# *SCHEMATIC DESIGN APPROVAL*

| | |
|---|---|
| **Name of Project:** | **UAS Ketchikan Regional Maritime and Career Center** |
| **Project Type:** | **Renewal and Replacement** |
| **Location of Project:** | **UAS, Ketchikan Campus, Robertson & Hamilton Buildings, Ketchikan** |
| **Project Number:** | **2015-03** |
| **Date of Request:** | **April 21, 2016** |

| | |
|---|---|
| **Total Project Cost:** | **$5,758,000** |
| **Approval Required:** | **Full Board** |
| **Prior Approvals:** | **Formal Project Approval – December 2015** |

A Schematic Design Approval (SDA) is required for all Capital Projects with a Total Project Cost in excess of $250,000.

SDA represents approval of the location of the facility, its relationship to other facilities, the functional relationship of interior areas, the basic design including construction materials, mechanical, electrical, technology infrastructure and telecommunications systems, and any other changes to the project since formal project approval. Unless otherwise designated by the approval authority or a material change in the project is subsequently identified, SDA also represents approval of the proposed cost of the next phases of the project and authorization to complete the design development process, to bid and award a contract within the approved budget, and to proceed to completion of project construction. Provided however, if a material change in the project is subsequently identified, such change will be subject to the approval process.

Action Requested

**The Facilities and Land Management Committee recommends that the Board of Regents approves the schematic design approval request for the University of Alaska Southeast UAS Ketchikan Regional Maritime and Career Center as presented in compliance with the campus master plan, and authorizes the university administration to complete construction bid documents to bid and award a contract within the approved budget, and to proceed to completion of project construction not to exceed a Total Project Cost of $ 5,758,000. This motion is effective May 26, 2016.**

In accordance with the Statement of Requirements, the Hamilton and Robertson buildings will be renovated to improve the quality of space available to existing programs and to replace building systems that have exceeded their service lives.

RATIONALE AND REASONING

Background

University of Alaska Southeast Ketchikan has offered marine transportation training to mariners for the better part of 30 years. The Robertson Building was built as a bowling alley in 1959 , purchased in 1976, and put into UAS service in 1977; the Hamilton Building was constructed in 1984 by UAS. Many of the original building systems have suffered from changing uses and ad hoc adaptions to those uses. Although the Robertson Building was renovated in 2003, subsequent changes to academic programs and curriculum have left current programs without adequate support. The Hamilton Building has never been renovated; essential building systems have exceeded their services lives. The two buildings are programmatically and physically connected; they are for all practical purposes a single facility.

Programmatic Need

UAS Ketchikan Marine Transportation and Maritime & Multi-skilled Worker Programs will be impacted positively by renovating the current tech center into the Ketchikan Regional Maritime and Career Center. The renovation will upgrade the current space and provide the necessary lab and classroom space for these programs to continue to grow.

A MAA, SON, and SOR were prepared for and approved by the Board of Regents detailing the need and outlining how the project supports the University mission, SAF, UA Shaping Alaska's Future, UAS Strategic and Assessment Plan, the UAS Ketchikan Strategic Enrollment Management Plan, and the statewide Alaska Maritime Workforce Development Plan.

Project Scope

The project will include an extensive renewal of the Hamilton building (construction phase I), entirely replacing mechanical and electrical systems and reconfiguring the building to house labs for programs requiring industrial quality teaching space. Minor alteration to the Robertson Building (construction phase II) will accommodate programs that do not require industrial space. Energy efficiency and the thermal envelope will be upgraded as budget allows.

Project Impacts

This project is funded by a U.S. Department of Education Title III grant. Construction will be phased in accordance with multi-year grant funding requirements and to minimize disruption to campus operations. There will be no impacts beyond programs housed in the facility. Welding classes will be relocated off campus during Phase I construction.

Variances

None.

Total Project Cost and Funding Sources

| Funding Title | Fund Account | Amount |
|---|---|---|
| FY2016 – FY2019 | 515704 77101 | $5,498,000 |
| FY2016 – FY2019 | 288701 78228 | $260,000 |
| **Total Project Cost** | | **$5,758,000** |

Annual Program and Facility Cost Change Projections

| | Amount |
|---|---|
| Total Annual Program Cost Increase | No increase |
| Total Annual O&M Cost | No increase |
| Total Annual Renewal and Replacement Cost | No increase |
| **Total Annual Cost Change Projections** | **No increase** |

Project Schedule

| | |
|---|---|
| DESIGN | |
| Conceptual Design | November 2015 |
| Formal Project Approval | December 10, 2015 |
| Schematic Design | April 2016 |
| Schematic Design Approval | June 2016 |
| Construction Documents | January 2017 |
| BID & AWARD | |
| Advertise and Bid | February 2017 |
| Construction Contract Award | March 2017 |
| CONSTRUCTION – Phase 1 | |
| Start of Construction (on-site) | May 2017 |
| Construction Complete | September 2017 |
| Date of Beneficial Occupancy | September 2017 |
| Warranty Period | One year |
| CONSTRUCTION – Phase 2 | |
| Start of Construction (on-site) | May 2018 |
| Construction Complete | August 2018 |
| Date of Beneficial Occupancy | August 2018 |
| Warranty Period | One year |

Project Delivery Method

The project will be Design-Bid-Build.

Project Design Team

Bettisworth Welsh Whiteley, LLC
- PND Engineers
- Murray & Associates
- Haight & Associates
- Nortech
- Alaska Energy Engineering
- HMS, Inc.

Supporting Documents

- One-page Project Budget
- Design Narrative Document
- Drawings
  - Site Plan
  - Exterior Elevations
  - Floor Plans

Affirmation

This project complies with Regents Policy, the campus master plan and the Project Agreement.

This Approval is subject to the following provisions:

WHEREAS, The Network will develop, support, and assess initiatives that strengthen postsecondary expectations, preparation, financing, and support services with a goal to increase the percentage of all Alaskans who complete postsecondary education, particularly earning credentials relevant to a robust Alaskan economy; and

WHEREAS, The Network has set an attainment goal for Alaska – "65 by 2025" – highlighting the imperative to increase the percent of working-age adults holding a high-value certificate, college degree, or other industry-recognized credential from 50 to 65 percent by 2025, particularly gaining credentials aligned to Alaska's workforce needs.

NOW, THEREFORE BE IT RESOLVED that the University of Alaska Board of Regents commends the work and mission of the Alaska Postsecondary Access & Completion Network and commits to ongoing collaboration; and

BE IT FURTHER RESOLVED that the University of Alaska Board of Regents endorses the "65 by 2025" postsecondary attainment goal and intends to actively engage as a Network member organization working to achieve "65 by 2025"; and

BE IT FURTHER RESOLVED that this resolution be incorporated into the official minutes of the June 2-3, 2016, meeting of the University of Alaska Board of Regents.

**13. Approval of Revisions to Regents' Policy 10.05.015 - Concurrent Enrollment**

PASSED
"The Board of Regents approves revisions to Regents' Policy 10.05.015 – Concurrent Enrollment as presented. This motion is effective June 3, 2016."

**14. Schematic Design Approval for the University of Alaska Southeast Ketchikan Regional Maritime and Career Center**

PASSED
"The Board of Regents approves the schematic design approval request for the University of Alaska Southeast Ketchikan Regional Maritime and Career Center as presented in compliance with the campus master plan, and authorizes the university administration to complete construction bid documents to bid and award a contract within the approved budget, and to proceed to completion of project construction not to exceed a total project cost of $ 5,758,000. This motion is effective June 3, 2016."

UAS UNIVERSITY OF ALASKA SOUTHEAST
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| UNIVERSITY OF ALASKA | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Project Name: Ketchikan Regional Maritime & Career Center | | | | | |
| University: University of Alaska Southeast | | | | | |
| Building: Robertson & Hamilton Buildings | | Date: | 5-Nov-15 | | 15-Apr-16 |
| Campus: Ketchikan Campus | | Prepared by: | WK Gerken | | Ke Mell |
| Project #: 2015-03 | | Acct #: | | | |
| Total GSF Affected by Project: | 20,398 | | | | |
| **PROJECT BUDGET** | | | FPA Budget | | SDA Budget |
| **A. Professional Services** | | | | | |
| Advance Planning, Program Development | | | | | 148,703 |
| Consultant: Design Services | 13.2% | | 465,000 | | 516,852 |
| Consultant: Construction Phase Services | 4.1% | | 160,000 | | 160,000 |
| Consul: Extra Services (List: Hazmat, Energy) | | | | | 27,757 |
| Site Survey | | | | | 7,402 |
| Soils Testing & Engineering | | | | | 6,655 |
| Special Inspections | | | | | - |
| Plan Review Fees / Permits | | | | | |
| Other | | | | | |
| Professional Services Subtotal | | | **625,000** | | **867,369** |
| **B. Construction** | | | | | |
| General Construction Contract(s) | | | 3,875,000 | | 3,929,000 |
| Other Contractors (List:_____) | | | | | |
| Construction Contingency | 12% | | 585,000 | | 585,000 |
| Construction Subtotal | | | **4,460,000** | | **4,514,000** |
| *Construction Cost per GSF* | | | *219* | | *221* |
| **C. Building Completion Activity** | | | | | |
| Equipment | | | 150,000 | | |
| Fixtures | | | | | |
| Furnishings | | | | | |
| Signage not in construction contract | | | | | |
| Move-Out Costs | | | | | |
| Move-In Costs | | | | | |
| Art | | | | | |
| Other (Interim Space Needs or Temp Reloc. Costs) | | | 80,000 | | 25,000 |
| OIT Support | | | 85,000 | | |
| Maintenance Operation Support | | | | | |
| Building Completion Activity Subtotal | | | **315,000** | | **25,000** |
| **D. Owner Activities & Administrative Costs** | | | | | |
| Project Plng, Staff Support | 3.5% | | 190,000 | | 189,223 |
| Project Management | 3.0% | | 168,000 | | 162,191 |
| Misc. Expenses: Advertising, Printing, Supplies, Etc. | | | | | |
| Owner Activities & Administrative Costs Subtotal | | | **358,000** | | **351,414** |
| **E. Total Project Cost** | | | **5,758,000** | | **5,757,783** |
| *Total Project Cost per GSF* | | | *$ 282* | | *$ 282* |
| **F. Total Appropriation(s)** | | | **5,758,000** | | **5,758,000** |

**Schematic Design**

April 2016

**University of Alaska Southeast**

**Ketchikan Regional Maritime & Career Center**

**Project No.: 2015-03**

**Bettisworth** WelshWhiteley LLC

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**Bettisworth** WelshWhiteley LLC

# UAS Ketchikan Regional Maritime & Career Center

UAS Project No.: 2015-03

**SCHEMATIC DESIGN NARRATIVE**

April 2016

## 1. Project Overview

The University of Alaska Southeast Ketchikan's Regional Maritime & Career Center consists of two connected buildings: The Robertson and Hamilton Buildings. While constructed separately they are programmatically and physically connected and form the "Lower Campus" of UAS Ketchikan.

The facility is contained within a site bordered by two city streets to the East and North, the Tongass Narrows waterway to the West and a commercial dry cleaners to the South.

The three primary maritime programs located at the facility are Welding, Power Technology & Multi-skilled Worker and Marine Transportation. These programs train part of Alaska's maritime workforce. The programs have grown considerably in the past thirteen years since any of the facility was remodeled. In addition, Southeast Alaska's maritime economy has seen employment increase by 14% in the past five years, and maritime related industry growth is expected to continue to rise through the foreseeable future, per the Alaska Department of Labor and Workforce Development, leading to continued occupational demand.

## 2. Current Configuration

The Robertson Building is a one story building originally constructed in 1959 as a bowling alley. It has tilt-up concrete walls enclosing a metal frame that supports the metal roof. The University acquired the property in 1976, remodeling at that time for educational use. A covered open work area sometimes referred to as the 'boat shed', was added in two stages along the West side. The building was renovated in 2003 when the classrooms were added and offices and restrooms remodeled. New electrical and mechanical systems were also installed at that time.

The Hamilton Building was constructed in 1985, with academic spaces on the first level and mechanical and ventilation equipment, and a small amount of storage provided on a second level. There has been no significant remodeling of the Hamilton Building since it was constructed.

