UNIVERSITY of ALASKA
Many Traditions One Alaska

Total Project Cost	$ 1,800,000
Approval Level:	AVP F&LM

SCHEMATIC DESIGN APPROVAL REQUEST

TO: Kit Duke
AVP Facilities and Land Management

THROUGH: John Pugh
Chancellor

For John Pugh, 12/12/2014

THROUGH: Michael Ciri
Vice Chancellor

THROUGH: W. Keith Gerken
Director

FROM: Ke Mell
Project Manager

DATE: December 15, 2014

SUBJECT: Project Type: Renovation & Repurposing Project
Project Name: Technical Education Center Renewal, Phase 2
Project No.: 13-02b

Cc: Rick Caulfield, Provost
Pete Traxler, Associate Dean Career Education

SCHEMATIC DESIGN APPROVAL

Name of Project:	**UAS Technical Education Center Renewal, Phase 2**
Project Type:	**Deferred Maintenance and Renewal, Renovation & Repurposing**
Location of Project:	**UAS, Juneau Campus, Technical Education Center and Welding Lab, Juneau**
Project Number:	**2013-02b**
Date of Request:	**December 15, 2014**

Total Project Cost:	**$ 4,620,000**	**Phase 2 TPC: $ 1,800,000**
Approval Required:	**FLMC Chair**	
Prior Approvals:	**Preliminary Administrative Approval**	**June 2012**
	Formal Project Approval	**December 12, 2013**
	Phase I Schematic Design Approval	**May 4, 2014**

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 Associate Vice President of Facilities and Land Management approves the Schematic Design Approval request for the University of Alaska Southeast Technical Education Center Renewal, Phase 2 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 $1,800,000.

Project Abstract

The Technical Education Center Renewal, Phase 2, is the second year of a multi-year project of building upgrades to the Technical Education Center and the Welding Lab. Academic programs and curriculum have changed significantly since the Technical Education Center and Welding Lab were put into service in 1984 and 1981 respectively. As a consequence, current programs were not well supported. The Technical Education Center received additions in 1985 and 1992, but neither building has had a major remodel until this project began. Mechanical and electrical systems in both buildings were largely

original. The concept for this project began in 2006 as an expansion of the current diesel technology lab and has expanded based on the conceptual planning process.

RATIONALE AND REASONING

Background
The project is phased: 1) to fit within available funds and 2) so that as much of the work as possible can be done during the summer break to minimize the impact to those programs that have no alternative locations to teach in during the academic year.

Programmatic Need
Some wood shop equipment used by the Construction Technology Program is unnecessary and can be removed. Reducing the area occupied by wood shop equipment will free up space for a classroom needed in tandem with lab space in accordance with current teaching practices.

Project Scope
In Phase 1, the Power Technology Program received upgraded and expanded space, configured to meet current program requirements.

Phase 2 will reconfigure existing space to provide a smaller and more efficient Construction Technology lab, a Power Technology classroom, new Health Sciences space, while replacing and/or renewing existing building systems.

Future phases include replacement of additional building equipment systems and components that are nearing the end of their service lives, upgrading building common areas, and upgrading additional program spaces.

Project Impacts
Conceptual and schematic design for all phases is complete. Project phasing is tailored to minimize impacts on academic programs. All programs will remain in TEC at full capacity throughout the project. Each phase will be self-contained, though building on previous phases.

Variances

1) The UAS Health Sciences program is currently located in the Hendrickson Building. The Hendrickson Building is being renovated as part of the Juneau Campus Modifications project and will be repurposed as administrative space. Several possible locations for Health Sciences have been examined and the fact that Health Sciences is organizationally part of the School of Career Education, it was logical to accommodate Health Sciences in the TEC. The Juneau campus modifications project will fund a portion of the cost of the work required to relocate Health Sciences.
2) Just as the schematic phase was completed, the UAA Nursing Program approached UAS to examine the possibility of co-location with the UAS Health Sciences Program. If shared use of the class/lab space currently designed for this project is feasible, this would seem to be more cost effective in terms of both capital and operating costs. We have not had time to examine how this shared use might impact this schematic design and we will do this as part of our further design phases. At this point, our sense is that the shared use is certainly possible but that some additional support spaces may need to be added to the current design. If the scope of changes rises to the level of a "material" or "significant" change, UAS will prepare a Project Change Request in accordance with Board policy.

3) The Formal Project Approval included a rearrangement of space to accommodate an expanded Mine Training Center within the TEC project. One of the goals of the expanded Mine Training Center is to achieve a greater visibility and autonomy for this program. This has been a difficult design challenge within the existing facility. During schematic design it was determined that the Mine Training Center would be better accommodated in the adjacent Marine Technology Building (MTB). The MTB is located on the same site as the TEC and will provide suitable space, as part of a Career Education complex, with the benefit of a separate entrance and identity. The remodel of the MTB to accommodate the Mine Training Center will proceed as an independent project, funded with a recently received Department of Labor Grant.

Total Project Cost and Funding Sources – Phase 2

Funding Title	Fund Account	Amount
2013 DM&R Funds	77110-563138	$575,000
FY09 Capital Funds (Anderson Building)	77101-563118	$1,225,000
Total Phase 2 Funding		$1,800,000

Annual Program and Facility Cost Change Projections

Program Costs	Amount
Salaries and benefits for new program Staff and Faculty	unchanged
Program Operating Costs	unchanged
Total Annual Program Cost Increase	unchanged
Facilities Cost Changes:	
Maintenance & Repair	unchanged
Operations	will be reduced
Annual O&M Cost Changes	will be reduced
Total Annual Cost Projections	**will be reduced**

Project Schedule

DESIGN	
Conceptual Design	September 2013
Formal Project Approval	December 2013
DESIGN – Phase 2	
Schematic Design	October 2014
Schematic Design Approval	December 2014
Construction Documents	February 2015
BID & AWARD - Phase 2	
Advertise and Bid	March 2015
Construction Contract Award	March 2015
CONSTRUCTION – Phase 2	
Start of Construction	May 2015
Construction Complete	August/December 2015
Date of Beneficial Occupancy	August/December 2015
Warranty Period	One year

Project Delivery Method
Design-Bid-Build

Project Design Team
Jensen Yorba Lott, Inc.

Murray and Associates, P.C.
Begenyi Engineering, LLC

Supporting Documents
- One-page Project Budget
- Design Narrative Document
- Drawings
  - Floor Plans

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

Approvals
The level of approval required for SDA shall be based upon the estimated TPC as follows:

- TPC > $5.0 million will require approval by the board based on the recommendations of the Facilities and Land Management Committee (FLMC).
- TPC > $2.0 million but not more than $5.0 million will require approval by the FLMC.
- **TPC ≤ $2.0 million will require approval by the AVP of Facilities and Land Management.**

Schematic Design Approval is hereby granted:

12·15·2014

Kit Duke, AVP F&LM — Date

This Approval is subject to the following provisions:

UNIVERSITY OF ALASKA

Project Name: Technical Education Center Renewal

MAU: UAS

Building: Technical Education Center | Date: 12/10/2014 | Prepared by: WKGerken

Project #: 2013-02 | Acct #(s): various

Total GSF Affected by Project, Phase I:	7,296		**Phase I**		**Phase 2**
PROJECT BUDGET		FPA Budget	SDA Budget		SDA Budget
A. Professional Services					
Schematic Design, All Phases			86,040		
Consultant: Design Services	10.0%	536,000	172,362		147,638
Consultant: Construction Phase Services	5.0%	71,000	20,583		73,819
Consul: Extra Services, Energy Analysis, All Phases			15,590		
Site Survey					
Soils Testing & Engineering					
Special Inspections	2%	71,000	20,583		
Plan Review Fees / Permits		8,000	2,667		
Other: Pdf scans of original building drawings			740		
Professional Services Subtotal		**686,000**	**318,565**		**221,457**
B. Construction					
General Construction Contract(s)		3,191,000	935,589		897,480
Health Science Relocation					420,716
Other Contractors (List:_____)					
Construction Contingency	12.0%	383,000	93,559		158,184
Construction Subtotal		**3,574,000**	**1,029,148**		**1,476,380**
Construction Cost per GSF		*163*	*141*		
C. Building Completion Activity					
Equipment		25,000	20,000		
Furnishings		75,000	15,000		
Signage not in construction contract					
Move-Out Costs					
Move-In Costs					
Art					
Other (Interim Space Needs or Temp Reloc. Costs)					
Maintenance Operation Support					
Building Completion Activity Subtotal		**100,000**	**35,000**		**-**
D. Owner Activities & Administrative Costs					
CIP Recovery	3.5%	152,000	48,395		59,424
Project Plng, Staff Support					
Project Management	2.5%	108,000	34,568		42,446
Misc. Expenses: Advertising, Printing, Supplies, Etc.					
Owner Activities & Administrative Costs Subtotal		**260,000**	**82,963**		**101,870**
E. Total Project Cost		**4,620,000**	**1,465,675**		**1,799,707**

UAS
Technical Education Center Renewal

Phase 2
Schematic Design Narrative

Jensen Yorba Lott, Inc.

