

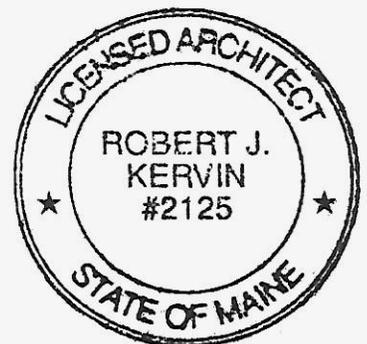
MAINTENANCE BUILDING
PROJECT NO BGS/ PT #2366
NMCC, 33 EDGEMONT DRIVE
PRESQUE ISLE, MAINE

Job No.: 9-14

Date: SEPTEMBER 15, 2014

Prepared By:

ROBERT J. KERVIN, ARCHITECT
896 BANGOR STREET
HODGDON, MAINE



Robert J. Kervin

TABLE OF CONTENTS

SECTION#	SECTION TITLE	PAGES
DIVISION 0 - INFORMATION TO BIDDERS		
00 11 13	Notice to Contractors	2
MCCS	Notice to all Bidders	1
00 21 13	Instructions to Bidders	2
00 41 13	Contractor Bid Form	3
00 43 13	Contractor Bid Bond	2
00 52 13	Contract Agreement	4
00 61 13.13	Contractor Performance Bond	2
00 61 13.16	Contractor Payment Bond	2
00 71 00	Definitions	5
00 72 13	General Conditions	23
00 73 16	Insurance Requirements	3
DIVISION 1 - GENERAL REQUIREMENTS		
01 10 00	Summary of Work	2
01 31 00	Construction Schedules	1
01 33 00	Submittals and Substitutions	2
01 41 60	Soil Testing	2
01 73 20	Selective Demolition	1
01 77 00	Contract Closeout	3
01 78 39	Record Documents	1
01 81 00	Permits and Inspection Certificates	1
DIVISION 2 - SITE WORK		
02 20 00	Earthwork	7
02 21 00	Slope Protection and Temporary Erosion Control	5
22 92 50	Loaming, Seeding, and Mulching	5
DIVISION 3 - CONCRETE		
03 30 00	Cast-In-Place Concrete	4
DIVISION 4 - MASONRY		
04 20 00	Unit Masonry	14
DIVISION 5 - METALS		
05 40 00	Formed Metal Framing	2
DIVISION 6 - WOOD, PLASTICS & COMPOSITES		
06 10 00	Rough Carpentry	4
06 19 00	Wood Roof Trusses	2
06 20 00	Finish Carpentry	2
06 41 20	Cabinets and Counter Tops	2

TABLE OF CONTENTS

SECTION#	SECTION TITLE	PAGES
	DIVISION 7 - THERMAL AND MOISTURE PROTECTION	
07 21 00	Building Insulation	1
07 31 00	Asphalt Shingles and Flashing	2
07 46 00	Siding	3
07 92 00	Sealants and Caulking	2
	DIVISION 8 - OPENINGS	
08 11 00	Metal Doors and Frames	2
08 14 00	Wood Doors	2
08 41 00	Entrances and Storefronts	2
08 54 13	Windows	2
	DIVISION 9 - FINISHES	
09 29 00	Gypsum Board	2
09 31 00	Ceramic Tile	3
09 51 00	Acoustical Ceilings	1
09 65 00	Resilient Tile Flooring	3
09 68 00	Carpet	2
09 91 00	Painting	3
	DIVISION 10 - SPECIALTIES	
10 28 00	Toilet, Bath, and Laundry Accessories	1
	DIVISION 22 - PLUMBING	
22 00 00	Plumbing Systems	11
	DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING	
23 00 00	Heating, Ventilating, and Air Conditioning	29
	DIVISION 26 - ELECTRICAL	
26 00 00	Electrical	4

00 11 13
Notice to Contractors

NMCC Maintenance Building

Project Description:

Work includes but not limited to selective demolition of existing garage and construction of a new Maintenance Building shell space for future maintenance staff use. New construction includes all earthwork, all foundation work, installation of all required under slab items such as floor drains, building drain rough- ins and/ or water supply, exterior wall framing, sheathing installation, and all exterior insulation and finishes such as all exterior doors, windows, siding, brick wor, roofing , and exterior painting.

The cost of the work is approximately \$ 200,000. The work to be performed under this contract shall be completed on or before *1 December 2015*.

1. Sealed Contractor bids for the project noted above, in envelopes plainly marked "Bid for *Maintenance Building*" and addressed to:

*Barry A. Ingraham, Director of Physical Plant and Technology
NMCC, 33 Edgemont Drive, Presque Isle, Maine 04769*

will be opened and read aloud at *Northern Maine Community College, 33 Edgemont Drive, Presque Isle, Maine at 2:00 p.m. on 14 August 2015*. Bids submitted after the noted time will not be considered and will be returned unopened.

