) 10-ton Heat Pump: -Manufacturer: Mitsubishi -Model: PUHY-HP -Cold Climate Model -Low ambient kit -Inverter Scroll Compressors -Packaged Controls -208V/3 phase (10) Indoor Ducted 1-Ton Fan Coil Units -Manufacturer: Mitsubishi -Model: PEFY-P -Wall Mounted Controller -Integral Condensate Pump -208V/3 phase (1) Packaged DOAS w/ Energy Recovery -Manufacturer: Trane -Model: Horizon -Airflow: 2,000 cfm -8-Ton Air Source Heat Pump -25 KW backup Electric Heat -Digital Scroll Compressors -Energy Recovery Wheel -100% Economizer and DCV -Packaged Controls -208V/3 phase</p>

Domestic Water System	This baseline DHW system is based on the 2020 Vermont Commercial Building Energy Standards (CBES). The baseline system for this building type is a Gas storage water heater.	This baseline DHW system is based on the 2020 Vermont Commercial Building Energy Standards (CBES). The baseline system for this building type is a Gas storage water heater.	The proposed DHW system is based on an electric resistance storage water heater in order to fully electrify the system.
Envelope Improvements	The baseline envelope assembly values are the assumed values we can estimate from the existing building wall, window, and roof construction observed on site. They are as follows: Glazing: (operable) U-0.55, SHGC-0.48 Walls: 12" CMU, no ins. R-5 Roof: R 20 Air Tightness: 0.05 cfm/ft ²	The baseline envelope assembly values are the code minimum values as described in the 2020 Vermont Commercial Building Energy Standards (CBES), and are as follows: Glazing: (fixed) U-0.29, SHGC-0.48 Walls: 12" CMU and brick w/ new exterior insulation jacket-R-19ci Rockwool Comfortboard 80 on the exterior with vertical wood strapping to support cladding system. See Appendix B. Roof: R-40ci Polyisocyanurate with TPO membrane Air Tightness: 0.0075 cfm/ft ² (0.20 cfm/ft ² at 75 pa.)	The proposed envelope assembly values are the slightly more energy efficient than as described in the 2020 Vermont Commercial Building Energy Standards (CBES), and are as follows: Glazing: (fixed) U-0.25, SHGC-0.48 Walls: 12" CMU and brick w/ new exterior insulation jacket-R-19ci Rockwool Comfortboard 80 on the exterior with vertical wood strapping to support cladding system. See Appendix B. Roof: R-40ci Polyisocyanurate with TPO membrane Air Tightness: 0.0075 cfm/ft ² (0.20 cfm/ft ² at 75 pa.)
Interior Lighting	Interior lighting was calculated using the building area method presented in the 2020 Vermont Commercial Building Energy Standards (CBES). Based on the education occupancy of the building, the Baseline Interior Lighting is modeled at 0.67 W/sf.	Interior lighting was calculated using the building area method presented in the 2020 Vermont Commercial Building Energy Standards (CBES). Based on the education occupancy of the building, the Baseline Interior Lighting is modeled at 0.67 W/sf.	The proposed interior lighting is slightly more energy efficient than as described in the 2020 Vermont Commercial Building Energy Standards (CBES). Based on the education occupancy of the building, the Proposed Interior Lighting is modeled at 0.60 W/sf.

Summary

The results in *Table 1* show an estimated energy savings of 57.8% over the baseline building system with the existing envelope. By upgrading the existing envelope to current code minimum values, installing a VRF heating/cooling system, and installing an electric domestic hot water, the estimated annual energy consumption was reduced from 127,336kWh to 53,683kWh. This reduction in energy use and conversion to complete electrification, allowed the building to offset 100% of its annual energy use by using roughly 3,300 ft² of solar panels on the roof of the building.

Appendix A

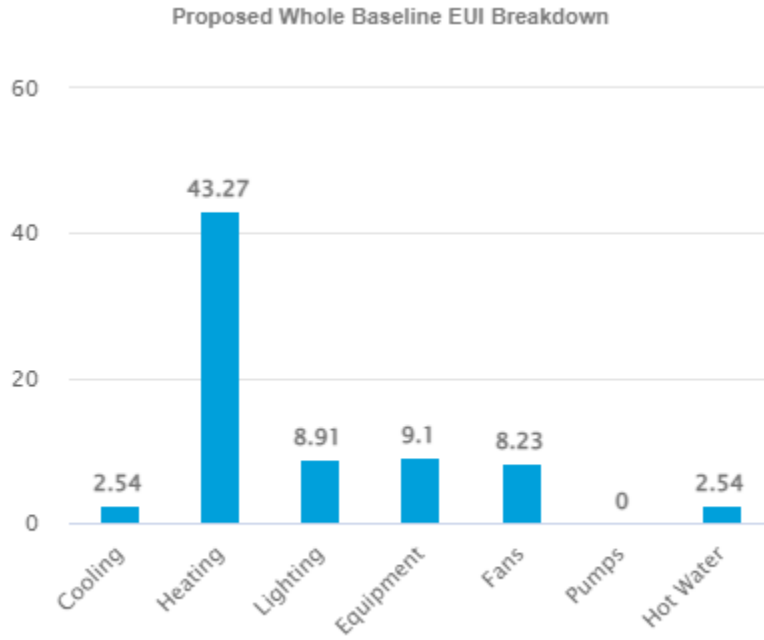


Figure 1: Annual Energy Use Intensity Breakdown (Baseline RTU (old envelope))