The two buildings are physically linked by a hallway with a single door opening. The buildings share an electrical service but are independent mechanically, with the exception that the boilers in the Hamilton Building provide hydronic heat to both buildings. The electrical service for the facility was upgraded in May 2010. The open work area/boat shed was extended towards East Street in 2007. The total area of the facility is 17,141 SF of lower floor, and 3,257 SF on upper storage and mechanical levels.

**3. Condition**

Although the Robertson Building was substantially remodeled thirteen years ago, subsequent changes to academic programs and curriculum have left current programs without adequate physical support. The mechanical and electrical systems can be adjusted with minimal effort to accommodate changes to the plan that are part of the interior remodel. New roofing is also warranted in the near future due to the age of the existing metal roof and minimal insulative value. During heavy rains, the rain noise on the poorly insulated metal roof disrupts teaching due to grossly inadequate roof insulation.

The Hamilton Building has not been renovated and has only been minimally altered since construction 30 years ago. Interior finishes are worn and require replacement. Acoustics are very poor in the classrooms due to the lack of acoustical treatment and mechanical systems. Exterior windows and doors are in poor condition.

The Mechanical Systems Survey by Murray & Associates states "The Hamilton Building mechanical and plumbing systems are 30 years old and should be replaced entirely". Similarly, the Electrical Systems Survey by Haight & Associates states "The Hamilton Building systems have received little attention since their original construction… are … 30 years old and have completed their service life, requiring complete replacement".

The existing inverted EPDM roofing system on the Hamilton Building was replaced 15 years ago and is intended to remain in place due to it only being half-way through its life expectancy.

The facility's infrastructure is adequate to handle the renovation, specifically the electrical service was recently upgraded, the water and sewer systems are in fine working order, and the buried fuel tank was recently installed as well. The life boat davit is located to the West along the shoreline and will remain in use as an important part of the Marine Transportation program.

**4. Schematic Design – Architectural Narrative**

While the Lower Campus has physical and site constraints, the Statement of Requirements and this schematic design prepared by Bettisworth Welsh Whiteley allows for the maritime programs to expand to meet the Statement of Requirements within the envelope of the current facility. The plan also provides space to allow other academic programs to remain at the lower campus, along with Facilities Operations and Maintenance.

Welding and Power Technology & Multi-Skilled Worker programs will occupy the Hamilton Building portion of the renovated facility. These two programs generate substantial dust and noise and there is a logic to grouping these two activities in the same portion of the facility and away from other academic programs. In addition, these two programs can share a classroom, which is an opportunity to efficiently use limited space. Overhead doors will be provided for both programs to facilitate moving materials and equipment.

A new loading pad will be located at the West end of the building with an adjacent three-sided enclosure for welding gas storage, oriented away from the prevailing wind. The Open Work Area (Robertson 109) will remain as a covered work and storage area.

The boilers and air handlers on the second floor of the Hamilton Building will be replaced, as will plumbing, mechanical heat piping, and electrical systems throughout the Building. The interior stair of the Hamilton Building that serves the second floor mechanical and storage spaces will be relocated to facilitate the function of the Power Technology Lab.

The Robertson Building requires less remodeling to accommodate the needs of Marine Transportation program, as well as the other academic programs such as Nursing, GED, and Natural Sciences, as well as a general classroom. Changes to the building's entry would include a rain canopy on the exterior, an interior vestibule to better control heat loss through the doorway, and a small meeting room adjacent to the entrance. Interior work would consist of dividing larger spaces into smaller by adding interior walls and doors. An example of this is the existing Power Tech Lab will be divided into simulator rooms for the Marine Transportation program. The adjacent large classroom will become a multi-purpose classroom to be shared between the Marine Transportation program, natural sciences and other programs.

New finishes will be required when converting the former shop spaces to academic classrooms. The reception office, Nursing classroom and existing restrooms will remain, in their current configurations without remodeling.

Faculty offices will be reconfigured to maintain a standard size and grouping together to facilitate interaction.
The Facilities Operations and Maintenance Department will be modified to eliminate the enclosed storage room which would be converted to storage for the Marine Transportation program.

A group study area allows students to study in small groups or independently. This area also serves as an area where students can eat their lunches and for faculty-student meetings as well.

**5. Civil Narrative**

The site civil scope of work includes improving drainage on site, expanding useable area and improving surfaces by paving the parking area and replacing or constructing new paved walkways. For the purposes of this narrative north is taken as the side of the site bounded by East Street and Stedman Street is along the east side of the site.

Drainage will be improved by re-grading the site and collecting and diverting storm water to catch basins. The schematic civil plan has the lot sloping from East Street down towards the existing Roberson Building. At the north edge of the Roberson Building a new curb and gutter will collect the surface drainage and divert it west to a new area drain and catch basin in the existing parking lot. The outlet pipe of this structure will lead to the shore line where another area drain and catch basin will collect additional surface drainage. The parking lot north and west of the Hamilton Building will be regraded to divert water to the two area drains. The collected water will then run through a water quality unit before being discharged to the Tongass Narrows Shoreline.

The water quality unit is a horizontal ADS unit that consists of a horizontal pipe with interior baffles and two access hatches on the top. The unit traps sediment in one chamber bounded by baffles and oily

liquids in another chamber. The access hatches are above each chamber and allow a vacuum truck to suck the collected sediments and trapped oily waters.

The storm drain outlet will have a trash rack at the outlet. The outlet will be above the extreme high water line so no Department of the Army permits are needed and no backflow prevention valve is needed. The outlet will have a grate covering the end to prevent large mammals living on the waterfront from entering and inhabiting the storm water pipe.

The regrading of the lot is likely to require some bedrock removal. Original construction of the Hamilton Building required removal of part of the hill that supports the radio transmission tower north of the site. The parking lot is underlain with shallow bedrock.

Along East Street the east side of the parking lot will be expanded by removing the abandoned sign base and some of the existing landscaping.

East of the Robertson Building one downspout outlet will need to be reconstructed and routed under the stairs. The outlet of this piping will be in the street curb.

Following re-grading the lot will be paved. The pavement section will include 2 inches of asphalt concrete pavement over a 6 inch, D1 gradation, base course.

The parking area will be striped to organize and maximize parking. The schematic design has 32 passenger vehicle spaces, one of which is an ADA accessible space with a access strip adjacent, complying for ADA Van Accessible parking.

Sidewalks will be constructed on the north of the Hamilton Building, the west of the covered storage west of the Robertson Building and the north side of the Robertson Building. Near the north entrance of the Robertson Building there will be a ramp and depressed sidewalk at the ADA Van Accessible space.

Fencing will be modified with the entrance on the south side of East Street with a 24 foot wide sliding gate.

To allow for better use of the site at the southwest corner, the grade will need to be raised. Along the existing alley south of the site and along the shoreline a 5 foot high large concrete block wall will be constructed. That wall will retain clean imported fill.

The existing Loading Dock will be replaced by a loading pad, 6 inches thick. It will be slightly below the finished first floor of the Hamilton Building. The parking lot north of the loading pad will be raised. The slab over the fuel tank will be raised and the access manholes will be raised.

Estimated quantities for the civil work include the following:

| | QUANTITY | UNITS |
|---|---|---|
| <u>EARTHWORK</u> | | |
| NET CUT | 527 | CY |
| (APPROX AMOUNT ROCK) | 195 | CY |

| | | |
|---|---|---|
| DEMOLITION | | |
| CONC. SIDWALK (Saw cut and Remove) | 919 | SF |
| CHAINLINK FENCING | 108 | LF |
| LANDSCAPE CURB / MONUMENT SIGN | 1 | LS |
| DOUBLE SWING GATE (Relocate or new) | 1 | EA |
| SINGLE AND MAN GATES (Relocate or new) | 1 | EA |

ENTRY AREA: APPROX. AREA OF WORK 1,006 SF.
LOADING DOCK: APPROX. AREA OF WORK 590 SF.

| | | |
|---|---|---|
| SITE CONSTRUCTION | | |
| 2"t AC PAVEMENT | 274 | TON |
| D-1 BASE COURSE | 366 | CY |
| CONC. SLAB (5"t Reinforced, Fuel Tank) | 106 | SF |
| CONC. SIDEWALK - BASE BID (Reinforced) | 1325 | SF |
| CONC. SIDEWALK - OPTIONAL (Reinforced) | 457 | SF |
| ADA ACCESSIBLE RAMP | 1 | EA |
| 3' WIDE VALLEY GUTTER | 46 | LF |
| SPILL CURB AND GUTTER | 107 | LF |
| VERTICAL CURB AND GUTTER | 121 | LF |
| ECO BLOCK RETAINING WALL (2.5x2.5x5) | 21 | EA |
| CHAINLINK FENCE | 53 | LF |
| 24' SLIDING GATE | 1 | EA |
| ADJUST FUEL LIDS TO GRADE | 2 | EA |
| STRIPING | 1 | LS |

| | | |
|---|---|---|
| STORM DRAIN | | |
| 6'x6' CONCRETE AREA DRAIN | 2 | EA |
| CATCH BASIN | 2 | EA |
| DOWNSPOUT CONNECTION | 1 | EA |
| OUTLET TRASH GUARD | 1 | EA |
| 4" CPP (Pipe from Downspout) | 54 | LF |
| 18" CPP | 105 | LF |
| OIL/WATER SEPARATOR w/ 18" BYPASS | 1 | EA |

**6. Structural Narrative**

Criteria Code: 2012 International Building Code with City of Ketchikan and State of Alaska Amendments

Structural Risk: Class II

Loads:

Snow: Ground Snow Load: 55 psf
Exposure Coefficient: Ce = 0.9, Exposure E, Partially Exposed
Thermal Coefficient: Ct = 1.0 For Roofs over heated spaces
Ct = 1.2 for unheated exterior canopies
Flat Roof Snow Loads: Pf = 40 psf minimum for roofs over heated spaces
Pf = 42 psf for unheated canopies
Drift loads: per ASCE 7-2010

Live Loads:
Mezzanines: 125 psf for light storage
Crane loads: 3 ton pick load
20 % of 6000 pounds or 1200 pounds – transverse rail load

Wind Load:
Ultimate Wind Speed: 140 miles per hour
Exposure D

Seismic Load
Site Class C

| | | |
|---|---|---|
| Ss = 0.303g | Fa = 1.20 | Sds= 0.24g |
| S1 = 0.25g | Fv = 1.55 | Sd1 = 0.26g |

R = 3.5 for ordinary moment frames for 1 story light canopies and framing with dead load less than 20 psf
R = 3.25 for ordinary braced frame systems with dead load less than 20 psf

<u>Construction</u>

Structural work includes modifications and additions to the existing structural systems for the Robertson and Hamilton Building. For the purposes of this narrative north is towards East Street with Stedman Street to the east. Structural work is shown on schematic structural plans and includes:

An option is the entry will not be enclosed but open. The columns and roof framing will be essentially the same. The foundation for the option will not have a perimeter foundation wall on a strip footing.

- Welding Gas Storage on Load Dock

The loading dock will be demolished and replaced by a 6 inch thick loading pad with thickened edges. On the southern edge there will be a 6 inch thick concrete wall supporting a roof framed with a 6 inch deep wide flange beam cantilevered from one side wall and then a 6 inch deep beam across the open side. The steel beams and the walls will support a 1.5 inch thick steel deck.

- Crane at Power Technology Lab

A new overhead 3 ton capacity bridge crane will be installed in the new Power Technology Lab. The crane will be supported by two rails that will be supported by rail beams, W`14x30 which will be supported on steel weldments off of the existing steel columns.

- Relocate Stairs in Hamilton Building

The existing stairs will be demolished and new steel pan stairs will be constructed in a new location. The stair stringers will be C12x20.7 and will be supported on C12x20.7 landing beams. At landings the construction will consist of concrete on a steel pan deck.

- Roof at Welding Storage

At the welding storage new columns and beams will support a low slope roof that cantilevers over some of the exterior electrical equipment. There will be field bolted moment connections between the columns and beams to create rigid frames in each principal direction. .

- IT Mezzanine

New tube steel columns in walls will support a new 10 inch deep steel beam spanning from the new wall south and north of the Simulator Room. The beam will support a 1.5 inch deep steel pan deck covered with concrete creating a 3.5 inch thick deck. The deck will span between the new beam to the existing steel stud wall along the north south corridor.