2. The bid shall be submitted on the Contractor Bid Form (section 00 41 13) provided in the Bid Documents. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
3. Bid security *is required* on this project.
The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner.
4. Performance and Payment Bonds *are required* on this project.
The selected Contractor shall to furnish a 100% contract Performance Bond (section 00 61 13.13) and a 100% contract Payment Bond (section 00 61 13.16) in the contract amount to cover the execution of the Work.
5. Filed Sub-bids *are not required* on this project.
6. There *are no* Pre-qualified General Contractors on this project.
7. An on-site pre-bid conference *will* be conducted for this project.
The pre-bid conference is *mandatory* for General Contractors and optional for Subcontractors and suppliers. *The pre-bid conference will be on 31 July 2015 at 10:00 a.m. and is to commence from the Lobby of the Christie Complex.*

00 11 13
Notice to Contractors

8. Bid Documents - full sets only - will be available on or about *17 July 2015* and may be purchased or obtained at no cost from:

Robert J. Kervin, Architect
896 Bangor Street
Hodgdon, Maine 04730
Tel.: 207-532-3247

9. Bid Documents may be examined at:

AGC Maine
188 Whitten Road
Augusta, ME 04332
Phone 207-622-4741 Fax 207-622-1625

Construction Summary
734 Chestnut Street
Manchester, NH 03104
Phone 603-627-8856 Fax 603-627-4524

Willis of Northern New England
31 Court Street
Auburn, ME 04212-0040
Phone 207-783-2211 Fax 207-777-6223

**00 41 13
Contractor Bid Form**

**Maintenance Building
Project No BGS/PT # 2366
Norther Maine Community College
33 Edgemont Drive, Presque Isle, Maine**

To: *Barry A. Ingraham*
Director of Physical Plant and Technology
Northern Maine Community College
33 Edgemont Drive
Presque Isle, Maine 04769

1. The undersigned, or "Bidder", having carefully examined the form of contract, general conditions, specifications and drawings dated *September 15, 2014*, prepared by *Robert J. Kervin, Architect* for *Maintenance Building, Project No BGS/PT# 2366, NMCC, 33 Edgemont Drive, Presque Isle, Maine*, as well as the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the Base Bid amount of:

_____ Dollars
\$ _____

Allowances are not included on this project.

The bid amount above includes the following Allowances:

\$ _____
\$ _____

2. Alternate bids *are included* on this project.
Any dollar amount line below that is left blank by the Bidder shall be taken as a bid of **\$0.00**.
Alternate bid prices are as follows:

<u>Alternate No.</u>	<u>Title of Alternate</u>	<u>Dollar amount</u>
<i>1</i>	<i>Install fire wall</i>	\$ _____ \$ _____
<i>2</i>	<i>Install attic insulation and interior wall framing</i>	\$ _____
	<i>"Alternates are as described in Summary of Work</i>	\$ _____
	<i>Section 01 10 00"</i>	\$ _____

**00 41 13
Contractor Bid Form**

3. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. _____ Dated: _____
Addendum No. _____ Dated: _____

4. Bid security *is required* on this project.

The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.

The bid amount includes the following Filed Sub-bids which were submitted to the Bidder and to the Maine Construction Bid Depository.

<u>Name of Filed Sub-bidder</u>	<u>MasterFormat section number and title</u>	<u>Dollar amount</u>
_____		\$ _____
_____		\$ _____
_____		\$ _____
_____		\$ _____
_____		\$ _____

6. The Bidder agrees, if this bid is accepted by the Owner, to sign the designated Owner-Contractor contract and deliver it, with any and all bonds and affidavits of insurance specified in the Bid Documents, within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the day following the holiday or other closure day, Saturday or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

00 41 13
Contractor Bid Form

7. This bid is hereby submitted by:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation,
if a corporation: _____

List of all partners,
if a partnership: _____

SECTION 01 10 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 Summary

- A. **“Maintenance Building Addition and Garage Renovation at NMCC” by Robert J. Kervin, Architect, Job No: 9-14**, consists of all labor, materials, methods, equipment, and products necessary to complete required demolition and new shell construction as described in the written specifications and drawings. Construction includes, but not limited to: any required changes to existing garage interior and exterior to allow for new addition foundation and modifications to existing garage foundation, exterior walls, roofing, windows, doors, flashing, and other exterior finish including siding, brick work, and roofing on new addition, exterior painting, rough-in and stub-up and capped interior plumbing.
- A. Work performed for the completion of this project, to be scheduled so as to least impact the day to day business activities of the Owner and shall allow for normal operations to continue to the maximum extent reasonably possible during demolition and construction. The General Contractor shall coordinate with the Owner appropriate timing for relocation of personnel, as needed to allow for renovation work. Safety of students, college personnel, and the public shall be top priority of the Contractor and his workers during demolition and construction. Removal and delivery of materials shall take place from the North West Campus Entrance and shall be done during periods of least amount of activity such as student movement.
- B. The Owner’s preference is to have all work performed in a logical sequence and so as to least impact day to day operations of the College.

1.2 Demolition

- A. Remove and properly dispose of materials as indicated for removal on plans or as indicated in the specifications.
1. Contractor to remove existing concrete floor as indicated on Demolition Plan for repair of under slab tank and for water/ sewer line work. Removed concrete floor to be patched with concrete and made level with existing floor upon completion of work.
 5. Contractor to remove existing wall in garage for connection to new addition and install a temporary exterior insulated door with lock at top of ramp where fire rated door is to be located.