October 23, 2014

SCHEMATIC DESIGN NARRATIVE

GENERAL PROJECT DESCRIPTION:

The UAS Technical Education Center in downtown Juneau is comprised of two buildings; the technical center and the welding lab. The facility serves the vocational education program for UAS consisting of Power Diesel Mechanic Training, Mine Training, Welding, Construction Technology as well as Marine Highway Education and the Health Sciences program. The facility is also used by local mine companies for safety training and refresher courses and by first responders for CPR and EMT training. The Technical Center is slated to be renovated under phase 2 of the project. The Technical Center is a two story structure of 27,637 gsf on the first floor and 8, 861 gsf on the second floor for a total building area of 36,498gsf.

PHASE 2 SCOPE OF WORK

Phase 2 of the project will include the following base bid work and alternates:
Base Bid: Work will include work that did not get completed in phase 1 construction consisting of renovation of the Power technology classroom (119), Construction Technology class room (120), adjacent storage rooms 112 and 115, Hall 121 and storage rooms 128 & 129. Base bid will also include replacement of the auto shop air compressor and repair of the existing back flow preventer.

Bid alternates include the following:

Alternate 1 Replace the wood shop dust collection system.

Alternate 2 Replace motor controls and fan motors.

Alternate 3 Replace exterior overhead/coiling doors

Alternate 4 Provide exhaust fans for UAS existing portable generators.

Alternate 5 Clean ducts

Alternate 6 Provide wrap around heat recovery

Alternate 7 Renovation of the first floor mining area (rooms 123-130). This alternate is fully funded and will be awarded. The funding is from a grant and thus needs to be accounted for separately.

Alternate 8 Renovation of the second floor for the Health Sciences program. This alternate is fully funded and will be awarded. The funding is not from the same source as the other work and thus needs to be accounted for separately.

Alternate 9 Epoxy flooring for the first floor of the facility. This will be bid as a unit cost including floor preparation. The university will award the extent of flooring that is within their budget.

PHASE 2 PROJECT SCHEDULE

The extent of work included in phase 2 exceeds the amount of construction that can be completed within the summer months (Approximately May 7 to August 15).
For this reason the project will have staggered completion dates.
Completion by August 15, 2015: base bid work, alternate 8 and possibly alternate 9 for a portion of the facility.
Completion by December 30, 2015: Alternate 1-7 &the remainder of 9 that can be awarded.

BUDGET
The construction budget for base bid and alternates 1-6 and 9 is $1,131,780.
The construction budget for alternate 7 is approximately $800,000.
The construction budget for alternate 8 will be determined through cost estimation as part of this work.

Base Bid and bid alternates are identified graphically on sheet A003 and A004 and the work is described in the narrative and key notes.

COMPLIANCE CRITERIA:
Code Data 2009 IBC:
The building is classed: Occupancy E & S1,
We have assumed an E occupancy because the building is used by the high school, rather than a B occupancy normally used for higher education facilities. Because the building has an automatic sprinkler system there is little impact to areas or fire separation if classed as an E rather than a B.
Construction type V B full automatic sprinkler system.
The building designed is based on section 508.3 non separated uses which does not require fire separation between E and S1 occupancy.

Table 508.3
Technical Center
Allowable area S1/VB 9,000 sf per floor one story 40' (Most restrictive) Design is based on this use.
Allowable area E/VB 9,500 sf per floor one story 40'
Allowable area increase 504.2 Automatic Sprinkler system 2 stories 60'
Allowable are increase 506.2 Frontage W=30' minimum F=P If= .75
Allowable area increase 506.3 Is=2 Automatic Sprinkler System
Allowable area Aa= 35,625 gsf

Actual area 27,637 sf
Actual Height 2 stories 38'-6"

Table 601 Fire resistant rating requirements for building elements: 0 hours for all components except exterior non bearing walls.
1 hour 5'-10'
0 hour >10'
There is no exterior wall closer than 5' to the property line for either building

Table 508.2.5 Incidental accessory occupancies
Furnace Room equipment >400,000 BTU/hour: Sprinkler & smoke partition 508.2.5.2
Paint shop: 1 hour and sprinkler
Vocational Shops (in E occupancy): Sprinkler & smoke partition 508.2.5.2

The following describes specific components of the project by discipline:

ARCHITECTURAL

See drawing key notes, partition schedule, door schedule, finish schedule and floor plans for description of work. Products listed are "Basis of Design" and are not intended to indicate proprietary specification.

TECHNICAL EDUCATION CENTER

EXTERIOR CONSTRUCTION

Exterior walls: Existing exterior walls are constructed of 2" insulated metal siding fastened to 7/8" hat channels which are attached to 3 5/8" metal studs. The metal studs are attached to steel roof beams and wall girts. New exterior walls will be constructed at the Mining

- Base Bid: No work.
- Alternate 7: New exterior walls will be constructed at the Mining Classroom entrance. Provide R32 insulated metal siding 4" thick. Kingspan 300 R Striated metal siding.

Exterior Wall Openings:

Windows: Existing windows are double insulated aluminum frame windows without a thermal break. New windows will be insulated fiberglass windows (Cascadia 325 series).

- Base Bid: No work.
- Alternate 8: Install new insulated fiberglass windows in new openings, where shown. classrooms.

Entry Doors: Existing entry doors at the main lobby are aluminum frame doors with 1" insulated glass without a thermal break. All other exterior doors are hollow metal doors in hollow metal frames.

- Base Bid: No work.
- Alternate 7: New entry doors will be insulated hollow metal doors with closers and weather seals, thermal break.

Overhead Doors/Coiling doors: Existing overhead doors and coiling doors will be replaced with insulated doors, Overhead Door Thermacore thermal break R 26 insulated exterior sectional door.

- Base Bid: No work.
- Alternate 3: Replace exterior over head sectional and coiling doors.

Roof:

Roof Deck: The existing roof deck is constructed of 1 ½" 22 GA metal decking. No work will occur on the existing roof.

Alternate 7: A new entrance canopy will be constructed for the mining classroom entry. Roofing will consist of 80 mil fully adhered PVC roofing, metal coping and flashing at the perimeter and at walls. Carlisle sure-flex. Roof Insulation: Extruded polystyrene insulation or polyisocyanurate rigid

insulation 10-12” thick as required to achieve roof drainage to gutter and downspout. Insulation will be mechanically fastened to the metal roof deck.

Floor Construction:

The existing first floor is constructed of 5” concrete slab on grade. The second floor is constructed of 4” concrete on 1 ½” metal deck. Concrete floors will require grinding and patching where piping and other items that penetrate the floor are removed.

Base Bid: All slabs slated to be left exposed will receive concrete sealer.

Alternate 7: Existing floor elevations in the mining classroom area are 2” below adjacent concrete floor elevations. Provide 2” concrete topping in rooms 123-130 using a self leveling concrete topping. Ardex K500.

INTERIOR CONSTRUCTION

Flooring : Existing finish flooring where occurs, will be removed. Certain areas contain ACM mastic and ACM sheet vinyl which will be abated.

ACM abatement:

Base Bid: No work.

Alternate 8: ACM mastic occurs in existing rooms 213-216. Remove flooring and mastic as acm.

Finish Flooring:

Finish flooring will occur as noted in the finish schedule and will consist of:

Sheet Vinyl: Sheet vinyl with backing .08 thick type 1 grade 1Class B. Mannington Primus.

Carpet: 6,6 Nylon Tile carpeting patterned loop. Severe traffic appearance rating. Mannington Means II Infinity Modular.

Concrete Sealer: All concrete will be sealed with concrete sealer and coated with 6 coats of floor maintenance finish BETCO industrial.

Alternate 9: Areas on the first floor that are to remain concrete but that require a better appearance will receive epoxy floor system, Tnemec Shop floor (237,248 & 201) a 3 step epoxy coating with primer and urethane top coat. Floor preparation includes, removal of furniture and equipment, removal of floor sealers, cleaning, grinding and patching for proper application of the epoxy system. This alternate will be bid at a unit cost. The extent of square footage receiving the epoxy floor coating will be based on what the University can afford.

Walk off Mat: A walk off mat will be provided at the new entry to mining. Mannington Commercial Recoarse II.

Floor Base: Rubber floor base with standard toe. Roppe

Partitions: Interior partitions will be constructed of metal studs with batt insulation and 5/8” type x gypsum drywall each side. Partitions will extend from floor to underside of floor/roof deck with perimeter and all penetrations sealed where fire rated or smoke rated construction is required. Partitions will receive semi gloss paint.

Wainscot: Wainscots for vocational classrooms will consist of ½” plywood extending 8’ up the wall. The plywood will be a faced and stained. Joints will be butted.

Ceilings: Ceilings where they occur will either be suspended acoustical ceiling or painted gypsum drywall. Gypsum drywall ceiling will receive semi gloss paint. Acoustical tile ceilings will be 2'x4' fissured mineral fiber lay in tiles in a steel suspension system. Armstrong Fissured.

Cabinets: Cabinets will be plastic laminate faced plywood with premium grade plastic laminate on exposed surfaces and melamine interiors.