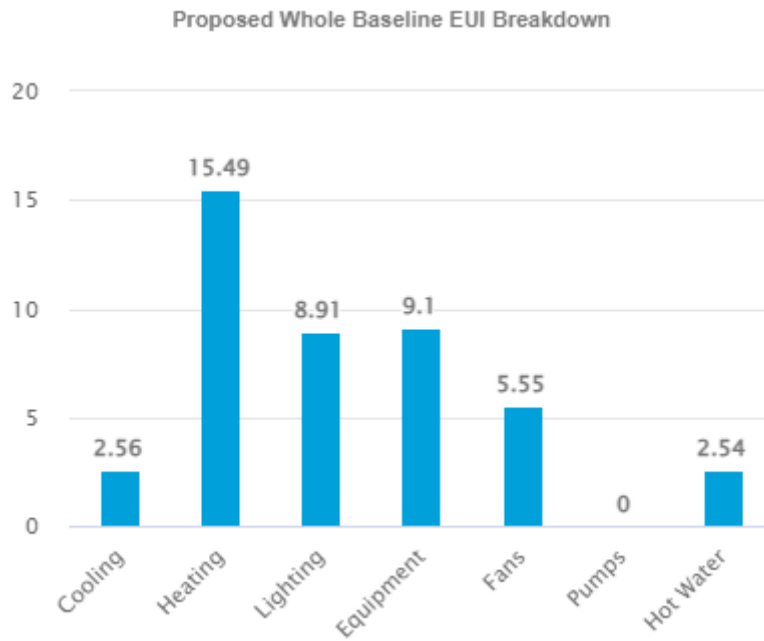


Figure 2: Annual Energy Use Intensity Breakdown (Baseline RTU (new envelope))

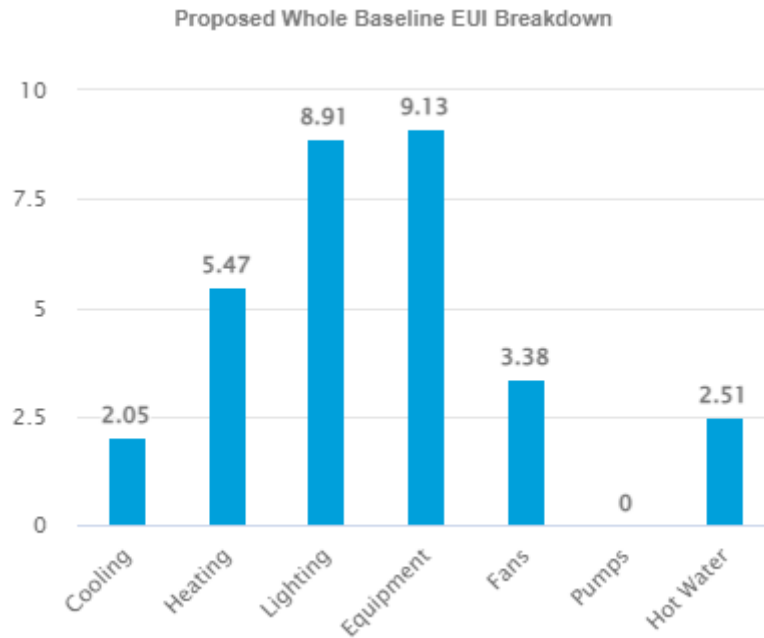


Figure 3: Annual Energy Use Intensity Breakdown (VRF w/ DOAS (new envelope))

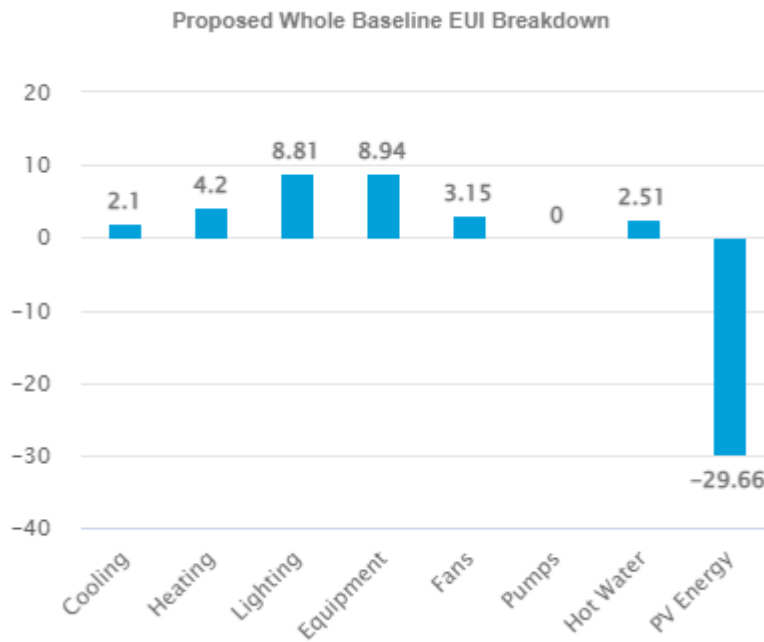


Figure 4: Annual Energy Use Intensity Breakdown (VRF w/ DOAS and PV (new envelope))

Appendix B

Telegraph building proposed wall assembly. See below except substitute mineral wool for the XPS shown in the photos. Cladding system can be anything: fiber cement, metal, or wood.