1.3 New Construction

- A. Plans for New Construction show finish Floor Plan, Sections, Details, Schedules, Elevations, Mechanical and Electrical Plans and Details, and Reflected Ceiling Plan. Project Work includes:
1. Site work including water and drainage piping, Earth work, and Foundation work.
 2. Furnish and install all under slab plumbing with stub-ups.
 3. Furnish and install exterior wall and roof framing, (install exterior wall and roof sheathing provided by donation to Owner).
 4. In new addition only provide and install exterior doors, hardware, windows, and exterior trim only.
 5. Roofing, siding, exterior insulation to be provided and installed.
 6. Interior insulation, flooring, ceilings, drywall, interior painting, accessories, and interior trim not included.
 7. Finish plumbing, heating, ventilation, air conditioning, electrical, mechanical not included.
 8. Finish cabinetry not included.

1.4 Miscellaneous Work

- A. The Contractor shall provide all other material, equipment and labor necessary to complete the “Shell Construction Work” as specified herein and as required to complete the project.

1.5 Owner provided Items:

- A. One hundred (100) sheets of exterior wall sheathing and one hundred forty five (145) sheets of roof sheathing have been donated to Northern Maine Community College for this project.

1.6 Alternate Bids

B. The following alternate bid is to be provided by the Contractor to allow the Owner a more complete building:

1. Contractor to provide and install fire wall separation as shown on the plans for adjacent wall to new addition and as indicated for ceiling of existing Garage.
2. Provide and install attic insulation in new addition and cover with poly vapor barrier as indicated on plans. Provide and install interior wall framing in new facility only.

No finish electrical, plumbing, heating, ventilation, air conditioning, or mechanical, no interior wall finish, suspended ceilings, finish cabinetry, no interior plastering, painting, or finish floors in new facility under this alternate bid.

No existing garage doors, partitions, or fixtures to be removed from existing garage at this time. Existing siding and shingles to remain or to be patched into new work. Existing garage utilities to remain in use, including water, sewer, and electrical.

END OF SECTION

**NOTICE TO VENDORS AND BIDDERS:
STANDARD TERMS AND CONDITIONS APPLICABLE TO ALL MCCS CONTRACTS**

The following standard contracting terms and conditions are incorporated and shall become a part of any final contract that will be awarded by any college or other operating unit of the Maine Community College System (collectively "MCCS"). These terms and conditions derive from the public nature and limited resources of the MCCS. MCCS DOES NOT AGREE TO:

1. Provide any defense, hold harmless or indemnity;
2. Waive any statutory or constitutional immunity;
3. Apply the law of a state other than Maine;
4. Procure types or amounts of insurance beyond those MCCS already maintains or waive any rights of subrogation;
5. Add any entity as an additional insured to MCCS policies of insurance;
6. Pay attorneys' fees, costs, expenses or liquidated damages;
7. Promise confidentiality in a manner contrary to Maine's Freedom of Access Act;
8. Permit an entity to change unilaterally any term or condition once the contract is signed; and
9. Automatic renewals for term(s) greater than month-to-month.

By submitting a response to a Request for Proposal, bid or other offer to do business with MCCS, YOUR ENTITY UNDERSTANDS AND AGREES THAT:

1. The above standard terms and conditions are thereby incorporated into any agreement entered into between MCCS and your entity; that such terms and condition shall control in the event of any conflict with such agreement; and that your entity will not propose or demand any contrary terms;
2. The above standard terms and conditions will govern the interpretation of such agreement notwithstanding the expression of any other term and/or condition to the contrary;
3. Your entity will not propose to any college or other operating unit of the MCCS any contractual documents of any kind that are not in at least 11-point font and completely contained in one Word or PDF document, and that any references to terms and conditions, privacy policies or any other conditions referenced outside of the contract will not apply; and
4. Your entity will identify at the time of submission which, if any, portion or your submitted materials are entitled to "trade secret" exemption from disclosure under Maine's Freedom of Access Act; that failure to so identify will authorize MCCS to conclude that no portions are so exempt; and that your entity will defend, indemnify and hold harmless MCCS in any and all legal actions that seek to compel MCCS to disclose under Maine's Freedom of Access Act some or all of your submitted materials and/or contract, if any, executed between MCCS and your entity.

00 21 13
Instructions to Bidders

1. Bidder Requirements

- 1.1 A bidder is a Contractor who is qualified, or has been specifically pre-qualified by the Bureau of General Services, to bid on the proposed project described in the Bid Documents.
- 1.2 Contractors and Subcontractors bidding on projects that utilize Filed Sub-bids shall follow the requirements outlined in these Bid Documents for such projects. See Section 00 22 13 for additional information.
- 1.3 Contractors are not eligible to bid on the project when their access to project design documents prior to the bid period distribution of documents creates an unfair bidding advantage. Prohibited access includes consultation with the Owner or with design professionals engaged by the Owner regarding cost estimating, constructability review, or project scheduling. This prohibition to bid applies to open, competitive bidding or pre-qualified contractor bidding or Filed Sub-bidding. The Bureau may require additional information to determine if the activities of a Contractor constitute an unfair bidding advantage.
- 1.4 Each bidder is responsible for becoming thoroughly familiar with the Bid Documents prior to submitting a bid. The failure of a bidder to review evident site conditions, to attend available pre-bid conferences, or to receive, examine, or act on addenda to the Bid Documents shall not relieve that bidder from any obligation with respect to their bid or the execution of the work as a Contractor.
- 1.5 Prior to the award of the contract, General Contractor bidders or Filed Sub-bidders may be required to provide documented evidence to the Owner or the Bureau showing compliance with the provisions of this section, their business experience, financial capability, or performance on previous projects.
- 1.6 The selected General Contractor bidder will be required to provide proof of insurance before a contract can be executed. Refer to section 00 73 16 Insurance Requirements, for specific requirements.
- 1.7 Contracts developed from this bid shall not be assigned, sublet or transferred without the written consent of the Owner.