Counters: Counters in shop areas will be 2" Maple butcher block. All other counters will be ½" solid surface over ¾" plywood.

Interior Doors: Interior doors will have painted hollow metal frames.

Base Bid and alternate 7 : Doors will be painted hollow metal doors. Ceco Door

Alternate 8: Doors will be solid core wood doors with wood veneer. Vancouver Door 520 C

Signage: Rooms signs will be provided at each door with room numbers, room name and both raised text and braille. Signs will be fabricated of moisture resistant photopolymer.

Toilet Accessories: Toilet accessories will be fabricated of stainless steel and/or plastic and will include an, automatic paper towel roll dispenser at each sink, surface mounted liquid soap dispenser between each sink and surface mounted jumbo toilet paper dispenser for each water closet. mounted mop and broom holder for each janitor room.

Appliances: None

Specialties:

Visual display boards will be provided for each classroom. Claridge Series 5

Cubicle curtains and Tracks will be provided for room 216. Imperial aluminum cubicle tracks and curtains.

Equipment: Heavy duty steel shelving. JARKE heavy duty cantilevered racks.

LANDSCAPE
None to be provided.

CIVIL
None to be provided.

STRUCTURAL

Design Criteria

Code: 2009 International Building Code as amended by the State of Alaska and the City and Borough of Juneau

Loads:

Snow: 70 psf Ground Snow Load
Importance: I = 1.0
Exposure: Ce = 1.0
Thermal: Ct = 1.0
Flat Roof Snow: 50 psf

Seismic:
Site Class D
Importance, I = 1.0
Ss = 0.57g, Fa = 1.34, Sds = 0.51g
S1 = 0.27g, Fv = 1.85, Sd1 = 0.34g
R = 3.25 for Ordinary Steel Concentrically Braced Frame

Wind: 105 mph (3 second gust)
Importance, I = 1.0
Exposure D

Materials:

Steel

W shapes: ASTM A 992 (Yield Strength 50, 000 psi)
Channels and Angles: ASTM A 36 (Yield Strength 36,000 psi)
Plates ASTM A 36 (Yield Strength 36,000 psi)
Welding per American Welding Society Structural Welding Code D1.1

Concrete

28 day strength, fc' = 4,000
Reinforcement: ASTM A 615, Grade 60

TECHNICAL CENTER

Structural System Construction

- Base Bid: No work.

- Alternate 7: Structural work involves the removal and replacement of a brace near the east end of the north wall of the building. The replacement brace would be in the same location but the orientation would be opposite of the current brace, that is rising from the east to the west in lieu of rising from the west to the east as the brace is currently configured. A lateral load analysis will need to be performed to determine the wind and seismic forces in the brace. New field welded connections are likely needed. Some column reinforcement may be needed. New plates welded to columns and anchored into the concrete may be needed.

- Alternate 7: A canopy will be constructed at the entrance to the mining classroom area. It will consist of 2 concrete footings, 2 structural steel columns and a steel roof frame with structural metal decking and associated steel edge angle.

MECHANICAL

DIVISION 22 & 23 - MECHANICAL SYSTEMS

The mechanical portion of the project will consist of renovating the mechanical systems of the UAS Technical Education Center phase 2 of construction. The schematic mechanical design narrative is organized by construction phase under which select mechanical system upgrades are listed as requested by the Owner. See end of report for summary of existing systems.

SUMMARY OF BASE BID AND ALTERNATE MECHANICAL WORK

- The **BASE BIDE** scope of work consists of: removal and replacement of the shop air compressor located in 113-Battery Room; reconfiguration of the saw dust collection system ductwork in the new 120-Construction Tech and 121-Hall areas; reconfiguration of the supply and return air ductwork in new 119-Power Tech Class area; removal of MFEF-2A ductwork in ceiling space of 133-Small Engines classroom; and removal and replacement of MFEF-3 and MFEF-6 vehicle exhaust ductwork in High Bay and Mechanical room.
- The **ALTERNATE 1** scope of work consists of: removal and replacement of the dust collector.
- The **ALTERNATE 2** scope of work consists of: replacement of fan motors SF-1, RF-1, SF-2, RF-2A, RF-2B, RF-2C with premium efficiency motors; and replacement of the electrical MCC panel.
- The **ALTERNATE 3** scope of work is part of architectural. No mechanical work.
- The **ALTERNATE 4** scope of work consists of the installation of a generator motor fume exhaust fan MEFE-4 system in the new 130-Heavy Equipment Simulator room.
- The **ALTERNATE 5** scope of work consists of the cleaning of duct systems and fan interiors for the SF-2, RF-2A, RF-2B, RF-2C, RF-2B, SF-3, RF-3A, and RF-3B fan systems. A major portion of the SF-2 ductwork is underground.
- The **ALTERNATE 6** scope of work consists of the installation of a heat recovery system in the SF-2 duct system located in the 200U1-Mechanical room. The system consists of a heat recovery coil (HRC-2A), a pre-heat coil (HRC-2B), a circulator pump (P-6), a glycol feed system (GF-1), hydronic piping, and related DDC controls.
- The **ALTERNATE 7** scope of work consists of reconfiguration of supply and return air ductwork serving the 130-Heavy Equipment Simulator room, 127-Vestibule, 125-Office, 126-Office, and 124 Mining Computer Lab areas.
- The **ALTERNATE 8** scope of work consists of the demolition of the second floor 212-Transmission classroom compressed air piping, and capping of floor drains in this area; and reconfiguration of supply and return air ductwork serving the 212-Transmission, 213-Ante-Room, 214-Survey Storage, 215-Fisheries Storage, 216-Classroom, 217-Classroom, and 218-Classroom areas to serve the new C.N.A Lab, C.N.A. Offices, and Laundry Storage areas.
- The **ALTERNATE 9** scope of work is part of architectural. No mechanical work.

Design Criteria
The mechanical systems will be designed and constructed in accordance with the following codes:

- 2009 International Building Code
- 2009 International Mechanical Code
- 2009 Uniform Plumbing Code
- 2009 International Fire Code
- National Fire Protection Association
- ASHRAE - American Society of Heating, Refrigeration, and Air-conditioning Engineers
- ASHRAE Standard 62.1-2007: Ventilation for Acceptable Indoor Air Quality.
- City and Borough of Juneau Code Modifications
- Ventilation Testing and Balancing

Ductwork:
Ventilation ductwork shall be designed and constructed to SMACNA HVAC Duct Construction Standards. Ductwork shall be galvanized steel duct ASTM A525 and ASTM A527 having G60 zinc coating in conformance with ASTM A90. All joints will be sealed with water based mastic type duct joint sealers. Ductwork from exterior penetration to 10 feet from exterior shall be insulated with 1-1/2 inch mineral fiber insulation duct insulation with vapor barrier. All supply ductwork is to be insulated.

Vehicle exhaust ductwork shall be designed and constructed to SMACNA HVAC Duct Construction Standards. Ductwork shall be stainless steel duct ASTM A666 Type 304, 26 gage minimum. Welded joints with temperature rating of 500° F with no breakdown.

Sawdust collection ductwork shall be designed and constructed to SMACNA HVAC Duct Construction Standards and designed for use with a sawdust collection system. Ductwork shall be galvanized steel duct ASTM A525 and ASTM A527 having G60 zinc coating in conformance with ASTM A90. Duct joints shall be a flanged, tool-free, clamp-together type system similar to Nordfab. Each equipment drop is to have its own blast gate shut-off with flexible connection to equipment.

Domestic Plumbing:
The domestic piping material shall be hard-drawn copper tubing, ASTM B 88, Type L with 95-5 solder fittings, Pro-press fittings, or equivalent. Below grade domestic piping shall be Type K with brazed fittings. Sanitary waste piping shall be cast-iron hub and spigot type cast iron below grade and above grade piping shall be hub-less type with heavy duty, Husky type pipe clamps.

All plumbing system domestic hot water, cold water piping shall be insulated with mineral fiber pipe insulation with covers. Vent through roof shall be insulated within 10 feet of exterior penetration. Up to 1 inch pipe size will have minimum of 1 inch thick insulation, 1-1/2 inch pipes size and over will have minimum of 1-1/2 inch thick insulation.

Sprinkler Piping:
Sprinkler piping material shall be Steel Pipe ASTM a795 Schedule 10 or ASTN A53 Schedule 40 black. Fittings ASME B16.9, wrought steel butt welded or ASME B16.11, forged steel socket welded and threaded.

SCOPE OF MECHANICAL WORK

PHASE 2 – BASE BID – DEMOLITION:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Remove SF-3 ductwork: Remove approximately 100-feet of 10x10 SA ductwork and (4) supply grilles. Remove approximately 50-feet of 34x18 EA ductwork with (2) return air grilles all serving the existing Marine Carpentry & Wood Shop 120 area.