- Revision to North Entry Robertson

The existing entry opening in the concrete wall at the north end of the Robertson Building will be widened to include a new door and a relight alongside the door. The existing wall panel will be strengthened by the installation of a steel tube steel member, HSS 5x2x1/4 laid flat in horizontal position within one foot and above the door. The tube steel will have welded end plates and knife plates to attach the steel to the existing columns on each side of the door. The tube steel will have anchor tab plates welded to one side with the tab plates secured to the concrete wall panel using threaded rod embedded into the concrete with an adhesive.

## 7. Mechanical Narrative

The following codes and standards will be used for the mechanical design of the renovation.

- 2012 International Building Codes
- 2012 Uniform Plumbing Code
- 2015 National Fire Code/National Fire Protection Association
- ASHRAE 62 Ventilation for Indoor Air Quality
- Ventilation for Contaminate Control by American Conference of Governmental Industrial Hygienists.

**Demolition**

The mechanical systems will be thoroughly demolished in the Hamilton building portion of the Ketchikan Regional Maritime & Career Center except for the underground oil tank largely due to their poor condition as illustrated in the recent condition survey. In the Robertson building portion the

mechanical systems, being recently installed or renovated in 2003, will be retained but modified and updated and thus there will be only select demolition of these systems.

**Heating**

Plant: The heating plant for the Maritime a & Career Center will be located in the Hamilton Building second floor adjacent to where the existing heating plant is located. The baseline heating plant is intended to be two oil-fired boilers sized for approximately 70% design heating load and arranged in parallel with injection pump for each boiler. Primary-secondary heating piping arrangement is intended to help protect boiler shock and keep all circulation pumps sized lower. Secondary lead-lag variable speed pumps will circulate heating water to air handling unit heating coils, space heating units, and domestic hot water heating. The heating plant will be designed to utilize a low temperature heating water medium to allow for the additive alternate low temperature source, heat pumps. 8-inch breeching from each boiler would be connected together into one central 12" diameter chimney through the roof. Alternate heating plant options are being considered by another consultant. Baseline oil-fired heating plant would consist of the following:

- **Two boilers, cast-iron sectional, forced draft; sized at 448 MBH each, 8-inch dia breeching.**
- **Two boiler injection pumps, ¾ hp.**
- **Two circulation pumps, lead-lag variable speed, 1 hp.**
- **Heating plant piping; 3-inch size.**
- **Dual remote oil circulation pumps (first floor) and 50 gallon day tank (second floor).**

Heating Units:

Hamilton: Six heating zones in the Hamilton building portion are intended to supply ducted heated air from six variable volume air units booster coils and controlled by wall mounted thermostats. Average size of the VAV box is to be 800 cfm. Hamilton Entry will be heated with a new cabinet unit heater controlled by room thermostat. VAV booster coils and heating units will be sized for 110F entering water temperature. The Welding Lab will have a single unit heater (60 MBH) to pickup heating when larger doors are open. New 2-inch insulated heating piping, approx 250 feet HS/HR total, will be routed in the Hamilton building portion to its VAV boxes and other heating units.

Robertson: The two existing air handling units are intended to continue to supply heating air to the Robertson building portion of the Center. One existing unit heater is located in the Facilities Maint and will remain to supply heating. The existing 2-1/2 inch heating piping from the Hamilton bldg to the Robertson bldg will be reused with a new connection between the buildings.

The Robertson Building heating is accomplished mostly through the two existing ventilation systems; AHU-1 with zoned dual plenum heating with hot and cool deck dampers, 7 zones, controlled by room thermostats and AHU-2 with constant volume terminal boxes with reheat coils, 9 zones. A unit heater is located in the garage area.

The AHU-1 pre-heat and hot deck heating coils will be replaced with a low temperature heating medium type; each at 180 MBH. AHU-2 heating coil at 100 MBH would be replaced and six VAV boxes booster coils would be replaced with low temperature type coils; average VAV booster coil size of 4 MBH each. One AHU-2 heating zone (Health Science Classroom) would be moved to the AHU-1 system for better

scheduling of ventilation systems thus only 8 VAV booster coils will need to be replaced with low temperature type. Booster coil replacement would include booster coil, automatic valve, flow setter, isolating valves, air vent, and two test ports.

The existing underground 2000 gallon double wall fuel tank is located just west of the Hamilton Building under the parking area and would remain existing for the new heating plant. The remote oil circulation pumps and piping would be replaced with the lead-lag oil pumps located in a separate room on the first floor. Existing oil leak detection and monitoring panel would be relocated to a new corridor wall or inside the oil pump room. The oil pumps would supply oil to a new 50 gallon double wall day tank located in the new second floor Mechanical room where the oil burners would be gravity fed.

**Ventilation**

Hamilton: Replace the existing AHU system and all ductwork. New internally isolated **AHU-3 (5000 cfm)** located in new second floor Mechanical Room with variable speed supply and return fans (7.5 and 5.0 hp with VFD's), mixing box with outside air and return air dampers, MERV 13 replaceable filters, and heating coil (165 MBH) with face & bypass dampers. A separate supply fan **SF-1 (750 cfm)** would be located in the boiler room and supply cooling air to the boiler room. New ductwork would be routed to all spaces in Hamilton building including the Shared Class Weld/P. Tech classroom. Outside air intake cap, 3x4 feet and exhaust louver of 4x6 feet would be required.

Robertson: The Roberson Building is ventilated by two air handling units described in the heating section of this report. AHU-1 serves the classrooms areas through a dual plenum system and also has return fan RF-1. AHU-2 serves the office entry administration areas through constant volume terminal boxes with reheat coils.

One heating zone would be moved from AHU-2 over to AHU-1 which will require approximately 100 feet of 12-inch dia insulated duct, two automatic dampers and actuators (400 cfm, 12x8 inch) with connection to existing dual deck arrangement. Both AHU-1 (SF 2 hp, RF 3/4hp) and AHU-2 (SF 1-1/2 hp, RF 1 hp) would have their motors replaced with premium efficient and variable speed capability types. Both AHU systems would be converted to variable speed volume systems with VFD's and additional automatic controls as required.

In addition AHU-1 is anticipated to be converted to demand controlled ventilation with carbon dioxide sensors in each classroom to monitor and reduce air volumes during low occupancy. This system will be largely installed in the direct digital controls upgrade.

Ductwork, diffusers, and grilles for the AHU-2 system would be modified for the revised administration area layout.

**Exhaust Systems**

Hamilton: All exhaust fan systems would be removed. A ceiling mounted toilet room exhaust fan **(EF-5 @ 100 cfm)** would serve new restroom and would be controlled by an occupancy sensor with minimum runtime of 10 minutes. A new welding lab dry light duty dust collector exhaust fan **(EF-6 @ 3500 cfm, 7.5 hp)** with explosion vents, recirculation cartridge type filters, silencer, and shaker motor (2 hp) would exhaust from every welding station and cutting station area, approximately 24 individual pickups. A spark detector system would be located in the inlet ductwork with fire suppression connection from

existing wet sprinkler system. Abort gate/damper assembly would be located on the return ducting of the EF-6 system exhausted to outside. Design Manufacturer is AAF RC Optiflo.

A new utility type exhaust fan **(EF-7 @ 1800 cfm)** located in the new Hamilton second floor Mechanical Room and would provide general duty exhaust for Power Tech Lab. A new utility type exhaust fan **(EF-8 @ 1500 cfm)** located in the new Mechanical Room and would provide general duty exhaust for Welding Lab.

Power Tech Classroom: Install a new exhaust fan (**EF-9 @ 450 cfm)** that would exhaust fumes from a model engine or small generator. Locate the exhaust fan in second floor Mechanical Room and operate vehicle diesel exhaust fan from wall mounted switch. Terminate in flexible retractable hose reel with 35 foot length.

Robertson: Existing central exhaust fan EF-1 serves the main toilet rooms. Existing exhaust Fan EF-2 is a roof mounted fan that serves the LAB classroom. Existing EF-3 is a roof mounted fan that serves the fume hood in the Science Classroom/Lab, which is scheduled for demolition. EF-4 is an existing ceiling mounted fan with inlet grille that serves the Staff Lounge. All fans would be retained, except EF-3, and would be cleaned under this project.

**Plumbing Systems**

Hamilton: The plumbing systems would be removed entirely. New plumbing fixtures would be connected to existing sanitary waste piping located underground approximately 10 feet from each new fixture. Plumbing piping system would be connected to the existing Robertson building plumbing.
New Hamilton plumbing fixtures anticipated are:

- Welding Lab: wall mounted stainless steel utility sink, floor drain, emergency eyewash/shower with tempering valve and immediate floor drain.
- Toilet Room: Water closet, dual flush, floor mounted and wall mounted lavatory with hands free tempered faucet, floor drain with trap primer and an emergency eye wash.
- Janitor: Service sink, floor mounted.
- Power Tech: For refrigeration training install one cold water hose bibb and a floor sink with trap primer.
- Exterior: Wall convenience hose bibs/hydrant non-freeze type.
- Mechanical Room, Second Floor: Install a 2-inch floor sink and floor drain with tempering valves.

The existing 4-inch water service for domestic and sprinkler for Hamilton would be abandoned, shut off at the street service. Domestic and sprinkler service would be obtained from the existing systems in Robertson building. The existing 4-inch sanitary service that is routed to the south out of the building and then east to Tongass Ave would be reused for the Hamilton fixtures. New vent piping would be installed to a vent-through-roof located above the second floor Mechanical Room.

Robertson: The existing plumbing fixtures are anticipated to be reused in the project. The indirect hot water and tube bundle are to be demolished and replaced with a 50 gallon insulated hot water tank with electric elements. Existing hot water recirculation pump is to be reused.

- Marine Transportation Storage Drain: Install a new 2-inch drain and tempering valve for storage of wet gear in Marine Transportation Storage. Route a 2-inch sanitary pipe towards Stedman Street and connect to existing 4-inch sanitary, approximately 100 feet of 2-inch underground piping. Approximately 30 feet by 3 feet wide of concrete floor would need to be demolished and reinstalled for the sanitary waste pipe installation.

**Mechanical Controls**
The mechanical controls for the facility will be entirely replaced. The controls in the Hamilton building are original pneumatic-electronic type and are largely non-functional. The controls for the Robertson Building are direct digital controls (DDC) and installed in 2003 but are comprised of antiquated equipment that is no longer being supported by the manufacturer. Demolition of controls will include all pneumatic-electronic controls for Hamilton building and all direct digital controls and equipment for Robertson building.

New DDC type controls will be installed for the entire facility and connected to University web system for interface and monitoring. The DDC manufacturer will be competitively bid from a select list from the Owner. A new laptop computer would provide workstation at the facility and interface for DDC system onsite and remotely. Variable speed ventilation systems, demand control ventilation with CO2 sensors in classrooms, and monitoring outside air volumes will be incorporated into the new DDC system.

**Sprinkler Systems**
Hamilton: Demolish the entire wet pipe sprinkler system in the Hamilton building but retain the satellite garage glycol sprinkler system and backflow preventer. Extend a 4-inch wet sprinkler branch from the Robertson sprinkler header to serve Hamilton, approximately 120 feet in length. Install new sprinkler system in Hamilton and connect to existing glycol loop for exterior covered area, locate backflow preventer and glycol fill in second floor mechanical room.

Robertson: Modify existing wet sprinkler system for remodeled room layout of Robertson.

**Rain Leader – Drainage Systems**
Hamilton: Connect the existing roof drains together in new insulated 4-inch rain leader piping (approx 400 feet at 4-inch) and route to existing underground storm drain connection. Leave existing drains and overflow scuppers as-is.

Robertson: No rain leader system as rain is routed to gutters and downspouts. Minor site/drainage modifications are anticipated in one location of the downspout discharge at the east entry to avoid flow over sidewalk at building entry.

**Specialty Piping Systems – Compressed Air**
Hamilton: An existing 60 gallon receiver simplex air compressor with air dryer was recently installed in the Hamilton Building second floor for lab use. The compressor will be retained and moved to a new location in the Mechanical Room. New air piping will be routed to Welding Lab and Power Tech Lab starting with 1-inch main and transitioning to ¾-inch branches. Anticipated are 5 drops in Welding lab and 1 drop in Power Tech Classroom. Two air drops in Welding Lab and one drop in Power Tech would

terminate at a hose reel and consist of ½-inch air piping in a 35 foot retractable manual reel with air/water filter and shutoff. The other three drops in Welding Lab would terminate in an wall air outlet for quick-connect connection.