2. Authority of Owner

- 2.1 The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
- 2.2 Subject to the Owner's stated right to accept or reject any or all bids, the Contractor shall be selected on the basis of the sum of the lowest acceptable bid plus any Alternate Bids the Owner elects to include.
- 2.3 The Owner is exempt from the payment of Federal Excise Taxes and Federal Transportation Tax on all shipments, as well as Maine State Sales and Use Taxes on items "...physically incorporated in real property ...". The bidder shall not include these taxes in their bid. See Section 00 72 13 for additional information.

00 21 13
Instructions to Bidders

3. Submitting Bids and Bid Requirements

- 3.1 Each bid shall be submitted on the forms provided in the Bid Documents.
- 3.2 Each bid shall be valid for a period of thirty calendar days following the Project bid opening date and time.
- 3.3 A bid that contains an escalation clause is considered invalid.
- 3.4 Bidders shall include a Bid Bond or other approved bid security with the bid form submitted to the Owner when the bid form indicates such bid security is required. The bond value shall be 5% of the bid amount. The form of bond is shown in section 00 43 13.
- 3.5 *Bidders shall include the cost of Performance and Payment Bonds in the bid amount if the bid amount will result in a construction contract value over \$125,000, inclusive of alternate bids that may be awarded in the contract. Pursuant to 14 M.R.S.A., Section 871, Public Works Contractors' Surety Bond Law of 1971, subsection 3, the selected Contractor is required to provide these bonds before a contract can be executed. The form of bonds are shown in section 00 61 13.13 and 00 61 13.16.*
- 3.6 Bidders may modify bids in writing prior to the bid closing time. Such written amendments shall not disclose the amount of the initial bid. If so disclosed, the entire bid is considered invalid.
- 3.7 Bidders shall acknowledge on the bid form all Addenda issued in a timely manner. The Architect shall not issue Addenda affecting bidders less than 72 hours prior to the bid closing time. Addenda shall be issued to all companies who are registered holders of Bid Documents.
- 3.8 A bid may be withdrawn without penalty if a written request by the bidder is presented to the Owner prior to the bid closing time. Such written withdrawal requests are subject to verification as required by the Bureau. After the bid closing time, such written withdrawal requests may be allowed in consideration of the bid bond or, without utilizing a bid bond, if the Contractor provides documented evidence to the satisfaction of the Bureau that factual errors had been made on the bid form.
- 3.9 Projects which require a State of Maine wage determination will include that schedule as part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.10 Projects which require compliance with the Davis-Bacon Act are subject to the regulations contained the Code for Federal Regulations and the federal wage determination which is made a part of the Bid Documents. See section 00 73 46, if such rates are required.

**00 41 13
Contractor Bid Form**

**Maintenance Building
Project No BGS/PT # 2366
Northern Maine Community College
33 Edgemont Drive, Presque Isle, Maine**

To: *Barry A. Ingraham*
Director of Physical Plant and Technology
Northern Maine Community College
33 Edgemont Drive
Presque Isle, Maine 04769

1. The undersigned, or "Bidder", having carefully examined the form of contract, general conditions, specifications and drawings dated *September 15, 2014*, prepared by *Robert J. Kervin, Architect* for *Maintenance Building, Project No BGS/PT# 2366, NMCC, 33 Edgemont Drive, Presque Isle, Maine*, as well as the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the Base Bid amount of:

_____ Dollars
\$ _____

Allowances are not included on this project.
The bid amount above includes the following Allowances:

\$ _____
\$ _____

2. Alternate bids *are included* on this project.
Any dollar amount line below that is left blank by the Bidder shall be taken as a bid of **\$0.00**.
Alternate bid prices are as follows:

<u>Alternate No.</u>	<u>Title of Alternate</u>	<u>Dollar amount</u>
<i>1</i>	<i>Install fire wall</i>	\$ _____ \$ _____
<i>2</i>	<i>Install attic insulation and interior wall framing</i>	\$ _____
	<i>"Alternates are as described in Summary of Work</i>	\$ _____
	<i>Section 01 10 00"</i>	\$ _____

**00 41 13
Contractor Bid Form**

3. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. _____ Dated: _____
Addendum No. _____ Dated: _____

4. Bid security *is required* on this project.

The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.

The bid amount includes the following Filed Sub-bids which were submitted to the Bidder and to the Maine Construction Bid Depository.

<u>Name of Filed Sub-bidder</u>	<u>MasterFormat section number and title</u>	<u>Dollar amount</u>
_____		\$ _____
_____		\$ _____
_____		\$ _____
_____		\$ _____
_____		\$ _____

6. The Bidder agrees, if this bid is accepted by the Owner, to sign the designated Owner-Contractor contract and deliver it, with any and all bonds and affidavits of insurance specified in the Bid Documents, within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the day following the holiday or other closure day, Saturday or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

**00 41 13
Contractor Bid Form**

7. This bid is hereby submitted by:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation,
if a corporation: _____

List of all partners,
if a partnership: _____

00 43 13
Contractor Bid Bond

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of five percent of the bid amount, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, signed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the bid due date.