VENTILATION – EXHAUST SYSTEMS:

- ❑ Remove EF-3 fan: Remove utility exhaust fan EF-3 located in Mechanical Room 219. Remove approximately 50-feet of existing EA and (2) EA grilles located in Plastics Shop 122.
- ❑ Remove dust collector ductwork: Remove approximately 250-feet of EA ductwork and drops for (8) pieces of equipment located in the Carpentry/Wood Shop 125 area.
- ❑ Remove MFEF-2B ductwork: Remove approximately 250-feet of EA ductwork and drops for (3) pieces of equipment located in the Small Engines 133 area.
- ❑ Remove MFEF-3 and MFEF-6 ductwork: Remove approximately 150-feet of 6-inch galvanized ductwork on the inlet side of vehicle exhaust fans in the High Bay and approximately 40-feet of 10x16-inch galvanized ductwork on the outlet side in the Mechanical Room.

TEC AIR COMPRESSOR:

- ❑ **Remove air compressor:** Remove existing shop air compressor located in 113-Battery Room.

PHASE 2 – BASE BID – NEW WORK:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Install SF-3 ductwork: Install approximately 60-feet of 12x12 SA ductwork with (4) supply grilles serving the Power Tech Classroom 119 area. Install approximately 120-feet of 18x18 RA ductwork with (2) exhaust grilles serving new Power Tech Classroom 119. Install approximately 100-feet of 18x18 RA ductwork with (2) exhaust grilles serving the new layout adjacent to both the new Hall 121 and existing Heavy Equipment Simulator 130 areas as shown on architectural. See schedule on mechanical drawings for grille sizes.

VENTILATION – EXHAUST SYSTEMS:

- ❑ Revise dust collector ductwork: Revise EA ductwork for (10) pieces of equipment located in the new Construction Tech 120 area. Install approximately 230-feet of new EA ductwork in ceiling space with (11) equipment drops for each equipment station and (2) drops for floor sweeps. Provide flexible connections approximately 8-feet for piece of equipment. Average of 4-inches for each drop.
- ❑ Install MFEF-3 and MFEF-6 ductwork: Install approximately 150-feet of 6-inch welded stainless steel ductwork in the High Bay and approximately 120-feet of 10x16 welded stainless steel ductwork in the Mechanical Room as part the MFEF-3 and MFEF-6 vehicle exhaust systems.

PLUMBING – DOMESTIC WATER PIPING:

- ❑ Install new backflow preventer: Install new backflow preventer piping and fitting located in the mechanical room.

PLUMBING – SPRINKLER PIPING:

- ❑ Modify sprinkler system: Sprinkler heads and branch piping will need to be renovated to match the new layout of alternate project area. Minor modifications to existing system will be required to ensure coverage of the remodeled areas. Remove and replace sprinkler heads in base bid work area.

TEC AIR COMPRESSOR:

- ❑ **Install air compressor:** Install new rotary screw air compressor, oil filter, and sound muffler to be located in 113-Battery Room.

PHASE 2 BASE BID EQUIPMENT SCHEDULE

1. Air Compressor (AC-1) 200 GAL 50 HP/460V/3PH

PHASE 2 – ALTERNATE 1 – DEMOLITION:

- ❑ Remove dust collection system: Remove existing dust collection system (DC).

PHASE 2 – ALTERNATE 1 – NEW WORK:

VENTILATION – EXHAUST SYSTEMS:

- ❑ **Install dust collection system (DC-1):** Install new dust collection system (DC-1) with recirculation air option.

PLUMBING – SPRINKLER PIPING:

- ❑ Modify sprinkler system: Sprinkler heads and branch piping will need to be renovated to match the new layout of alternate project area. Minor modifications to existing system will be required to ensure coverage of the remodeled areas. Remove and replace sprinkler heads in alternate work area.

PHASE 2 ALTERNATE 1 EQUIPMENT SCHEDULE

1. Sawdust Collector Fan 11,000 cfm 40 HP/460V/3PH
2. Sawdust Collector Shaker ¾ HP/208V/1ph
3. Recirculation Air Option with 99.9% Filtration

PHASE 2 – ALTERNATE 2 – DEMOLITION:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Remove SF-1, RF-1 fan motors: Remove supply fan SF-1 and return fan RF-1 motors in Mechanical Room 219.

- ❑ Remove SF-2, RF-2A, RF-2B, RF-2C fan motors: Remove supply fan SF-2 and return fans RF-2A & RF-2B & RF-2C motors in Mechanical Room 219.

- ❑ Remove SF-3, RF-3A, RF-3B fan motors: Remove supply fan SF-3 and return fan RF-3A & RF-3B motors in Mechanical Room 219.

VENTILATION – EXHAUST SYSTEMS:

- ❑ Remove EF-2A ductwork: Disconnect 14-inch diameter EA ductwork connected to exhaust fan EF-2A located in Mechanical Room 219. Remove approximately 30-feet of EA ductwork serving Engine Cleaning 112.

- ❑ Remove MFEF-2B fan: Remove motor fume exhaust fan MFEF-2B. Existing ductwork is to remain at the Diesel & Marine Electrical 114 area. Disconnect and abandon 7-inch diameter ductwork connected to MFEF-2B in Mechanical Room 219 and serving Small Engines 133.

TESTING, ADJUSTING, AND BALANCING

- ❑ Each fan is to tested after motor replacement.

PHASE 2 – ALTERNATE 2 – NEW WORK:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Install SF-1, RF-1 fan motors: Replace supply fan SF-1 and return fan RF-1 motors in Mechanical Room 219 with premium efficiency motors. See schedule below for all fan specifications.

- ❑ Replace SF-2, RF-2A, RF-2B, RF-2C fan motors: Replace supply fan SF-2 and return fan RF-2A & RF-2B & RF-2C motors in Mechanical Room 219 with premium efficiency motors.

- ❑ Replace SF-3, RF-3A, RF-3B fan motors: Replace supply fan SF-3 and return fan RF3A & RF-3B motors in Mechanical Room 219 with premium efficiency motors.

PHASE 1 ALTERNATE 2 MOTOR REPLACEMENT SCHEDULE

1.	SF-1	5225 cfm	3 hp/480V/3ph
2.	RF-1	4250 cfm	1.5 hp/480V/3 ph
3.	SF-2	12600 cfm	7.5 hp/480V/3ph
4.	RF-2A	7500 cfm	3 hp/480V/3ph
5.	RF-2B	2200 cfm	¾ hp/480V/3ph
6.	RF-2C	1000 cfm	¼ hp/120V/1ph
7.	RF-2D	1000 cfm	¼ hp/120V/1ph
8.	SF-3	8250 cfm	5 hp/480V/3 ph
9.	RF-3A	5500 cfm	1.5 hp/480V/3ph
10.	RF-3B	2200 cfm	¾ hp/480V/3ph
11.	EF-2A	1380 cfm	½ hp/120V/1ph
12.	EF-2B	150 cfm	¼ hp/120V/1ph, Explosion Proof

(Note: Replacement motors listed above are to be premium efficiency type.)

PLUMBING – SPRINKLER PIPING:

- ❑ Remove SF-1, RF-1 fan motors: Remove supply fan SF-1 and return fan RF-1 motors in Mechanical Room 219.

- ❑ Remove SF-2, RF-2A, RF-2B, RF-2C fan motors: Remove supply fan SF-2 and return fans RF-2A & RF-2B & RF-2C motors in Mechanical Room 219.

- ❑ Remove SF-3, RF-3A, RF-3B fan motors: Remove supply fan SF-3 and return fan RF-3A & RF-3B motors in Mechanical Room 219.
- ❑ Remove EF-2A ductwork: Disconnect 14-inch diameter EA ductwork connected to exhaust fan EF-2A located in Mechanical Room 219. Remove approximately 30-feet of EA ductwork serving Engine Cleaning 112.

- ❑ Remove MFEF-2B fan: Remove motor fume exhaust fan MFEF-2B. Existing ductwork is to remain at the Diesel & Marine Electrical 114 area. Disconnect and abandon 7-inch diameter ductwork connected to MFEF-2B in Mechanical Room 219 and serving Small Engines 133.
- ❑ Each fan is to tested after motor replacement.
- ❑ Install SF-1, RF-1 fan motors: Replace supply fan SF-1 and return fan RF-1 motors in Mechanical Room 219 with premium efficiency motors. See schedule below for all fan specifications.
- ❑ Replace SF-2, RF-2A, RF-2B, RF-2C fan motors: Replace supply fan SF-2 and return fan RF-2A & RF-2B & RF-2C motors in Mechanical Room 219 with premium efficiency motors.
- ❑ Replace SF-3, RF-3A, RF-3B fan motors: Replace supply fan SF-3 and return fan RF3A & RF-3B motors in Mechanical Room 219 with premium efficiency motors.

13. SF-1 5225 cfm 3 hp/480V/3ph
14. RF-1 4250 cfm 1.5 hp/480V/3 ph
15. SF-2 12600 cfm 7.5 hp/480V/3ph
16. RF-2A 7500 cfm 3 hp/480V/3ph
17. RF-2B 2200 cfm ¾ hp/480V/3ph
18. RF-2C 1000 cfm ¼ hp/120V/1ph
19. RF-2D 1000 cfm ¼ hp/120V/1ph
20. SF-3 8250 cfm 5 hp/480V/3 ph
21. RF-3A 5500 cfm 1.5 hp/480V/3ph
22. RF-3B 2200 cfm ¾ hp/480V/3ph
23. EF-2A 1380 cfm ½ hp/120V/1ph
24. EF-2B 150 cfm ¼ hp/120V/1ph, Explosion Proof

(Note: Replacement motors listed above are to be premium efficiency type.)