Robertson: Existing air compressor and dryer would be retained. Add an 80 gallon receiver for additional storage of compressed air.

**Specialty Piping Systems – Welding Gases**
Locate welding cylinders in an exterior accessible storage with locking doors. Install gas and oxygen manifolds in storage room and route mains to Welding Lab with termination points at each welding station.

**Mechanical Cooling**
Robertson: Ductless split system refrigeration cooling systems are anticipated to provide cooling for two rooms in the Robertson Building. The fan –coil unit and wall mounted thermostat would be located in the room with refrigerant piping routed to an exterior condenser unit located on the exterior of the building.

- Marine Transportation IT: 18,000 Btu/hr capacity cooling unit.
- Marine Simulator: 30,000 Btu/hr capacity cooling unit.

## 8. Electrical Narrative

The most recent publications of codes, regulations, and standards of the following resources will be applied:

- National Fire Protection Association, NFPA 70 – National Electric Code
- National Fire Protection Association, NFPA 72 – Standard for the Installation, Maintenance and Use of Protective Signaling Systems
- International Fire Code, IFC
- Illuminating Engineering Society of North America, IESNA.
- International Electrical Testing Agency, NETA
- National Institute for Certification in Engineering Technologies, NICET
- Building Industry Consulting Service International, BICSI

### Power System

The existing 208Y/120 volt service and main distribution equipment will be retained. The load demand for the upgraded facility is anticipated to remain within the capacity of the equipment. The existing utility transformer will remain in its present location in the alcove on the south side of the facility between the Hamilton and Robertson Buildings. The existing service switchboard is currently mounted to a wooden platform to allow circuits to exit to older conduits on the side of the Hamilton Building. These conduits will be replaced allowing the switchboard to be lowered to the main floor elevation.

All of the distribution system in the Hamilton Building will be replaced. This includes the feeders and panelboards. New panelboards will be located to specifically serve the Welding Lab and the Power Technology Lab. Additional panelboards will be located in the Electrical Room on the Second Floor

supporting circuits to the common spaces, the storage spaces, Group Study, and HVAC systems. The feeders, panelboards, and transformers located in the southern alcove and in the Open Work Area will be removed. Any unsupported circuits will be fed from panelboards on the second floor.

The Robertson Building is served by a single feeder from the service switchboard. It supports a main distribution panel in the Robertson Building electrical room. This main distribution panel, its outgoing feeders and panelboards will be retained. The Panelboards in the Bridges Room will be retained, but they will be refed from a UPS located on the Mezzanine Floor.

All of the panelboards will be deadfront style with hinged covers and doors. All feeder circuits will involve single conductors routed through conduit. The conduit on the interior of the building will be EMT and that in the southern alcove will be rigid steel. All conductors will be stranded copper with THHN/THWN insulation.

The existing grounding system will be retained and updated as required by code. Equipment bonding conductors will be routed with all feeders. The panelboards will all include ground buses to support branch circuit equipment ground conductors.

*Welding Lab:* A panelboard will be located near to the room entrance. It will provide branch circuits for all of the equipment and lighting in this room. Wireways will be mounted to the wall above the work stations with conduits extending down to receptacles and junction boxes for the equipment. The wireways will be connected to the panelboard with conduit. All wireways and conduit will be exposed. Cord reels with flexible cables and receptacles will be mounted to the ceiling at strategic locations as needed to support portable tools used in the center of the room. Power will be provided for the roll-up door as required.

*Hydraulics & Power Technology Labs:* A panelboard will be located inside the Power Technology Lab, near the entrance. It will serve both rooms. It will provide branch circuits for all of the equipment and lighting in this room. Wireways will be mounted to the wall above the work stations with conduits extending down to receptacles and junction boxes for the equipment. The wireways will be connected to the panelboard with conduit. All wireways and conduit will be exposed. Cord reels with flexible cables and receptacles will be mounted to the ceiling at strategic locations as needed to support portable tools used in the center of the room. Power will be provided for the roll-up door as required. A 3-ton bridge crane in the Power Technology Lab will also be provided.

*Group Study Area:* 120 volt receptacles will be distributed in the room to provide power for computers and portable equipment or devices.

*Corridors, Storage Rooms, Toilet Rooms, Vestibule, & Exterior:* 120 volt receptacles will be provided in strategic locations to support facility maintenance and cleaning.

*Mechanical Room:* 120 volt receptacles will be provided in strategic locations to support facility maintenance and cleaning. Circuits will be provided as needed to support the HVAC equipment. Motor starters will be provided as required.

*Robertson Storage Rooms:* The existing 120 volt receptacles will be retained where possible. Additional receptacles will be provided if necessary.

*Shared Classroom, Faculty Offices, & Reception:* The existing 120 volt receptacles will be retained where possible. Circuits will be rerouted if needed to complete connections where walls are moved or relocated. Additional receptacles will be provided where needed.

*Group Study at Stedman Entry:* The existing 120 volt receptacles will be retained where possible. Additional receptacles will be provided where needed.

*Multi-purpose Classroom:* Provide new 120 volt receptacles on the new wall common to the Simulator Room. Adjust the locations of receptacles on the west wall as required for the new cabinets.

*Simulator & Bridges Rooms: R*eceptacles and circuits will be provided as required for the computers and equipment associated with the system equipment.

*UPS:* A single UPS will be located in the Mezzanine above the Bridges & Simulator Rooms specifically for these rooms. It will be rated for the equipment in these rooms with some contingency allowance with a runtime of 15 minutes or more. It will include a panelboard for circuit distribution.

**Lighting & Lighting Control Systems**

All new lighting will utilize LED sources. The controls will include low voltage devices with ON-OFF, dimming, occupancy or vacancy sensors, photoelectric cells, and scheduling features. The existing lighting in the spaces not receiving modifications will be retained. Some luminaires may be relocated in the Robertson Building. The new rooms will have the following features:

*Welding, Power Technology, & Hydraulics Labs:* `Enclosed Industrial type, mounted to the ceiling with a layout that provides the best light uniformity over the work areas. The illumination levels will be approximately 50 foot candles in most work areas, but 100 foot candles where fine processes are anticipated. The storage and passage areas will be illuminated at approximately 15 foot candles. ON-OFF controls will be utilized. Designated luminaires in passages will be connected to dim to 30 percent output when in the OFF mode. The luminaires in the storage areas will be controlled by occupancy sensors.

*Mechanical, Storage, Electrical, & Data Rooms:* Industrial linear fixtures will be suspended from the ceiling with a layout allowing the best illumination of the equipment and materials. The illumination levels will be approximately 20 foot candles with the passages at 10 foot candles.

*Corridors:* Linear luminaires with direct and indirect output will be mounted to the walls. These will be used to illuminate bulletin boards and group study tables. The average illumination levels will be 10 foot candles with higher levels for the bulletin boards and group study tables. The lighting will be controlled by schedule with designated luminaires dimming to 30 percent when in the OFF mode.

*Restrooms:* Wall mounted, enclosed linear luminaires will be positioned above the mirrors. They will be controlled by occupancy sensors. Where provided, the exhaust fans will be controlled with the lights. The controls will be programmed to remain operating for a minimum of 15 minutes after the room becomes unoccupied.

*Group Study:* 2x2 troffers or recessed cylinders will be installed in the ceiling. Their layout will provide the best illumination along the walls to facilitate the study tables. The average illumination will be 20 foot candles. The luminaires will be controlled by occupancy sensors.

*Shared Classroom & Faculty Offices:* The existing troffers in these areas will be retained and repositioned to best illuminate the new room configurations. The illumination levels will be 30 foot candles. The classroom will be controlled with a switch station and vacancy sensors. The offices will be controlled with wall switch type vacancy sensors.

*Reception:* Recessed cylinders will be located to illuminate the work counter. Track lighting will be positioned on the walls or ceiling to illuminate the display walls. This area will be controlled with a dimming switch station and vacancy sensors.

*Group Study Area at Stedman Entry:* New luminaires with LED light engines will be provided in this room to allow dimming control and distribution typical for this type of space. The luminaires may be narrow linear troffers or recessed cylinders to highlight a conference table. Track lighting may be provided to illuminate the display walls. The luminaires will be controlled with a dimming switch station and vacancy sensors.

*Multipurpose Classroom:* The existing luminaires will be retained with some of them repositioned as required with the modified wall common to the Simulator Room. The illumination levels will be approximately 30 foot candles. The existing controls will be retained.

*Simulator & Bridge Classrooms:* The lighting in these rooms will uniquely include new 2x2 troffers used for non-instruction times and new recessed cylinders for instruction times. The recessed cylinders will utilize red light sources to simulate shipboard operations. All of the luminaires will be controlled from a dimming switch station.

*General Classrooms & Storage Rooms:* The existing luminaires will be retained and reused as much as possible. The luminaires will be repositioned as needed for the room modifications. The existing lighting controls will be retained where possible for the classrooms. The storage rooms will be controlled with switch type occupancy sensors.

*Exterior:* New wall mounted luminaires will be positioned on the wall along the back (water) side of the building. It will primarily illuminate the entrances, overhead doors, and loading dock. New luminaires will also be provided on the new canopy constructed over the main front entrance. These luminaires may be small recessed cylinders or long narrow profile luminaires mounted to the canopy. All of the lighting will be controlled by the photoelectric cell. The luminaires at the main front entrance and the back vestibule will include emergency battery support.

*New/Renovated Corridors & Passages:* Emergency battery packs will be included with the luminaires to provide the code required egress illumination with a power outage. Exit signs with emergency batteries will be located as required by code to define egress routes.

**Data & Communications Network**

The system in the Hamilton Building will be completely replaced. The new IDF will be located in a Data Room on the second floor adjacent to the electrical room. The new IDF will include patch panels and network switches with Category 6 cables routed to terminals in the Hamilton Building. Terminals will be distributed in the Welding, Power Technology and Hydraulics Labs as required for equipment and instruction stations. Wireless routers will be included and strategically located to provide data communications throughout the area. Additional terminals will be provided in the Group Study. The switches in this IDF will be connected to the existing network that resides in the Robertson Building existing Data Room using a fiber-optic backbone.

A new IDF will be provided in a room on the mezzanine above the Simulator & Bridge Rooms. It will be designated specifically for those rooms with patch panels and network switches as required. It will distribute Category 6 cables to the simulator and bridge equipment as required. Terminals will be provided for all of the equipment plus those required for instruction stations. This IDF will also be connected to the existing Data Room IDF with a fiber-optic backbone.

The network cables and terminals in the existing classrooms and offices will be retained. Some terminals will be removed and provided as required with the relocation of walls. These cables will be routed from the existing Data Room IDF.

New terminals and cables will be installed for the reception area and the meeting room. These cables will be routed from the existing Data Room IDF.

A basket tray will be installed in the Hamilton Building corridor to support cables to the IDF. The backbone cable will also utilize the basket tray to the Robertson Building where it will be supported by the existing cable tray. Conduits will be routed from the terminals to the basket tray in the Hamilton Building and to the existing cable tray in the Robertson Building.

A grounding system will be provided from the new IDF's to the new terminals.

**Fire Detection & Alarm System**

The existing Fire Detection & Alarm system will be retained with modifications as required by code for the modified spaces. The modifications in the Hamilton Building will include new manual pull stations at each of the exits and at the top of the stairs leading from the Mechanical Room. It will also include the provision of new horn/strobes and strobes as required by code. These will include such notification devices in each technical classroom, the restroom, and the corridor.

Strobes and horn/strobe notification devices in the Robertson Building will be relocated and supplemented as required to accommodate the space modifications.

All new circuits will be provided with cables or conductors in conduit. The basket or cable tray may be used where it is available.

**Door Access Controls**

Designed as an Additive Alternate, door access and control systems will be supported with cable and equipment installation as required for the electric latches, door position sensors, push buttons, and door operators. The door controls will be integrated into a network with a connection to the network as needed.

## 9. Construction Sequencing

The Schematic Design is intended as a single construction contract, phased renovation project to allow portions of the facility to remain in operation, with minimal disruption to academic programs which remain on-site during the renovation, during construction activities. This approach allows the University to maintain a presence at the Lower Campus during the renovation and minimizes interim space and moving costs.