The condition of the above obligation is such that whereas the principal has submitted to the Owner, or State of Maine, to a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the construction of insert name of project as designated in the contract documents

Now therefore:

If said bid shall be rejected, or, in the alternate,

If said bid shall be accepted and the principal shall execute and deliver a contract in the form of contract attached hereto, properly completed in accordance with said bid, and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid and said Surety does hereby waive notice of any such extension.

**00 43 13
Contractor Bid Bond**

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the bid due date.

Contractor

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

00 52 13
Contract Agreement

AdvantageME:
Appropriation No:

STATE OF MAINE
CONSTRUCTION CONTRACT

State Project

THIS AGREEMENT made the date of month in the year 2015 by and between the State of Maine through the Northern Maine Community College hereinafter called the *Owner* and Contractor company name hereinafter called the *Contractor*.

BGS Project No.: BGS/PT# 2366

The *Owner* and the *Contractor* for the consideration hereinafter named agree as follows:

ARTICLE 1 SCOPE OF WORK

§ 1.1 The *Contractor* shall furnish all of the materials and perform all the work described in the specifications and shown on the drawings for the project entitled: Maintenance Building.

§ 1.2 The specifications and the drawings have been prepared by Robert J. Kervin, Architect, acting as Designer and named in the documents as the Architect or Engineer. This firm has responsibilities for defining the scope of work governed by their agreement with the *Owner*, the specifications and the drawings, and the General Conditions and Special Provisions of the contract.

ARTICLE 2 COMPLETION DATE

§ 2.1 The work to be performed under this contract shall be completed on or before date. For each calendar day the project remains uncompleted \$0.00 shall be charged as liquidated damages.

ARTICLE 3 CONTRACT SUM

§ 3.1 The *Owner* shall pay the *Contractor* for the performance of the contract, subject to additions and deductions provided by approved Change Orders in current funds as follows: amount in words dollars and 00cents, \$0.00

ARTICLE 4 CONTRACT BONDS

§ 4.1 Contract bonds are not required if the contract amount is less than \$125,000 unless bonds are specifically mandated by the contract documents.

00 52 13
Contract Agreement

§ 4.2 On this project, the *Contractor* ***shall*** furnish the *Owner* the appropriate contract bonds in the amount of 100% of the contract amount.

ARTICLE 5 PROGRESS PAYMENTS

§ 5.1 The *Owner* shall make payments on account of the contract as provided therein as follows: Each month 95% of the value, based on contract prices of labor and materials incorporated in the work and of materials suitably stored at the site thereof up to the first day of that month, as certified by the Architect or Engineer.

§ 5.2 The *Owner* may cause the *Contractor* to be paid such portion of the amount retained hereunder as he deems advisable.

ARTICLE 6 FINAL PAYMENT

§ 6.1 Final payment shall be due 30 days after completion and acceptance of the work, provided the *Contractor* has submitted evidence satisfactory to the *Owner* that all payrolls, material bills and other indebtedness connected with the work has been paid.

ARTICLE 7 CONTRACT DOCUMENTS

§ 7.1 The General Conditions of the contract, instructions to bidders, bid form, Special Provisions, the written specifications and the drawings, and any Addenda, together with this agreement, form the contract; they are as fully a part of the contract as if hereto attached or herein repeated.

§ 7.2 Specifications: *September 15, 2014*

§ 7.3 Drawings:

Sheet C1- Existing Site Plan, New Site Plan, Location Plan, & Demolition Plan

Sheet 1- Foundation Plan, Sections, Details

Sheet 2- Floor Plan, Door, Hardware, and Window Schedules

Sheet 3- Building Sections, Details

Sheet 3A- Wall Details

Sheet 4- Exterior Elevations

Sheet 5- Room Finish Schedule, Interior Elevations, Door and Window Sections

Sheet 6- Roof Framing Plan, Details

Sheet M1- Mechanical Duct Work Plan

Sheet M2- Mechanical Piping Plan

Sheet M3- AC & Compressed Air Piping Plan

Sheet M4- Mechanical Room Part Plan & Boiler Riser Diagram

Sheet M5- Mechanical Details

Sheet M6- Mechanical Schedules & Legend

Sheet P1- Sanitary Waste Plumbing Plan

00 52 13
Contract Agreement

Sheet P2- Domestic Cold & Hot Water Plumbing Plan & Mechanical Room Plumbing Part Plan

Sheet P3- Plumbing Details and Fixture Schedule

Sheet E1- Electrical Lighting Plan, Legend

Sheet E2- Electrical Power Plan, Schedules

§ 7.4 Addenda: each addenda number and date, or "none"

ARTICLE 8 OTHER PROVISIONS

§ 8.1 The *Owner* and the *Contractor* are required to comply with applicable provisions of the American Recovery and Reinvestment Act (ARRA), and the Qualified School Construction Bonds (QSCB) program, including, but not limited to, the Buy American criteria, federal wage rates, and program-specific reporting requirements, for those projects funded through ARRA and QSCB.