- ❑ Modify sprinkler system: Sprinkler heads and branch piping will need to be renovated to match the new layout of alternate project area. Minor modifications to existing system will be required to ensure coverage of the remodeled areas. Remove and replace sprinkler heads in alternate work area.

CONTROLS:

- ❑ **Install DDC controls:** Upgrade respective fan system controls and room thermostats.

PHASE 2 – ALTERNATE 4 – NEW WORK:

VENTILATION – EXHAUST SYSTEMS:

- ❑ Install MFEF-4 fan and ductwork: Install new motor fume exhaust fan MFEF-4 in new Heavy Equipment/Simulator 130 ceiling space. Install approximately 20-feet of 8-inch diameter EA ductwork, (3) equipment drops, and approximately 15-feet of retractable 4-inch flexible duct each. Install new 24x24 exhaust grille on exterior West wall of Room 130.

PHASE 2 ALTERNATE 4 EQUIPMENT SCHEDULE

1. MEFE-4 1200 cfm 1 hp/480V/3ph, Explosion Proof

PHASE 2 – ALTERNATE 5 – NEW WORK:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ **Clean SF-1, RF-1, EF-1 ductwork and fan systems:** Clean SA and RA ductwork associated with the SF-1, RF-1, and EF-1 fan systems.

- ❑ **Clean SF-2, RF-2A, RF-2B, RF-2C ductwork and fan systems:** Clean SA and RA ductwork associated with the SF-2, RF-2A, RF-2B, and RF-2C fan systems. Interior of SF-2 fan system not included in this phase. A major portion of the SF-2 duct system is located underground, but accessible from pit area supply grilles. Demolition of floor slab for duct cleaning is not anticipated.

- ❑ **Clean SF-3, RF-3A, RF-3B ductwork and fan systems:** Clean SA and RA ductwork associated with the SF-3, RF-3A, and RF-3B fan systems. Interior of SF-2 fan system not included in this phase. A major portion of the SF-2 duct system is located underground.

PHASE 2 – ALTERNATE 6 – DEMOLITION:

VENTILATION – SUPPLY/RETURN/EXHAUST SYSTEMS:

- ❑ **Remove RF-2 ductwork:** Remove an approximately 6-feet section of 48x30 RA ductwork near the exhaust pit in the mechanical room for installation of heat recovery coil.

- ❑ **Remove SF-2 ductwork:** Remove an approximately 6-feet section of SF-2 ductwork near the exhaust pit in the mechanical room to accommodate the installation of a heat recovery coil.

PHASE 2 – ALTERNATE 6 – NEW WORK:

VENTILATION – SUPPLY/RETURN/EXHAUST SYSTEMS:

- ❑ Install Heat Recovery System: Install 54x54 heat recovery coil (HRV-2A) in RF duct system. Install approximately 200-feet of insulated 4-inch hydronic piping at approximately 12-feet above floor in the 200J-Mechanical room. Piping system is to include (1) automatic air vent, (1) hydronic circulator pump (P-6), and (1) 18-gallon glycol feed system (GF-1). Install 80x54 preheat coil in the SF-2 fan system. DDC controls for monitoring high temperatures and enabling circulation pump (10 points).

PHASE 2 ALTERNATE 6 EQUIPMENT SCHEDULE

1. HRC-2A 55.2 MBH 54x54, 25 GPM, 10,700 CFM
2. HRC-2B 56 MBH 80x54, 25 GPM, 10,700 CFM
3. P-6 25 GPM 13 FT.HD., 1/8HP/115V/1PH, UNITIZED
4. GF-1 18 GAL 10V/1PH, 77W

PHASE 2 – ALTERNATE 7 – DEMOLITION:

VENTILATION – EXHAUST SYSTEMS:

- ❑ Remove SF-2 ductwork: Remove approximately 200-feet of 12x12 SA ductwork and (4) SA diffusers. Remove approximately 50-feet of 18x16 RA ductwork and (1) RA grille.

PHASE 2 – ALTERNATE 7 – NEW WORK:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Install SF-2 ductwork: Install approximately 250-feet of 12x12 SA ductwork and (10) SA diffusers. Install approximately 75 feet of 12x12 RA ductwork with (5) RA grilles. New ductwork configuration to server new 130-Heavy Equipment Simulator, 127-Vetibule, 125-Office, 126-Office, and 124-Mining Computer Lab areas.

PLUMBING – SPRINKLER PIPING:

- ❑ Modify sprinkler system: Sprinkler heads and branch piping will need to be renovated to match the new layout of alternate project area. Minor modifications to existing system will be required to ensure coverage of the remodeled areas. Remove and replace sprinkler heads in alternate work area.

CONTROLS:

- ❑ **Install DDC controls:** Upgrade respective fan system controls and room thermostats for (2) heating zones.

PHASE 2 – ALTERNATE 8 – DEMOLITION:

VENTILATION – EXHAUST SYSTEMS:

- ❑ Remove SF-1 ductwork: Remove approximately 300-feet of 12x12 SA ductwork and (10) SA diffusers. Remove approximately 100-feet of 22x12 RA ductwork and (6) RA grilles.

PLUMBING – DOMESTIC WATER PIPING:

- ❑ Remove domestic hot, cold, waste, and vent piping: Remove supply, vent, and waste piping for (2) sinks located in renovated project area. Cap piping at last live points.

PLUMBING – COMPRESSED AIR PIPING:

- ❑ Remove compressed air piping: Remove approximately 100-feet of 1inch compressed air piping and (10) gas cock fittings. Cap piping at last live points.

PHASE 2 – ALTERNATE 8 – NEW WORK:

VENTILATION – SUPPLY/RETURN SYSTEMS:

- ❑ Install SF-1 ductwork: Install approximately 300-feet of 12x12 SA ductwork and (10) SA diffusers. Install approximately 250 feet of 12x12 RA ductwork with (7) RA grilles. New ductwork configuration to server new C.N.A Lab, (6) C.N.A. Offices, and Laundry Storage areas. Test and balance entire SF-1/RF-1/EF-1 system including new and existing grilles and diffusers.

PLUMBING – DOMESTIC WATER PIPING:

- ❑ Install domestic hot, cold, waste, and vent piping: Install estimated (4) stainless steel hand wash type sinks and connect to existing waste and supply piping in ceiling space below and venting piping above.

PLUMBING – SPRINKLER PIPING:

- ❑ Modify sprinkler system: Sprinkler heads and branch piping will need to be renovated to match the new layout of alternate project area. Minor modifications to existing system will be required to ensure coverage of the remodeled areas. Remove and replace sprinkler heads in alternate work area.

SUMMARY OF EXISTING SYSTEMS (for reference only)

The UAS Marine Technical Center Building is currently ventilated by (3) supply fans and (3) return fan units serve the different use areas of the building. A sawdust collection system serves the equipment and floor sweeps in the wood shop construction tech area. Three different exhaust fans serve the vehicle exhaust, and small engine parts are in the Automotive Shop. Toilet rooms are exhausted from central exhaust fan systems. An air compressor in the fan room serves compressed air to outlets throughout the automotive shop.

VENTILATION – SUPPLY/RETURN/EXHAUST FAN SYSTEMS:

- SF-1 supply fan is utility type fan located in Mechanical Room 219, and configured as a dual plenum (hot deck/mixed Air) ventilation system with (7) zones and serves the second floor ventilation and heating needs. Zone (1) serves the outside offices of the second floor. Zone (1) also has perimeter supplemental convector heating.

- SF-2 supply fan is a cabinet fan located in Mechanical Room 219 and supplies ventilation and heating air to the east half of the first floor areas. SF-2 is configured as a dual plenum (hot deck/mixed air) ventilation system with (9) zones. The zones are controlled by room thermostats modulating duct zone dampers. The SF-2 area is also served by (3) return fans, (2) exhaust fans, and (2) motor vehicle exhaust fans. The three return fans serve areas only within the proposed project upgrade areas.

- SF-3 supply fan is a cabinet fan located in the Mechanical Room 219, and supplies ventilation and heating air to the existing Wood Storage 117, Project Storage 118, Carpentry/Wood Shop 120, Plastics Shop 122, and is configured as a dual plenum (hot deck/mixed air) ventilation system with (2) zones. SF-3 ventilation system serves the area located in the midst of the proposed remodel areas. The zones are controlled by room thermostats modulating duct zone dampers. The SF-3 areas are served by (2) return fan systems, RF-3A and RF-3B, and are both utility sets located in Mechanical Room 219. Both return air fan systems are filtered and can continue to the serve the remodel areas.

- RF-1 return fan is a utility type fan located in Mechanical Room 219 and serves the second floor spaces.