Phase 1 – Hamilton Building Renovation

The first phase of the project will consist of complete renovation of the Hamilton Building, including demolition of all interior partitions, floor ceiling and wall finishes, interior stairway, sprinkler system, and mechanical and electrical systems. The boilers and air handlers on the second floor will be replaced, as will all electrical conduit, conductors, and panels. The fire alarm system, which connects both buildings, is nine years old, and is to be disassembled, stored, and reinstalled.

Sitework for this phase will include regrading and repaving (as an alternate) of the parking lot from East Street to correct drainage issues. Installation of catchbasins and below grade drain piping, and an oil water separator. Sidewalks and pole mounted area lights will be included.

Phase 2 – Robertson Building – Interior Remodel

This phase will consist of renovations to the interior spaces of the Robertson Building, including dividing some classrooms into smaller separate spaces, re-working the entry lobby to provide a vestibule, and separate group study area. The existing HVAC, electrical, sprinkler system, and ceiling will be adjusted to serve the reconfigured spaces. An outside air exhaust system will be provided for cooling of the Simulator IT room, along with a small mini-split heat pump to supplement cooling during the summer months.

Sitework for this phase will include burying roof drainage below grade, and connecting to the municipal storm sewer system along Stedman Street.

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April 14, 2016

**University of Alaska Southeast Ketchikan Regional Maritime and Career Center Renovation – Building Code Analysis – 2012 International Building Code**

Authored by: Amanda Robinson, Welsh Whiteley Architects LLC
Checked by Tim Whiteley, Welsh Whiteley Architects LLC

**A. Occupancy Types (Chapter 3):**

1. The following future categories of use were considered in this code study:
   - **B** (business – educational occupancies for students above the 12th grade) on main floor. Up to 490 occupants (including staff) whose primary us of the building is for educational instruction within a classroom or laboratory setting.
   - **A-3** (assembly group – classrooms with an occupant load greater than 50) on main floor. Up to 54 occupants within the science laboratory/ marine transportation classroom.
   - **F-1** (moderate hazard factory industrial – Power technology and welding laboratories) on main floor. 99 occupants within the power technology and welding laboratories whose primary use is for educational instruction.

B. **Required Fire Separations Between Occupancy Types (Chapter 5, Table 508.4)**

1. Separations between B and A: 1 hour separation required
2. Separations between A and F-1: 1 hour separation required
3. Separations between B and F-1: No separation required

Non-separated occupancies per IBC Section 503 permits no separation between these occupancies. "The allowable area and height of the building shall be based on the most restrictive allowances for occupancy groups under consideration for the type of construction." In this case the F-1 Occupancy is the most restrictive (per Section C below), and the allowable area and height is greater than the actual area and height of the building. Therefore, no occupancy separations are required.

C. **Allowed Building Floor Area and Height (Chapter 5, Table 503)**

1. Approximate Existing Floor Area:

| | Robertson/Hamilton Buildings |
|---|---|
| Main Floor | 17,100 s.f. |
| Upper Floor | 2,091 s.f. |
| Total Building Floor Area | 19,191 s.f. |

2. Existing Height: Approximately 32 feet, 2 stories

3. Allowed Building Height and Floor Area for V-B Construction with Automatic Sprinkler System* (Table 503 & Sections 504 and 506):

| Use | Height | Floor Area |
|---|---|---|
| B | (2 stories +1) = 3 Stories | (9,000 s.f. + 200%) = 27,000 s.f./floor |
| A-3 | (2 stories +1) = 3 Stories | (9,000 s.f. + 200%) = 27,000 s.f./floor |
| F-1 | (1 stories +1) = 2 Stories | (8,500 s.f. + 200%) = 25,500 s.f./floor |

4. Approximate Proposed Floor Area:

| | Robertson/Hamilton Buildings |
|---|---|
| Main Floor | 17,844 s.f. |
| Enclosed Work Area (boat shed) | 3,137 s.f. |
| Upper Floor | 2,091 s.f. |
| Total Building Floor Area | 23,072 s.f. |

D. **Building Type of Construction and Fire Resistance Ratings at Property Lines (Chapters 6 and 7):**

1. Existing Building Construction Type: V-B, constructed of any material permitted by code (602.5) and with no fire resistance rating required at structural and non-structural elements (Table 601).

2. Existing Distance to Property Lines*:

| | |
|---|---|
| South (Facing adjacent property access drive) | 5’ |
| West (Facing Stedman Street) | 40’ to CL of ROW |
| North (Facing East Street) | 50’ to CL of ROW |
| East (Facing Tongass Narrows) | 120’+ |

3. Fire Resistance at Exterior Walls Based on Distance to Property Lines are as Follows (Table 602):

| Distance to Property Line | B and A-3 Occupancies |
|---|---|
| Less than 5 feet: | **1 Hour** |
| 5 feet to less than 10 feet: | **1 Hour** |
| 10 feet and greater: | **Not Required** |

*These dimensions are based on the ‘Existing Conditions’ site plan prepared by R&M Engineering-Ketchikan, Inc. dated January 2016.

4. Allowed Window Openings at Exterior Walls (Table 705.8): UP = unprotected, S = sprinkled, P = protected (I.e. fire rated).

Percentages indicate amount of window area vs. the area of the surrounding wall surface.

| Distance to Property Line: | UP/S Openings | P Openings |
|---|---|---|
| 0 to less than 3 feet | Not Permitted | Not Permitted |
| 3 feet to less than 5 feet | 15% | 15% |
| 5 feet to less than 10 feet | 25% | 25% |
| 10 feet to less than 15 feet | 45% | 45% |
| 15 feet to less than 20 feet | 75% | 75% |
| 20 feet to less than 25 feet | No Limit | No Limit |
| 25 feet to less than 30 feet | No Limit | No Limit |
| 30 feet and greater | Not Required | Not required |

5. Parapets are generally required wherever exterior walls are required to be fire resistant construction based on distance to property lines (705.11), with the following exception for 1-hour rated walls:

1-hour fire rated walls are allowed to terminate at the underside of the roof sheathing if roof/ceiling framing elements, and structure supporting those elements, are of 1-hour fire resistive construction. Where ceiling joists are parallel to the fire wall, the 1-hour rating can terminate 4' from the interior wall surface. Where perpendicular to the fire wall, the 1-hour rating must extend the entire span of the ceiling joists.

If no parapets are provided, the roof may not be less than a Class B fire rating.

Openings in the roof may not be located within 10' of fire resistance rated exterior walls.

6. Projections: Roof overhangs, cornices, and other façade projections may not overhang more than 12" into the distance where openings are prohibited (for example a wall 5' from the property line may have 12" projections, but a wall 4' from the property line is not allowed any projections.) Where a combination of protected and unprotected overhangs are permitted, projections may not encroach more than 1/3 the distance to the property line (for example a wall 10' from the property line may have 3'-4" deep projections.)

E. **Sprinklers (Chapter 9):** The building is currently served by an automatic sprinkler system.

F. **Fire Alarms and Smoke Detection (Chapter 9):** The building is currently served by a fire alarm and smoke detection system.

G. **Occupant Loads and Exit Distances (Chapter 10):**

1. Applicable Occupant Load Factors (square footage divided by the OLF = occupant load) (Table 1004.1.1):

| | |
|---|---|
| Classrooms: | 20 Net |
| Offices: | 100 Gross |
| Assembly Areas: | 15 Net |
| Shops and Vocational | 50 Net |
| Storage: | 300 Gross |

2. Spaces with 1 Exit (Table 1015.1):

B and A Uses: If the occupant load exceeds 49 people, more than one exit must be provided, exit doors must swing out, and lighted exit signs are required.

3. Stories with One Exit (Table 1021.2):

| | | |
|---|---|---|
| First Floor: | B: | 49 Occupants and 75 feet of travel distance |
| | A-3: | 49 Occupants and 75 feet of travel distance |
| | F-1: | 49 Occupants and 100 feet of travel distance |
| Second Floor: | B: | 49 Occupants and 75 feet of travel distance |

4. Corridor Fire Resistance Rating (1018.1):

B, A & F Uses: No rating of the corridors serving these uses is required if the building is served by an automatic sprinkler system.

H. Example Occupant Load Calculation (Table 1004.1.1):

Main Floor – Classroom: 400 s.f. / 20 OLF = 20 People (1 exit required from if exit distance is within maximum.)

I. Accessibility:

Follow the American's with Disabilities Act, as well as Chapter 11 of the International Building Code, as adopted by the City of Ketchikan.