00 61 13.13
Contractor Performance Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly and faithfully perform the contract entered into this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract, for the construction of insert name of project as designated in the contract documents, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.13
Contractor Performance Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert day, i.e.: 8th* day of *select month, select year*, which is the same date as that of the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

00 61 13.16
Contractor Payment Bond

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the use and benefit of claimants, defined as an entity having a contract with the principal or with a subcontractor of the principal for labor, materials, or both labor and materials, used or reasonably required for use in the performance of the contract, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly satisfy all claims and demands incurred for all labor and materials, used or required by the principal in connection with the work described in the contract entered into this insert day, i.e.: 8th day of select month, select year, which is the same date as that of the construction contract, for the construction of insert name of project as designated in the contract documents, and shall fully reimburse the obligee for all outlay and expense with said obligee may incur in making good any default of said principal, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

00 61 13.16
Contractor Payment Bond

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert day, i.e.: 8th* day of *select month, select year*, which is the same date as that of the construction contract.

Contractor

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

Surety

(Signature)

insert name and title

insert company name

insert address

insert city state zip code

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

00 71 00
Definitions

1. Definitions
 - 1.1 *Addendum*: A document issued by the Architect that amends the Bid Documents. Addenda shall not be issued less than seventy-two hours prior to the specified bid opening time.
 - 1.2 *Allowance*: A specified dollar amount for a particular scope of work or service included in the Work that is identified in the Bid Documents and included in each Bidder's Bid. The Contractor shall document expenditures for an Allowance during the Project. Any unused balance shall be credited to the Owner. The Contractor is responsible for notifying the Owner of anticipated expenses greater than the specified amount and the Owner is responsible for those additional expenses.
 - 1.3 *Alternate Bid*: The Contractor's written offer of a specified dollar amount, submitted on the Bid Form, for the performance of a particular scope of work described in the Bid Documents. The Owner determines the low bidder based on the sum of the base Bid and any combination of Alternate Bids that the Owner selects.
 - 1.4 *Architect*: The Architect or Engineer acting as Professional-of-Record for the project. The Architect is responsible for the design of the Project.
 - 1.5 *Architectural Supplemental Instruction (ASI)*: A written instruction from the Architect for the purpose of clarification of the Contract Documents. An ASI does not alter the Contract Price or Contract Time. ASIs may be responses to RFIs and shall be issued by the Architect in a timely manner to avoid any negative impact on the Schedule of Work.
 - 1.6 *Bid*: The Contractor's written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of the Work. A Bid may include bonds or other requirements. A base Bid is separate and distinct from Alternate Bids, being the only cost component necessary for the award of the contract, and representing the minimum amount of Work that is essential for the functioning of the project.
 - 1.7 *Bid Bond*: The security designated in the Bid Documents, furnished by Bidders as a guaranty of good faith to enter into a contract with the Owner, should a contract be awarded to that Bidder.
 - 1.8 *Bidder*: Any business entity, individual or corporation that submits a bid for the performance of the work described in the Bid Documents, acting directly or through a duly authorized representative.
 - 1.9 *Bid Documents*: The drawings, procurement and contracting requirements, general requirements, and the written specifications -including all addenda, that a bidder is required to reference in the submission of a bid.
 - 1.10 *Bureau*: The State of Maine Bureau of General Services in the Department of Administrative and Financial Services.
 - 1.11 *Calendar days*: Consecutive days, as occurring on a calendar, taking into account each day of the week, month, year, and any religious, national or local holidays.
 - 1.12 *Certificate of Substantial Completion*: A document developed by the Architect that describes the final status of the Work and establishes the date that the Owner may use the facility for its intended

00 71 00
Definitions

purpose. The Certificate of Substantial Completion also include a provisional list of items (a "punch list") remaining to be corrected by the Contractor, if any, and identifies a date from which the project warranty period commences.

- 1.13 *Certificate of Occupancy*: A document developed by a local jurisdiction such as the Code Enforcement Officer that grants permission to the Owner to occupy a building.
- 1.14 *Change Order (CO)*: A document that modifies the contract and establishes the basis of a specific adjustment to the Contract Price or the Contract Time, or both. Change Orders may address correction of omissions, errors, and document discrepancies, or additional requirements. Change Orders should include all labor, materials and incidentals required to complete the work described. A Change Order is not valid until signed by the Contractor, Owner and Architect and approved by the Bureau.
- 1.15 *Change Order Proposal (COP)*: Change proposed by the Contractor in the contract amount, requirements, or time, which becomes a Change Order when approved by the Owner.
- 1.16 *Clerk of the Works*: The authorized representative of the Architect on the job site. Clerk of the Works is also called Architect's representative.
- 1.17 *Construction Change Directive (CCD)*: A written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to final agreement with the Contractor on adjustment, if any, in the Contract Price or Contract Time, or both.
- 1.18 *Contract*: A written agreement between the Owner and the successful bidder which obligates the Contractor to perform the work specified in the Contract Documents and obligates the Owner to compensate the Contractor at the mutually accepted sum, rates or prices.
- 1.19 *Contract Bonds (also known as Payment and Performance Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.20 *Contract Documents*: The drawings and written specifications (including all addenda), Standard General Conditions, and the contract (including all Change Orders subsequently incorporated in the documents).
- 1.21 *Contract Price*: The dollar amount of the construction contract, also called *Contract Sum*.
- 1.22 *Contract Time*: The designated duration of time to execute the Work of the contract, with a specific date for completion.
- 1.23 *Contractor*: Also called the "General Contractor" or "GC" the individual or entity undertaking the execution of the general contract work under the terms of the contract with the Owner, acting directly or through a duly authorized representative. The Contractor is responsible for the means, methods and materials utilized in the execution and completion of the Work.