- RF-2A return fan located in Mechanical Room 219 serves the first floor offices, Small Engines 133, Loading 126, and Diesel & Marine Electrical 114 rooms.

- RF-2B return fan located in Mechanical Room 219 serves the Machine Shop 138.

- RF-2C return fan located in Mechanical Room 219 serves Loading 126.

- RF-3A return fan located in Mechanical Room 219 serves Wood Storage 117, Project Storage 118, Bulk Storage 119, and Marine Carpentry/Wood Shop 120.

- ❑ RF-3B return fan located in Mechanical Room 219 serves Plastics Shop 122.

- ❑ EF-1 exhaust fan serves exhaust needs for second floor janitor closet, storage, and toilet rooms. The exhaust ductwork and grilles will require complete replacement to match the proposed second floor remodel.

- ❑ EF-2A exhaust fan serves the Janitor Closets 109 & 129, Storage 108, Toilet Rooms 130 & 131, Alignment 106, Phone 128, Electric Panel Room 127, and Engine Cleaning 112 areas.

- ❑ EF-2B exhaust fan serves the Battery Room 113.

- ❑ EF-3 serves a small amount of exhaust air as part of the SF-3 system area in the Plastic Shop 122.

- ❑ EF-4 serves to exhaust air from Mechanical Room 219.

- ❑ MFEF-2A Motor Fume Exhaust Fan, located in Mechanical 219, serves motor fume exhaust ports in Tune-Up 107 and Service Stalls 111.

- ❑ MFEF-2B Motor Fume Exhaust Fan, located in Mechanical 219, serves motor fume exhaust ports in Diesel & Marine Electrical 1114 and Small Engines 133.

EXISTING SUPPLY/RETURN/EXHAUST FAN SCHEDULE

1.	SF-1	5225 cfm	3 hp/480V/3ph
2.	SF-2	12600 cfm	7.5 hp/480V/3ph
3.	SF-3	8250 cfm	5 hp/480V/3 ph
4.	RF-1	4250 cfm	1.5 hp/480V/3 ph
5.	RF-2A	7500 cfm	3 hp/480V/3ph
6.	RF-2B	2200 cfm	¾ hp/408V/3ph
7.	RF-2C	1000 cfm	¼ hp/120V/1ph
8.	RF-3A	5500 cfm	1.5 hp/480V/3ph
9.	RF-3B	2200 cfm	¾ hp/480V/3ph
10.	EF-1	300 cfm	½ hp/120V/1ph
11.	EF-2A	1380 cfm	½ hp/120V/1ph
12.	EF-2B	150 cfm	¼ hp/120V/1ph, Explosion Proof
13.	EF-3	300 cfm	¼ hp/120V/1ph
14.	EF-4	1000 cfm	¼ hp/120V/1ph
15.	MFEF-2A	1400 cfm	2 hp/480V/3ph, Explosion Proof
16.	MFEF-2B	1100 cfm	1 hp/480V/3ph, Explosion Proof

VENTILATION – DUST COLLECTION SYSTEM:

The existing sawdust collection system is in fair condition.

Schedule of existing equipment is as follows:

4. Sawdust Collector Fan 11,000 cfm 40 HP/460V/3PH
5. Sawdust Collector Shaker ¾ HP/208V/1ph

PLUMBING – SPRINKLER PIPING:

Sprinkler protection for the first floor and second floors of the building are being provided by a wet sprinkler system for the interior of building in accordance with NFPA 13.

TEC AIR COMPRESSOR:

The original air compressor, located in Mechanical Room 219, is used extensively throughout the facility. Air compressor is in fair condition.

An additional air compressor, located in Battery Room 113, is used by the Service Stalls 111 area. Air compressor is in fair condition.

EXISTING COMPRESSED AIR EQUIPMENT SCHEDULE

1. AC-1 200 gal. 50HP/480V/3PH
2. Air Dryer 1/5 HP/120V/1PH
3. Sprinkler Compressor 1.5HP/460V/3PH

TEC BUILDING CONTROLS:

The building control system was originally pneumatically controlled. In the 1990's a partial upgrade to DDC was done that replaced room thermostats with DDC type and installed controllers for operation of systems. Much of the sensors and all valve and damper actuators were not replaced and are still pneumatic.

END OF MECHANICAL NARRATIVE

ELECTRICAL

Existing Systems

Utility Services and Distribution Equipment

Utility power for the Technology Center originates at a pole on Egan Drive. The primary feeder is routed through a vault in the road to the Welding Lab pad mounted transformer. The Welding Lab pad mounted transformer loop feeds the Technology Center transformer. The primary feeders are in good condition. The pad mounted transformers have some surface rust on the enclosures but otherwise are in good condition.

The Technology Center pad mounted utility transformer is located on the north side of the building. The pad mounted transformer feeds a main switchboard in Electrical 108. The switchboard is rated 1000 amperes, 277/480 volt, 3-phase, 4-wire. The switchboard main circuit breaker has a 900 ampere trip rating. The switchboard feeds panel boards, a motor control center, the elevator, emergency lighting inverters, and the sawdust collector. The panel boards are typically grouped with a 277/480 volt section, dry-type transformer, and 120/208 volt section placed in the same location. Some of the transformers were remote mounted due to space limitations. All of the service and distribution equipment is from the original construction and due for replacement.

Lighting Systems

Lighting in the Technology Center consists mostly of low-bay metal halide fixtures and fluorescent fixtures in various configurations. The fluorescent fixtures utilize T12 lamps, except in the construction technology area and the power technology lab where fixtures with T8 lamps have been installed. The lighting is controlled by low voltage switches wired through relays mounted in enclosures near the panel boards. Emergency power for egress lighting is provided by a central inverter system. The lighting branch circuits are configured 277 volt.

The illumination levels in many areas are inadequate. The metal halide fixtures are failing and provide undesirable color rendering characteristics. The fluorescent fixtures are inefficient. The low voltage control system in the Technology Center is failing. The central inverter systems appear to be operational, but the egress lighting system does not comply with current codes. Overall, the lighting systems are in poor condition and no longer maintainable.

Communications

A 50-pair outside plant telephone cable enters the Technology Center in Communications 107A. The space also houses the primary protection, termination, and cross-connect blocks. A 25-pair telephone trunk cable is routed in a 4-inch underground conduit from the Technology Center to the Welding Lab. The telephone trunk cable terminates in an enclosure in the welding lab storage room. An open data rack, located in a closet on the second floor of the Technology Center, supports data patch panels, network switches, and auxiliary components. The Technology Center was retrofitted with a voice-over-IP telephone system, likely in the last 10-years. The Technology Center lacks a reliable data infrastructure required to support current administrative and teaching technologies.

Fire Alarm
The Technology Center fire alarm system was replaced in 2011 and is in excellent condition.

Security
The main exterior doors of the Technology Center are secured with an electronic access system using swipe cards. The interior side of the doors has a push-to-exit button with an infrared sensor to automatically un-latch the door. The control panel and power supply are located in Electrical 108 in the Technology Center. The system is in working order and appears to be in good condition. We do not anticipate any work with the security system, unless system enhancements are desired by the Owner.

Electrical Improvements
Phase II - Base Bid
Utility Services and Distribution Equipment

- Demolish main switchboard.
- Replace panelboards H1A, L1A, H1B, L1B, H1C, L1C, H2A, and L2A in their current locations. Replace associated dry-type transformers. Re-connect existing feeders.
- Demolish panelboards H1F, L1G, HIG (2 sections), and L1G (2 sections). Demolish associated feeders, and associated dry-type transformers.
- Provide new main switchboard.
- Provide new panelboards H1E, L1E, H1F, and L1F to support mine training and construction technology. Provide new dry-type transformers. Provide new feeders from the main switchboard in Electrical 108.

Branch Circuits

- Provide new branch circuits within the extents of this phase of work.

Mechanical Equipment

- Demolish fan EF-3.
- Replace air compressor located in Battery Room 113. Utilize existing feeder and local disconnect switch.
- Revise connections and control system for dust collector.

Lighting Systems

- Provide new light fixtures within the extents of this phase of work.
- Provide low voltage controls.

Wiring Devices

- Provide new wiring devices within the extents of this phase of work.

Communications

- Provide new data outlets as required within this phase of work. Horizontal cables shall terminate in Communications 107A.

Fire Alarm

- Initiating and notification devices shall be relocated or added as required to coordinate with the new space configurations. System devices will re-connect to the existing fire alarm control panel. New cabling will be provided as required.

Phase II - Alternate 1, Replace Dust Collector

Utilize existing feeder from the main switchboard in Electrical 100J. Provide connection from saw dust collector control panel to 3/4 horsepower saw dust collector shaker motor. Provide control connection from saw dust collector control panel to Panelboards H1E and L1E for automatic control.

Phase II – Alternate 2, Replace Motor Control Center and Fan Motors

Utility Services and Distribution Equipment

- Replace the motor control center in Mechanical 200U1. Replace panelboard L2B and transformer L2B which are integral to the motor control center.