# REGIONAL MARITIME & CAREER CENTER

University of Alaska Southeast - Ketchikan Campus

## DRAWING INDEX

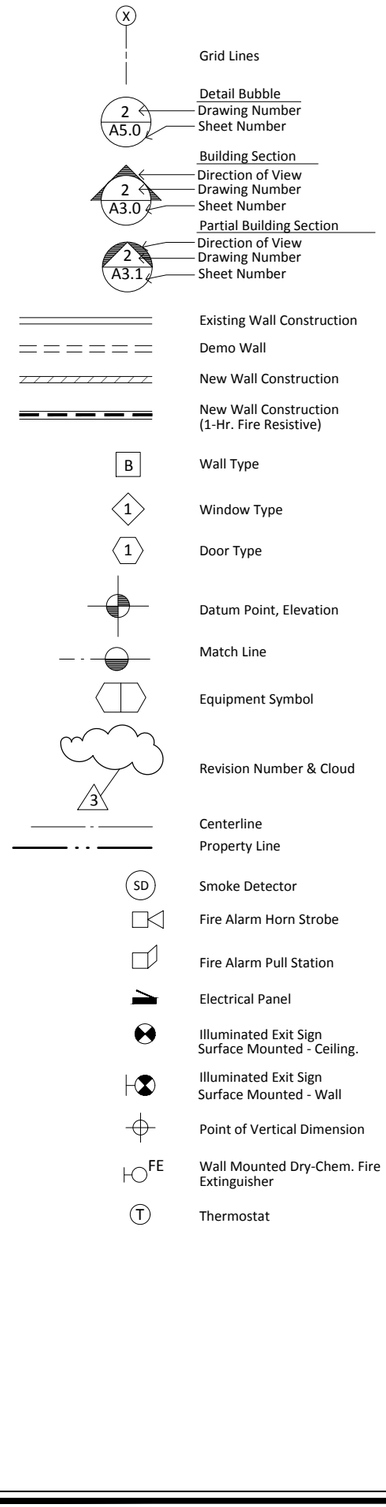
ARCHITECTURAL




Bettisworth WelshWhiteley LLC


April 2016
SCHEMATIC DESIGN

## DRAWING SYMBOLS




## ABBREVIATIONS

| | |
|---|---|
| AB | ANCHOR BOLT |
| ACOUS | ACOUSTICAL |
| ACT | ACOUSTICAL TILE |
| ADA | AMERICANS WITH DISABILITIES ACT |
| ADJ | ADJUSTABLE |
| AFF | ABOVE FINISHED FLOOR |
| AGGR | AGGREGATE |
| AL, ALUM | ALUMINUM |
| ANOD | ANODIZED |
| APPROX | APPROXIMATE |
| ARCH | ARCHITECTURAL |
| BD | BOARD |
| BTWN | BETWEEN |
| BITUM | BITUMINOUS |
| BLDG | BUILDING |
| BLK | BLOCK |
| BLKG | BLOCKING |
| BM | BEAM |
| BOT | BOTTOM |
| BUR | BUILT-UP ROOFING |
| CAB | CABINET |
| CHAMF | CHAMFER |
| CIP | CAST IN PLACE |
| CLG | CEILING |
| CLO | CLOSET |
| CLR | CLEAR |
| COL | COLUMN |
| CONC | CONCRETE |
| CONN | CONNECTION |
| CONSTR | CONSTRUCTION |
| CONT | CONTINUOUS |
| CORR | CORRIDOR |
| CPT | CARPET |
| CTSK | COUNTERSINK |
| CT | CERAMIC TILE |
| CTR | CENTER |
| DTL | DETAIL |
| DEMO | DEMOLITION |
| DF | DRINKING FOUNTAIN |
| DIA | DIAMETER |
| DIAG | DIAGONAL |
| DIM | DIMENSION |
| DISP | DISPENSER |
| DN | DOWN |
| DR | DOOR |
| DS | DOWN SPOUT |
| DW | DISH WASHER |
| DWG | DRAWING |
| E | EAST |
| EA | EACH |
| EXP JT | EXPANSION JOINT |
| ELEC | ELECTRICAL |
| ELEV | ELEVATOR, ELEVATION |
| EMER | EMERGENCY |
| ENCL | ENCLOSURE |
| EQ | EQUAL |
| EQUIP | EQUIPMENT |
| EXIST | EXISTING |
| EXP | EXPANDED, EXPANSION |
| EXT | EXTERIOR |
| FA | FIRE ALARM |
| FD | FLOOR DRAIN |
| FDN | FOUNDATION |
| FE | FIRE EXTINGUISHER |
| FEC | FIRE EXTINGUISHER CABINET |
| FF | FACTORY FINISH |
| FIN | FINISH |
| FLR | FLOOR |
| FLASH | FLASHING |
| FLUOR | FLUORESCENT |
| FOC | FACE OF COLUMN OR CONCERTE |
| FOF | FACE OF FINISH |
| FOS | FACE OF STUDS |
| FT | FOOT OR FEET |
| FTG | FOOTING |
| GA | GAUGE |
| GALV | GALVANIZED |
| GLU-LAM | GLUE-LAMINATED |
| GL | GLASS, GLAZING |
| GWB | GYPSUM WALL BOARD |
| GYP | GYPSUM |
| HB | HOSE BIB |
| HC | HOLLOW CORE |
| HD | HEAD |
| HDR | HEADER |
| HM | HOLLOW METAL |
| HORIZ | HORIZONTAL |
| HR | HOUR |
| HT | HEIGHT |
| HTG | HEATING |
| HVAC | HEAT/VENTILATION/AIR CONDITIONING |
| HW | HOT WATER |
| HWT | HOT WATER TANK |
| ID | INSIDE DIAMETER |
| IHM | INSULATED HOLLOW METAL |
| IN | INCH |
| INC | INCLUDING |
| INSUL | INSULATION |
| INT | INTERIOR |
| JB | JUNCTION BOX |
| JC | JANITORS CLOSET |
| KIT | KITCHEN |
| L | LENGTH, LONG |
| LAM | LAMINATE, LAMINATED |
| LAV | LAVATORY |
| LF | LINEAL FEET |
| LH | LEFT HAND |
| LT | LIGHT |
| MATL | MATERIAL |
| MAX | MAXIMUM |
| MB | MACHINE BOLT |
| MECH | MECHANICAL |
| MEMB | MEMBRANE |
| MEZZ | MEZZANINE |
| MTL | METAL |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MIR | MIRROR |
| MISC | MISCELLANEOUS |
| MTD | MOUNTED |
| N | NORTH |
| NIC | NOT IN CONTRACT |
| NO, (#) | NUMBER |
| NOM | NOMINAL |
| NTS | NOT TO SCALE |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OFF | OFFICE |
| OH | OVERHANG |
| OPNG | OPENING |
| OPP | OPPOSITE |
| OTS | OPEN TO STRUCTURE |
| PBD | PARTICLE BOARD |
| PERF | PERFORATED |
| PL | PROPERTY LINE/PLATE |
| P LAM | PLASTIC LAMINATE |
| PLYWD | PLYWOOD |
| PNL | PANEL |
| PR | PAIR |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| PT | POINT |
| PT | PRESSURE TREATED |
| R | RISER |
| RAD | RADIUS |
| RD | ROOF DRAIN |
| RBR | RUBBER |
| REF | REFERENCE, REFRIGERATOR |
| REFL | REFLECTED |
| RGTR | REGISTER |
| REINF | REINFORCED |
| REQ | REQUIRED |
| RESIL | RESILIENT |
| RH | RIGHT HAND |
| RM | ROOM |
| RO | ROUGH OPENING |
| ROW | RIGHT OF WAY |
| RT | RESILIENT TILE |
| S | SOUTH |
| SC | SOLID CORE |
| SCHED | SCHEDULE |
| SEAL | SEALANT |
| SECT | SECTION |
| SHR | SHOWER |
| SHT | SHEET |
| SIM | SIMILAR |
| SPEC | SPECIFICATION |
| SQ | SQUARE |
| SQ FT | SQUARE FOOT (FEET) |
| SQ IN | SQUARE INCH (ES) |
| SST | STAINLESS STEEL |
| STA | STATION |
| STD | STANDARD |
| STL | STEEL |
| STOR | STORAGE |
| STRUCT | STRUCTURAL, STRUCTURE |
| SUSP | SUSPENDED |
| SYM | SYMMETRICAL |
| SV | SHEET VINYL |
| T, TRD | TREAD |
| T&G | TONGUE AND GROOVE |
| TEL | TELEPHONE |
| TEMP | TEMPERED |
| TER | TERRAZZO |
| THRESH | THRESHOLD |
| T JT | TOOLED JOINT |
| TOS | TOP OF SLAB |
| TYP | TYPICAL |
| UL | UNDERWRITERS' LABORATORIES |
| UNFIN | UNFINISHED |
| UON | UNLESS OTHERWISE NOTED |
| VT | VINYL TILE |
| VERT | VERTICAL |
| VTR | VENT THROUGH ROOF |
| W | WEST |
| W/ | WITH |
| WC | WATER CLOSET |
| WD | WOOD |
| WDO | WINDOW |
| W/O | WITHOUT |
| WL | WATER LINE |
| WT | WEIGHT |
| WWF | WELDED WIRE FABRIC |
| WWM | WELDING WIRE MESH |

## ALTERNATES

Alternate #1: Air Source Heat Pump

Alternate #2: AHU-1 Demand Control Ventilation

Alternate #3: AHU-1 Variable Air Flow

Alternate #4: AHU-2 Variable Air Flow

Alternate #5: Covert 3 faculty Offices to 4.

Alternate #6: Parking Lot Paving and Sidewalks

Alternate #7: New canopy at Stedman entrance

Alternate #8: Electronic Door Control System

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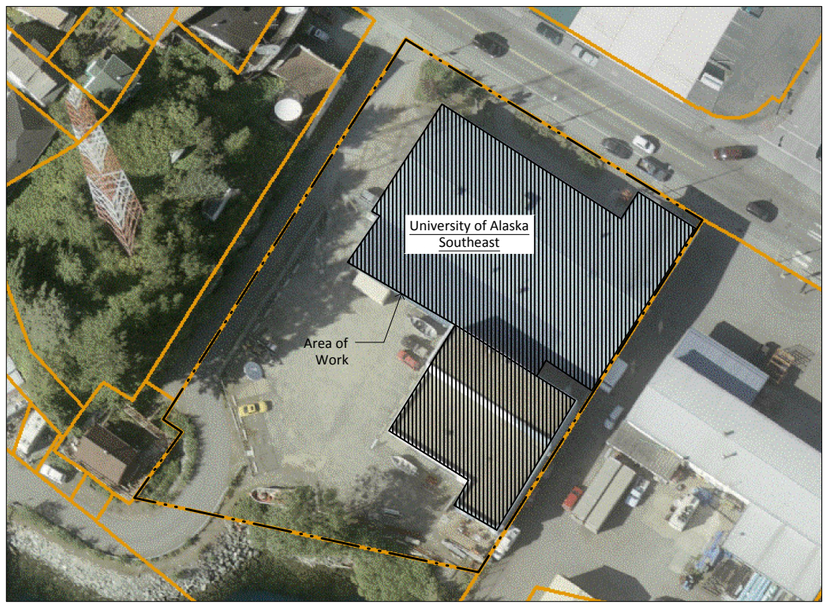


1 Vicinity Plan
NOT TO SCALE

N

Schematic Design

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REVISIONS

# Regional Maritime & Career Center

University of Alaska Southeast Ketchikan
UAS Proj. #: 2015-03

DATE: 04–15–16
PROJ. No.: 1535

A0.1
Project Information

EAST STREET

STEDMAN STREET

Existing Residence

New 24' Wide Sliding Gate

Alternate #6: New Pavement & Sidewalks

12 Spaces

New Fence

Boat Storage, Typ.

Access Easement

9 Spaces

Catch Basin

8 Spaces

Light Pole and Base

4 Spaces

Compact

Catch Basin

Alternate #6: New Pavement & Sidewalks

ROBERTSON BUILDING

Oil Water Separator

New Entry With Roof

Extend Fence Into Tidal Area

Existing Life Boat Davit & Walkway

Outlet Pipe

Existing Underground Fuel Storage Tank

Access Easement

Alternate #7: New Canopy

Loading Pad

HAMILTON BUILDING

Covered 3-Sided Storage for Welding Gas

Existing Dock

Existing Fence

Utility and Access Easement

1 Architectural Site Plan

0 10' 20'

N Plan North

True North

Schematic Design


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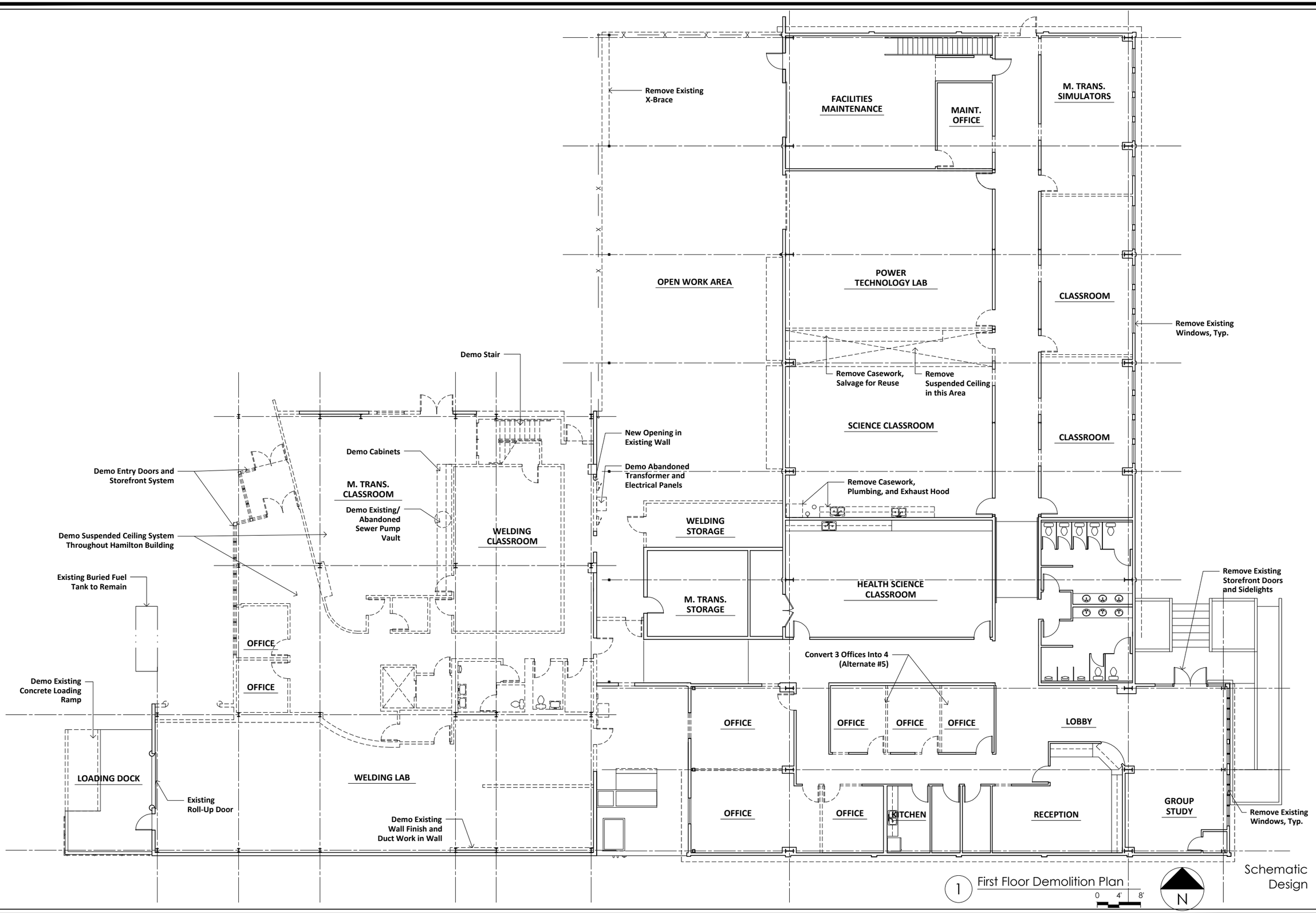
A0.2
Architectural Site Plan