00 71 00
Definitions

- 1.24 *Drawings*: The graphic and pictorial portion of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
- 1.25 *Filed Sub-bid*: The designated major Subcontractor's (or, in some cases, Contractor's) written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of a particular portion of the Work. A Filed Sub-bid may include bonds or other requirements.
- 1.26 *Final Completion*: Project status indicating when the Work is fully completed in compliance with the Contract Documents. Final Completion is documented by a date on which the Contractor's obligations under the contract are complete and accepted by the Owner and final payment becomes due and payable.
- 1.27 *General Requirements*: The on-site overhead expense items the Contractor provides for the Project, typically including, but not limited to, building permits, construction supervision, Contract Bonds, insurance, field office, temporary utilities, rubbish removal, and site fencing. Overhead expenses of the Contractor's general operation are not included. Sometimes referred to as the Contractor's General Conditions.
- 1.28 *Owner*: The State agency which is represented by duly authorized individuals. The Owner is responsible for defining the scope of the Project and compensation to the Architect and Contractor.
- 1.29 *Owner's Representative*: The individual or entity contracted by the Owner to be an advisor and information conduit regarding the Project.
- 1.30 *Overhead*: General and administrative expenses of the Contractor's principal and branch offices, including payroll costs and other compensation of Contractor employees, deductibles paid on any insurance policy, charges against the Contractor for delinquent payments, and costs related to the correction of defective work, and the Contractor's capital expenses, including interest on capital used for the work.
- 1.31 *Performance and Payment Bonds (also known as Contract Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.32 *Post-Bid Addendum*: Document issued by the Architect that defines a potential Change Order prior to signing of the construction contract. The Post-Bid Addendum allows the Owner to negotiate contract changes with the Bidder submitting the lowest valid bid, only if the negotiated changes to the Bid Documents result in no change or no increase in the bid price.

A Post-Bid Addendum may also be issued after a competitive construction Bid opening to those Bidders who submitted a Bid initially, for the purpose of rebidding the Project work without re-advertising.

- 1.33 *Project*: The construction project proposed by the Owner to be constructed according to the Contract Documents. The entire public improvement project may also include separate construction and other

00 71 00
Definitions

activities conducted by the Owner or other contractors. The Owner shall inform all contractors of the scope of the entire public improvement project relative to each individual contract.

- 1.34 *Proposal*: The Contractor's written offer submitted to the Owner for consideration containing a specified dollar amount or rate, for a specific scope of work, and including a schedule impact, if any. A proposal shall include all costs for overhead and profit. After acceptance by all parties a proposal amends the contract and is implemented by the Contractor.
- 1.35 *Proposal Request (PR)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.36 *Punch List*: A document that identifies the items of work remaining to be done by the Contractor at the Close Out of a Project. The Punch List is created as a result of a final inspection of the work only after the Contractor attests that all of the Work is in its complete and permanent status.
- 1.37 *Request For Information (RFI)*: A Contractor's written request to the Architect for clarification, definition or description of the Work. RFIs shall be presented by the Contractor in a timely manner to avoid any negative impact on the Schedule of Work.
- 1.38 *Request For Proposal (RFP)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.39 *Requisition for Payment*: The document in which the Contractor certifies that the Work described is, to the best of the Contractor's knowledge, information and belief, complete and that all previous payments have been paid by the Contractor to Subcontractors and suppliers, and that the current requested payment is now due. See *Schedule of Values*.
- 1.40 *Retainage*: The amount, calculated at five percent (5%) of the contract value or a scheduled value, that the Owner shall withhold from the Contractor until the work or portion of work is declared substantially complete or otherwise accepted by the Owner. The Owner may, if requested, reduce the amount withheld if the Owner deems it desirable and prudent to do so. (See Title 5 M.R.S.A., Section 1746.)
- 1.41 *Sample*: A physical example provided by the Contractor which illustrates materials, equipment or workmanship and establishes standards by which the Work will be judged.
- 1.42 *Schedule of the Work*: The document prepared by the Contractor and approved by the Owner that specifies the dates on which the Contractor plans to begin and complete various parts of the Work, including dates on which information and approvals are required from the Owner.
- 1.43 *Schedule of Values*: The document prepared by the Contractor and approved by the Owner before the commencement of the Work that specifies the dollar values of discrete portions of the Work equal in sum to the contract amount. The Schedule of Values is used to document progress payments of the Work in regular (usually monthly) requisitions for payment. See *Requisition for Payment*.
- 1.44 *Shop Drawings*: The drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