Mechanical Equipment

- Fans SF-1, SF-2, SF-3, RF-1, RF-2A, RF-2B, RF-2C, RF-2D, RF-3A, RF-3B, EF-2A, and EF-2B shall be replaced by the mechanical contractor. Coordinate reconnection to existing branch circuits.

Phase II – Alternate 3, Replace Exterior Overhead Doors

Provide new connections and control wiring for replacement of overhead doors. Connect replacement motors to existing branch circuits.

Phase II – Alternate 4, Portable Generator Exhaust Fan

Provide branch circuit, controls, and overcurrent protection for MFEF-4. Installation shall be explosion proof type construction.

Phase II – Alternate 5, Duct Cleaning

No electrical work is anticipated with this alternate.

Phase II – Alternate 6, Wrap Around Heat Recovery

Provide connection to heat recovery system components, including P-6 and GF-1.

Phase II - Alternate 7, Mining Area

Branch Circuits

- Provide new branch circuits within the extents of this phase of work.

Mechanical Equipment

- No mechanical connections are anticipated with this alternate.

Lighting Systems

- Provide new light fixtures within the extents of this phase of work.
- Provide low voltage controls.

Wiring Devices

- Provide new wiring devices within the extents of this phase of work.

Communications

- Provide new data outlets as required within the extents of this phase of work. Horizontal cables shall terminate in Electrical 200I.

Fire Alarm

- Initiating and notification devices shall be relocated or added as required to coordinate with the new space configurations. System devices will re-connect to the existing fire alarm control panel. Provide new cabling.

Phase II - Alternate 8, Health Sciences

Branch Circuits

- Provide new branch circuits within the extents of this phase of work.

Mechanical Equipment

- We do not anticipate any new connections to mechanical equipment.

Lighting Systems

- Provide new light fixtures within the extents of this phase of work.
- Provide low voltage controls.

Wiring Devices

- Provide new wiring devices within the extents of this phase of work.

Communications

- Provide new data outlets as required within the extents of this phase of work. Horizontal cables shall terminate in Electrical 200I.

Fire Alarm

- Initiating and notification devices shall be relocated or added as required to coordinate with the new space configurations. System devices will re-connect to the existing fire alarm control panel. Provide new cabling.

Electrical Design Criteria

General

The electrical systems will comply with accepted codes, standards and recommended practices common to the electrical industry and as required by local and state authorities, including but not necessarily limited to the following:

- National Electrical Code (NEC)
- International Fire Code (IFC)
- National Fire Protection Association (NFPA)
- ASHRAE/IESNA 90.1 – Energy Standard
- Illuminating Engineering Society of North America (IESNA)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Contractors Association (NECA)

All equipment will be listed and labeled by a nationally recognized testing agency acceptable to the State of Alaska.

Utility Service and Distribution Equipment

Switchboards and panelboards will be NEMA 250, Type 1, painted steel. Switchboards will be floor mounted on existing concrete pads; panelboards will be surface mounted. Buses and conductor connections will be tin-plated aluminum. Overcurrent protective devices will be molded case circuit breakers. Transformers will be ventilated, NEMA 250, Type 2 with energy efficiency compliant with NEMA TP-1, Class 1.

Feeders will be single conductors in conduit. All conductors will be copper with insulation Types XHHW, or THHN-THWN, as applicable. Connectors and splices will be of size, ampacity rating, material, type, and class for application and service required. Feeders will be concealed, except in un-finished spaces.

Branch Circuits

Branch circuits will be single conductors in conduit. All conductors will be copper with insulation Type THHN-THWN, as applicable. Connectors and splices will be of size, ampacity rating, material, type, and class for application and service required. Branch circuits will be concealed, except in un-finished spaces.

Grounding and Bonding

Insulated copper equipment grounding conductors will be provided with all feeders and branch circuits.

Hangars and Supports

The project will comply with NECA for application of hangars and supports for electrical equipment and systems. Interior support devices will be steel; exterior will be hot-dip galvanized with stainless steel hardware.

Raceways and Boxes
Underground exterior conduit will be Schedule 40 PVC. Exposed, outdoor conduit and interior locations subject to damage will be galvanized rigid steel. Electrical metallic tubing will be utilized for interior raceways not subject to damage or concealed in finished surfaces. Connections to vibrating equipment shall be flexible metal conduit, except liquid-tight flexible metal conduit will be applied in damp or wet locations. Outlet and devices boxes will be sheet metal.

Identification for Electrical Systems
Branch circuit conductors will be identified with self-adhesive vinyl labels where conductors are accessible in panels, junction and pull boxes. All feeders and branch circuits will be color-coded for phase identification with factory applied color or half-lapped tape.

Equipment identification labels will be provided on each unit of equipment including disconnect switches and protection equipment, control panels, control stations, and terminal cabinets. Systems include power, lighting, control, communication, signal, monitoring, and alarm.

Mechanical Equipment
Disconnect switches will be heavy-duty type with fuses as required. Motor starter switches will be quick-make, quick-break toggle with on/off indication. Full voltage, across the line, magnetic controllers with bimetallic overload relays will be used for equipment requiring automatic control. Coordinate mechanical equipment locations with the mechanical narrative and drawings. Most of the mechanical equipment in the Tech Center is connected to the motor control center in Mechanical 229.

Lighting Systems
Areas with high, unfinished ceilings will be illuminated with enclosed linear fluorescent fixtures with T5 lamps. Instructional spaces and offices will be illuminated with linear indirect/direct fluorescent fixtures with T5 lamps. Wall mounted lighting will supplement illumination of teaching walls. Exit signs and emergency illumination will be provided as required along the path of egress.

The lighting systems will comply with the minimum energy standards proposed by ASHRAE/IESNA. Illumination levels shall comply with recommended practices outlined by IESNA. Offices, storage rooms and classrooms will be controlled by occupancy sensors. Lighting will be bi-level switched in instructional spaces. Interior lighting systems will be connected to electronically controlled circuit breakers.

Average Illuminance Recommendations (in footcandles)
Offices: 45.
Mining Classroom: Ambient, 45. Teaching wall vertical, 30.
CNA Classroom: 65. Illuminance at head walls will be obtained by a supplemental wall mounted, dimmable, task lighting.
Vestibules and Corridors: 10.

Wiring Devices
Receptacles will be provided for convenience and equipment connections. Convenience receptacles will be located so that no point is more than 20-feet away from a receptacle. Devices for equipment will be provided as required.

All devices will be specification grade, or better. Convenience receptacles will be 125V, 20A. Ground fault devices will be provided as required by the NEC, non-feed through type. Toggle switches will be low voltage. Wall box dimmers will be 0-10 volt DC, modular, solid-state units with integral, on-off switches. Smooth, high-impact thermoplastic wall plates will be used in finished spaces. Galvanized steel wall plates will be used in unfinished spaces. Wet location device plates will be NEMA 250, Type 3R with lockable covers when located on the building exterior.

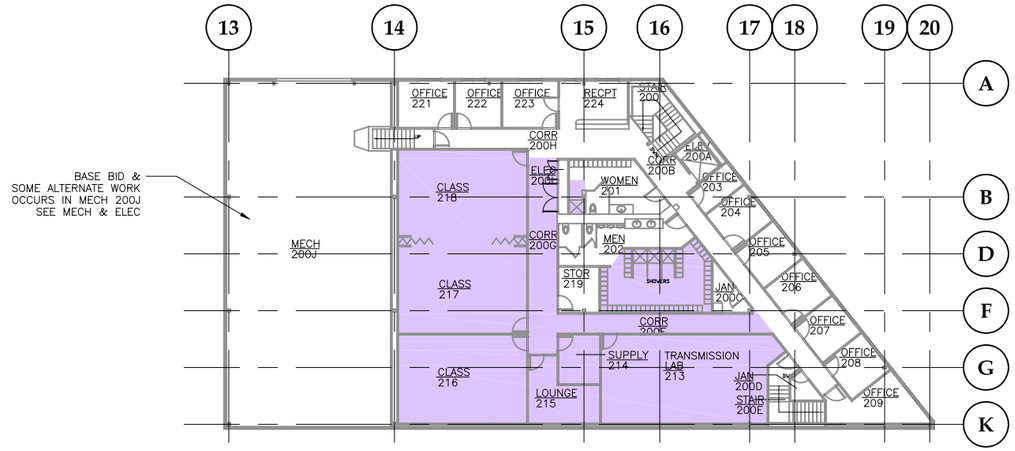
Communications
All components of the telephone and data system will comply with Category 6 performance criteria. Connecting blocks, cross-connects, and patch panels will be 110-style with insulation displacement connectors. Cables will be routed in electrical metallic tubing or cable tray.

Fire Alarm
The existing fire alarm system is addressable with multiplexed signal transmission and horn/strobe evacuation. Fire alarm initiation shall be by manual stations, heat detectors, smoke detectors, and duct smoke detectors.