1 First Floor Demolition Plan

0 4' 8'

N

Schematic Design

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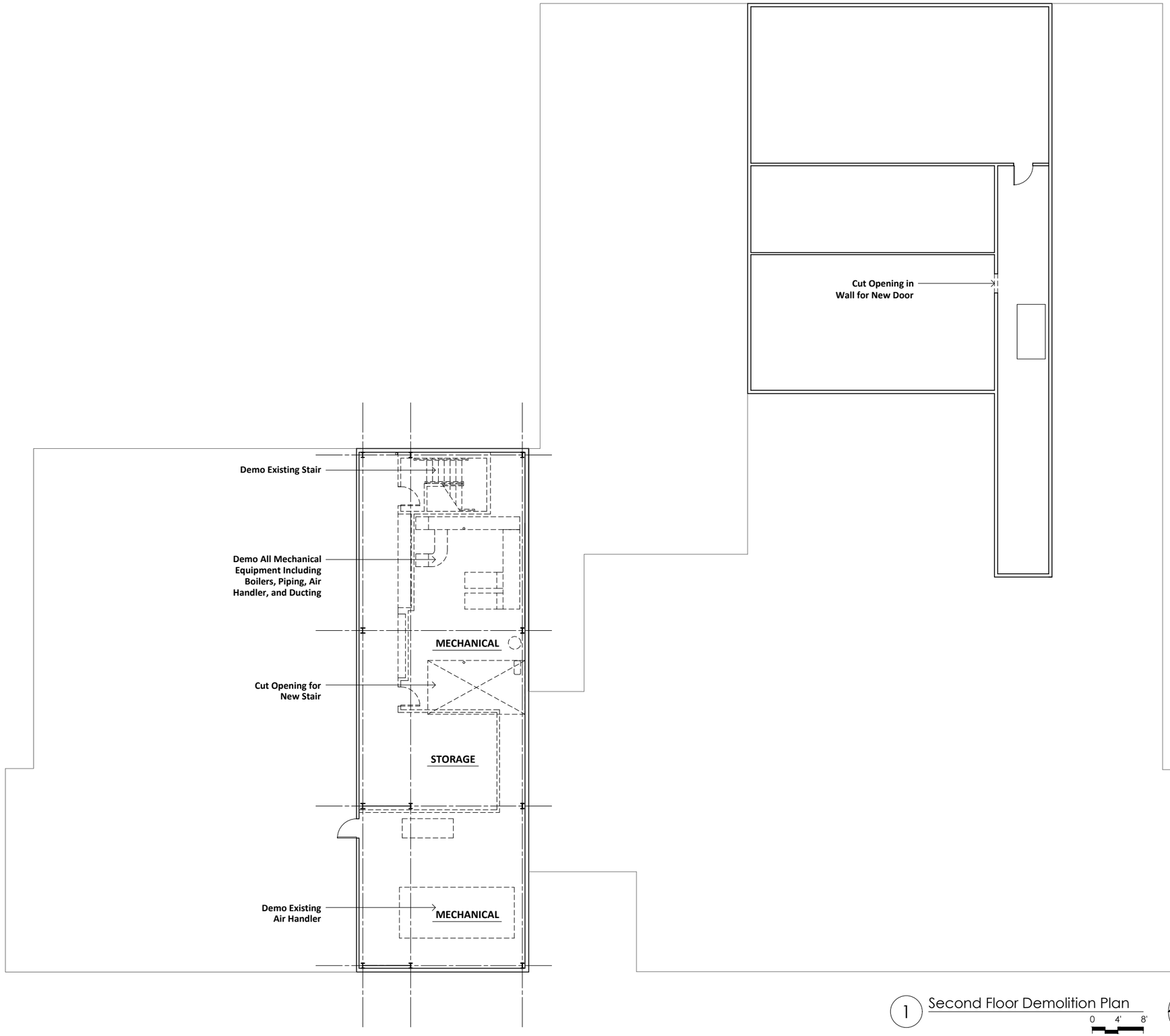
A1.0

First Floor Demolition Plan




1 Second Floor Demolition Plan

0 4' 8'

N

Schematic Design

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A1.1

Second Floor Demolition Plan

**SHEET NOTES**

1. **Existing doors are denoted as "E" on floor plan.**

New Fence
New Door and Storefront System
Haz-Mat Storage
New Swinging Gates
New Dividing Fence
New X-Brace
OPEN WORK AREA
Damage Control Unit (Portable)
(2) New 5' Wide Gates
New Man Door in Fence
New Overhead Door
Roof Above
New Rails
3 -Ton Bridge Crane
New Overhead Door
Existing Buried Fuel Tank
Oil Pumps
New Concrete Loading Pad
Storage Mezzanine Above
Existing Roll-Up Door
LOADING PAD (AT GRADE)
Welding Gas Storage
Welding Gas and Manifold
Low Head Room Storage Under Stair
Drinking Fountain
Brace, Typ.
20' Working Clearance
Re-Install Cabinets
New Counter and Sink
Existing Cabinets and Counters
Existing Elec. Equipment
Ramp (Existing)
Convert 3 Offices Into 4 (Alternate #5)
New Entry Canopy (Alternate #7)
New Entry Doors

FACILITIES MAINTENANCE 121 686 SQ. FT.
VESTIBULE 120V1
MARINE TRANS. STORAGE 119B 161 SQ. FT.
MARINE TRANS. STORAGE 118A 281 SQ. FT.
MARINE TRANS STORAGE 118B 44 SQ. FT.
BRIDGES/ MEETING 119 696 SQ. FT.
IT 119A 58 SQ. FT.
CONT. ROOM 117A 53 SQ. FT.
HALL 120
GENERAL CLASSROOM 116 438 SQ. FT.
SIMULATOR 117 527 SQ. FT.
CLASSROOM 114 404 SQ. FT.
POWER TECHNOLOGY LAB 107 2600 SQ. FT.
MULTI - PURPOSE CLASSROOM 115 1062 SQ. FT.
POWER TECH STORAGE 112B 152 SQ. FT.
STORAGE 112A 147 SQ. FT.
WOMEN'S 110W
MEN'S 110M
HYDRAULICS LAB 107A
TOOL CRIB 107B
JANITOR 100U
GROUP STUDY 105 563 SQ. FT.
HEALTH SCIENCE CLASSROOM 111 824 SQ. FT.
VESTIBULE 110V1
HALL 110
TOILET ROOM 110T
WELDING STORAGE 106A 80 SQ. FT.
TOOL CRIB 106B
WELDING LAB 106 2549 SQ. FT.
SHARED CLASS WELD./ P. TECH. 104 589 SQ. FT.
HALL 103
FACULTY OFFICE #3 103J 91 SQ. FT.
FACULTY OFFICE #4 103G 89 SQ. FT.
FACULTY OFFICE #5 103C 89 SQ. FT.
ADJUNCT OFFICE 103A 91 SQ. FT.
LOBBY 100
VESTIBULE 100V1
FACULTY OFFICE #1 103G 90 SQ. FT.
FACULTY OFFICE #2 103H 90 SQ. FT.
KITCHEN 103F 98 SQ. FT.
ELEC. 103E
DATA 103D
SHARED TECH. OFFICE 103B 128 SQ. FT.
RECEPTION 102 269 SQ. FT.
MEETING ROOM 101 263 SQ. FT.
SPRINK. 101A

1 First Floor Plan
0 4' 8'
N

Schematic Design


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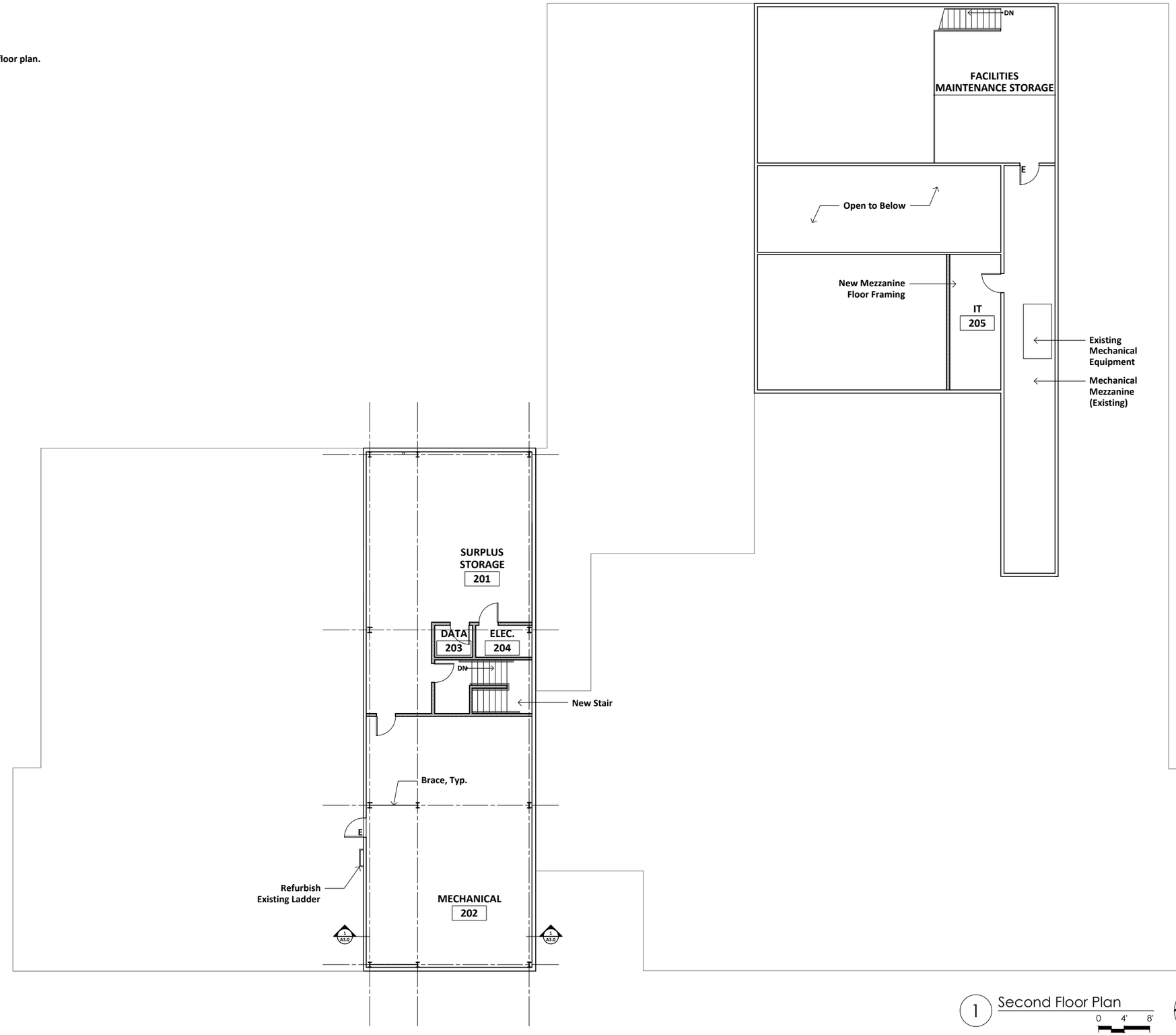
**A2.0**
First Floor Plan

**SHEET NOTES**

1. **Existing doors are denoted as "E" on floor plan.**




1 Second Floor Plan

0 4' 8'