END OF NARRATIVE

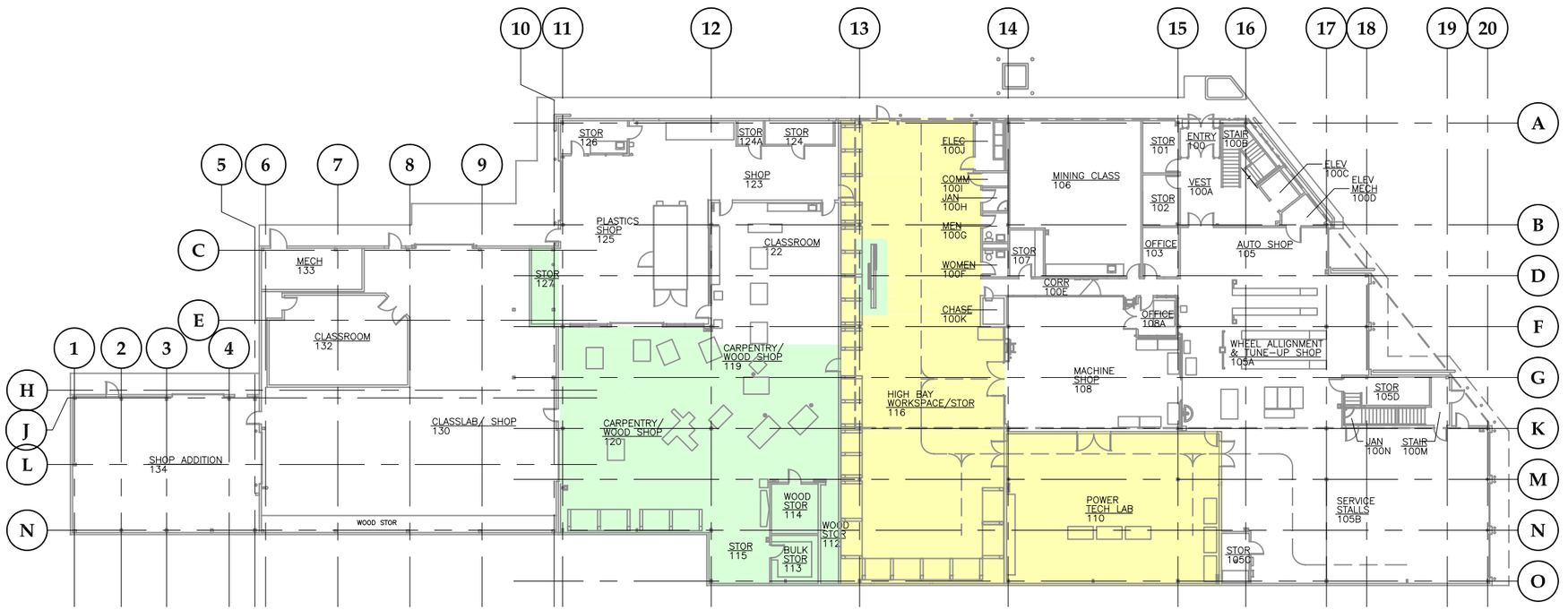
KEY

- BASE BID - Item A
- BASE BID - Item B - HEALTH SCIENCES CLASSES
- ALTERNATE 1 - DUST COLLECTION SYSTEM REPLACEMENT
- ALTERNATE 2 - MOTOR CONTROL & FAN MOTORS
- ALTERNATE 3 - EXTERIOR OVERHEAD DOORS
- ALTERNATE 4 - EXHAUST FANS FOR GENERATOR SETS
- ALTERNATE 5 - DUCT CLEANING
- ALTERNATE 6 - HEAT COIL
- PHASE 1 - CONSTRUCTION COMPLETED 2014



2 **EXISTING SECOND FLOOR PLAN**
TECH CENTER

SCALE: 0 8' 16' 32'



1 **EXISTING FIRST FLOOR PLAN - TECH CENTER**

SCALE: 0 8' 16' 32'

Jensen Yorba Lott Inc.
522 West 10th Street
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jensenyorbalott.com

University of Alaska Southeast
Technical Education Center Renewal
Phase II
No. 2013-02b
Juneau, Alaska

SCHEMATIC DESIGN

REVISIONS
1. .
2. .
3. .

SHEET TITLE
EXISTING BUILDING PHASING PLAN
.

DATE: Ocotober 20, 2014
FILE: 13078-PH 2

A003

KEY

- BASE BID - Item A
- BASE BID - Item B - HEALTH SCIENCES CLASSES
- ALTERNATE 1 - DUST COLLECTION SYSTEM REPLACEMENT
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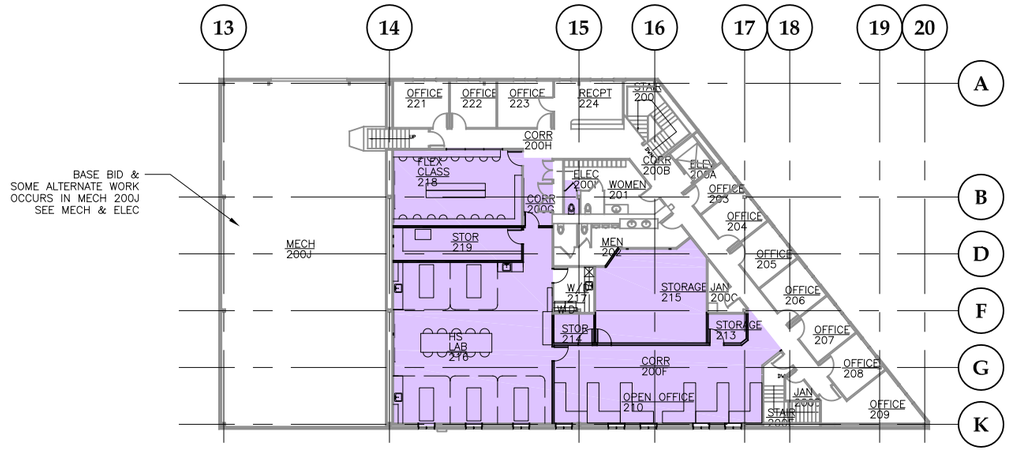
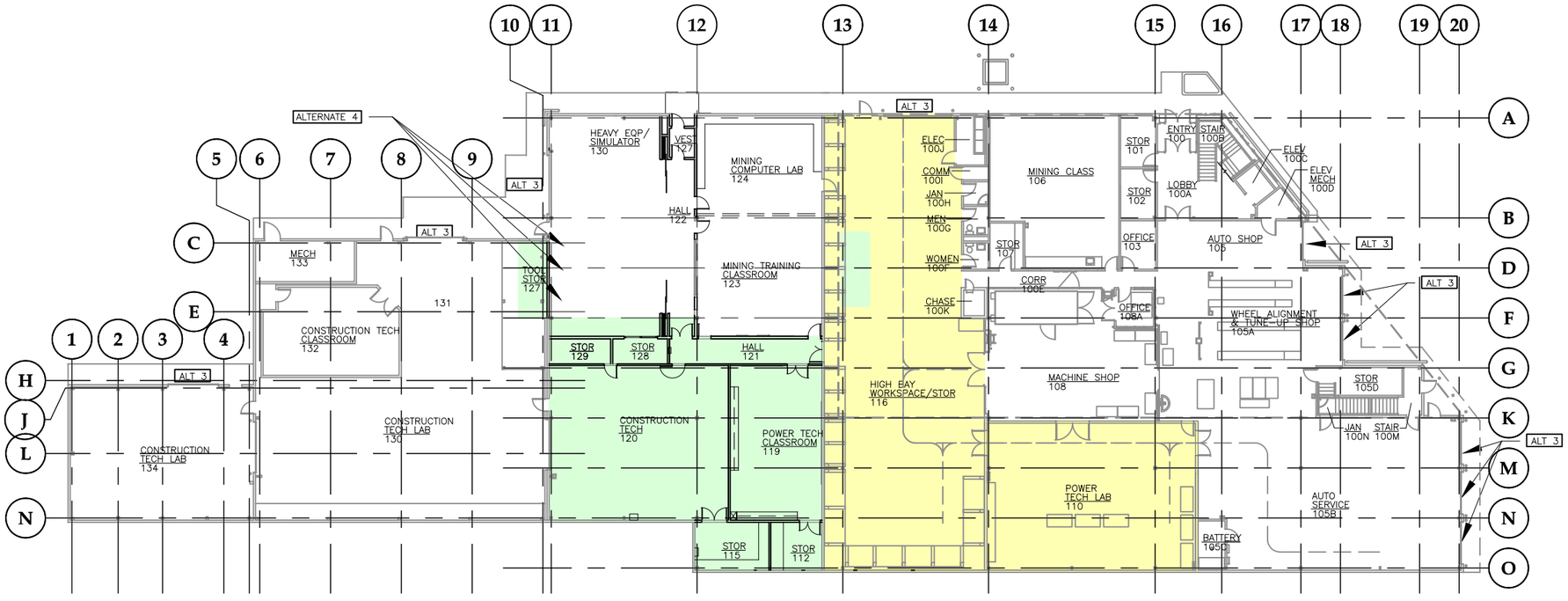


2 **SECOND FLOOR PLAN**
TECH CENTER
SCALE: 0 8' 16' 32'



1 **FIRST FLOOR PLAN - TECH CENTER**
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A004