N

Schematic Design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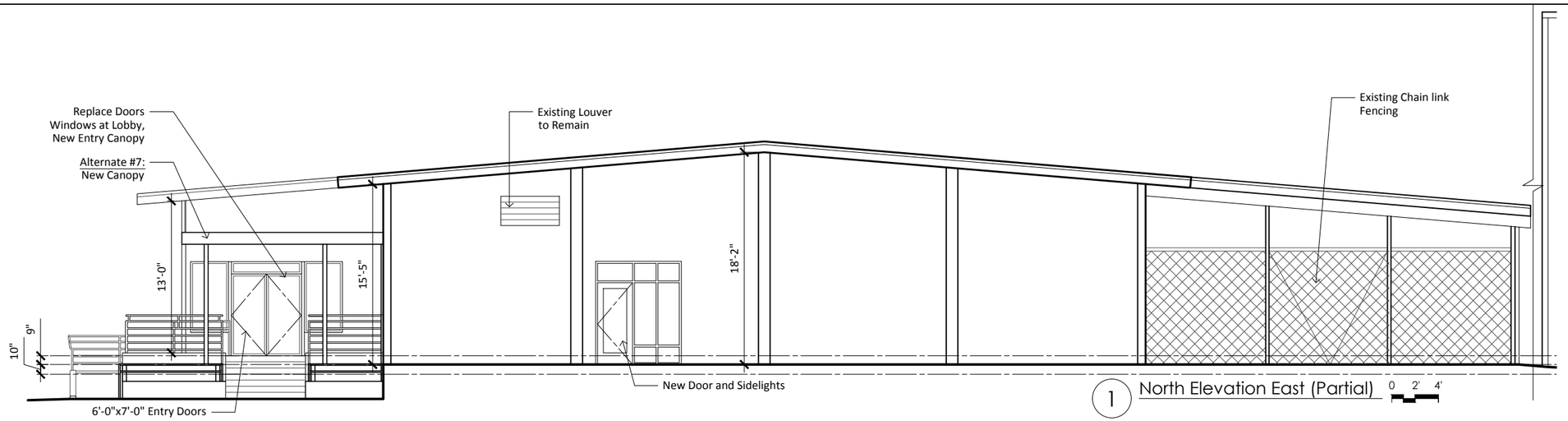
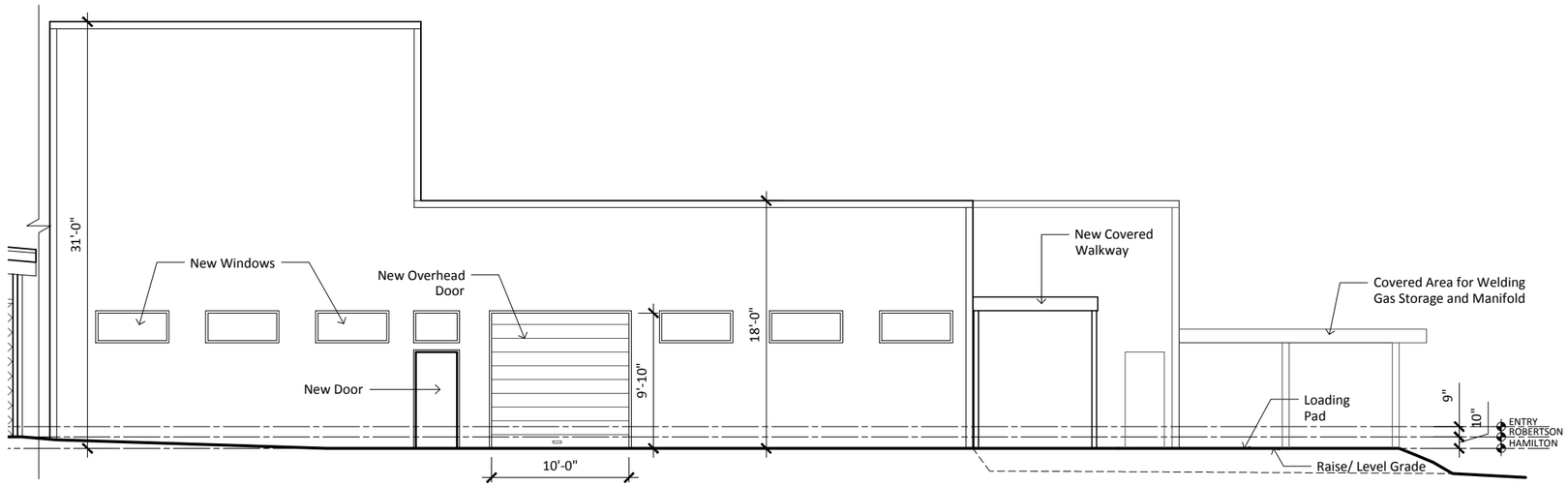
**A2.1**

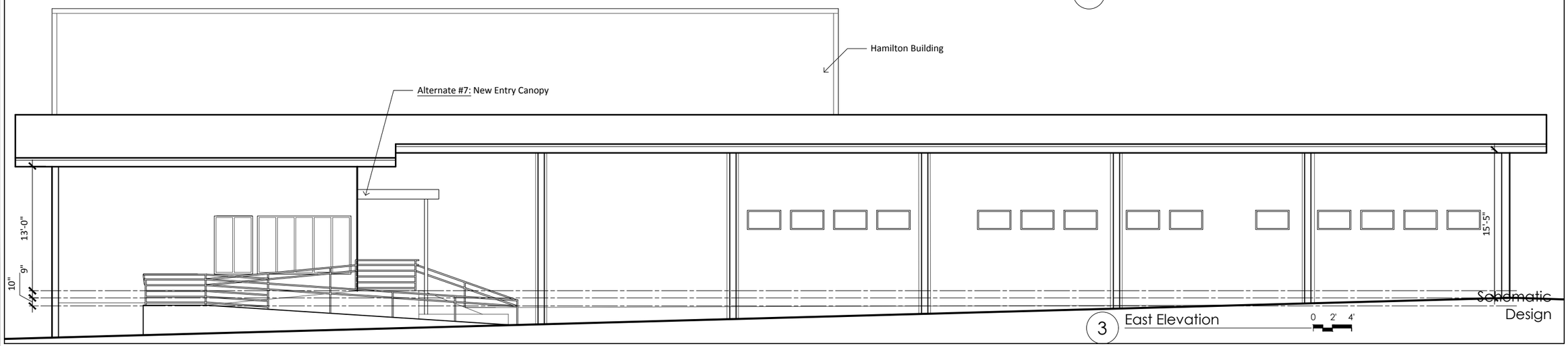
Second Floor Plan




1 North Elevation East (Partial) 0 2' 4'




2 North Elevation West (Partial) 0 2' 4'




3 East Elevation 0 2' 4'

Schematic Design

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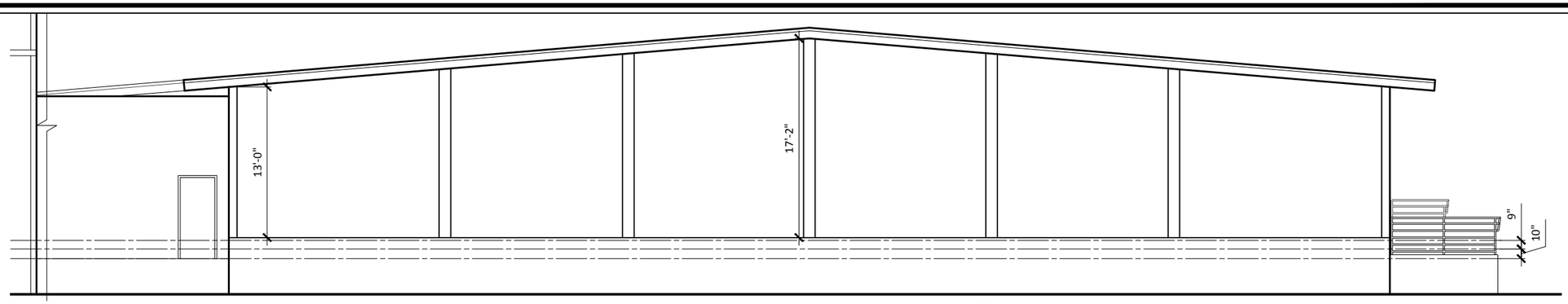
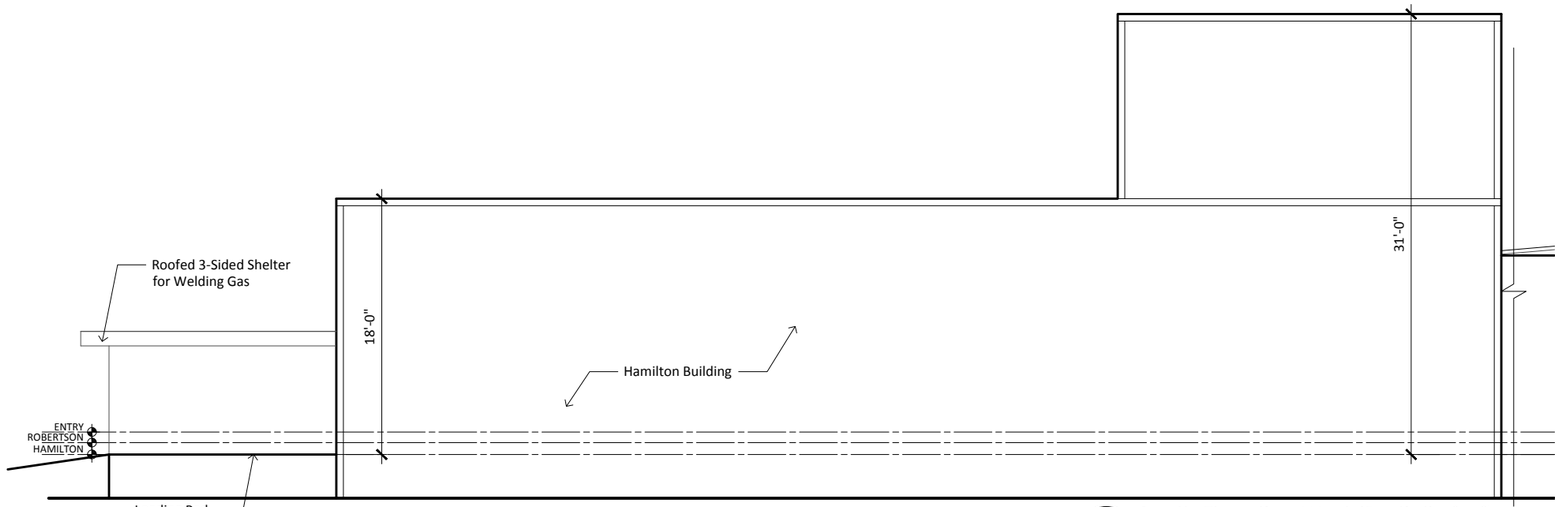
A4.0

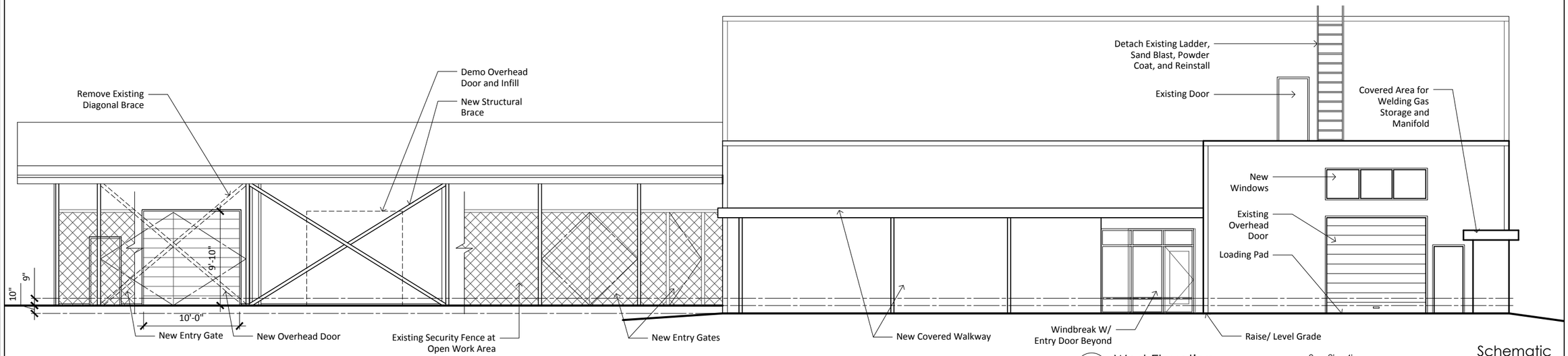
Elevations




1 South Elevation East (Partial) 0 2' 4'




2 South Elevation West (Partial) 0 2' 4'




3 West Elevation 0 2' 4'

Schematic Design

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A4.1
Elevations