00 71 00
Definitions

- 1.45 *Specifications*: The portion of the Contract Documents consisting of the written requirements of the Work for materials, equipment, systems, standards, workmanship, and performance of related services.
- 1.46 *Subcontractor*: An individual or entity undertaking the execution of any part of the Work by virtue of a written agreement with the Contractor or any other Subcontractor. Also, an individual or entity retained by the Contractor or any other Subcontractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work.
- 1.47 *Substantial Completion*: Project status indicating when the Work or a designated portion of the Work is sufficiently complete in compliance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose without unscheduled disruption. Substantial Completion is documented by the date of the Certificate of Substantial Completion signed by the Owner and the Contractor.
- 1.48 *Superintendent*: The representative of the Contractor on the job site, authorized by the Contractor to receive and fulfill instructions from the Architect.
- 1.49 *Surety*: The individual or entity that is legally bound with the Contractor and Subcontractor to insure the faithful performance of the contract and for the payment of the bills for labor, materials and equipment by the Contractor and Subcontractors.
- 1.50 *Work*: The construction and services, whether completed or partially completed, including all labor, materials, equipment and services provided or to be provided by the Contractor and Subcontractors to fulfill the requirements of the Project as described in the Contract Documents.

00 72 13
General Conditions

Table of Contents of this General Conditions Section

1. Preconstruction Conference
2. Intent and Correlation of Contract Documents
3. Additional Drawings and Specifications
4. Record of Documents
5. Ownership of Contract Documents
6. Shop Drawings
7. Samples
8. Substitutions
9. Patents and Royalties
10. Surveys, Layout of Work
11. Permits, Laws, and Regulations
12. Taxes
13. Labor and Wages
14. Insurance Requirements
15. Contract Bonds
16. Allowances
17. Assignment of Contract
18. Separate Contracts
19. Subcontracts
20. Contractor-Subcontractor Relationship
21. Supervision of the Work
22. Inspection of the Work
23. Architect's Status
24. Management of the Premises
25. Safety and Security of the Premises
26. Changes in the Work
27. Correction of the Work
28. Owner's Right to do Work
29. Termination of Contract and Stop Work Action
30. Delays and Extension of Time
31. Payments to the Contractor
32. Payments Withheld
33. Liens
34. Indemnification
35. Workmanship
36. Close-out of the Work
37. Date of Completion and Liquidated Damages
38. Dispute Resolution

00 72 13
General Conditions

1. Preconstruction Conference

- 1.1 The Contractor shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the Owner and Architect. The purpose of this conference is to:
- a) introduce all parties who have a significant role in the Project, including:
 - Owner (State Agency)
 - Bureau of General Services (BGS)
 - Architect
 - Consultants
 - Clerk-of-the-works
 - Contractor (GC)
 - Superintendent
 - Subcontractors
 - Other State agencies
 - Owner's Representative
 - Construction testing company
 - Commissioning agent
 - Special Inspections agent;
 - b) review the responsibilities of each party;
 - c) review any previously-identified special provisions of the Project;
 - d) review the Schedule of the Work calendar submitted by the Contractor to be approved by the Owner and Architect;
 - e) review the Schedule of Values form submitted by the Contractor to be approved by the Owner and Architect;
 - f) establish routines for Shop Drawing approval, contract changes, requisitions, et cetera;
 - g) discuss jobsite issues;
 - h) discuss Project close-out procedures;
 - i) provide an opportunity for clarification of Contract Documents before work begins;
 - j) schedule regular meetings at appropriate intervals for the review of the progress of the Work.

2. Intent and Correlation of Contract Documents

- 2.1 The intent of the Contract Documents is to describe the complete Project. The Contract Documents consist of various components; each component complements the others. What is shown as a requirement by any one component shall be inferred as a requirement on all corresponding components.
- 2.2 The Contractor shall furnish all labor, equipment and materials, tools, transportation, insurance, services, supplies, operations and methods necessary for, and reasonably incidental to, the construction and completion of the Project. Any work that deviates from the Contract Documents which appears to be required by the exigencies of construction or by inconsistencies in the Contract Documents, will be determined by the Architect and authorized in writing by the Architect, Owner and the Bureau prior to execution. The Contractor shall be responsible for requesting clarifying information where the intent of the Contract Documents is uncertain.

00 72 13
General Conditions

2.3 The Contractor shall not utilize any apparent error or omission in the Contract Documents to the disadvantage of the Owner. The Contractor shall promptly notify the Architect in writing of such errors or omissions. The Architect shall make any corrections or clarifications necessary in such a situation to document the true intent of the Contract Documents.

3. Additional Drawings and Specifications

3.1 The Owner shall provide to the Contractor, at no additional expense to the Contractor, a reasonable quantity of additional Drawings and Specifications for the execution of the Work.

3.2 The Architect shall promptly furnish additional revised Drawings and Specifications that are created due to corrections or clarifications made by the Architect. All such information shall be consistent with, and reasonably inferred from, the Contract Documents. The Contractor shall do no work without the proper Drawings and Specifications.

4. Record of Documents

4.1 The Contractor shall maintain one complete set of Contract Documents on the jobsite, in good order and current status, for access by the Owner and Architect.

4.2 The Contractor shall maintain, continuously updated, complete records of Requests for Information, Architectural Supplemental Instructions, Information Bulletins, supplemental sketches, Change Order Proposals, Change Orders, Shop Drawings, testing reports, et cetera, for access by the Owner and Architect.

5. Ownership of Contract Documents

5.1 The designs represented on the Contract Documents are the property of the Architect. The Drawings and Specifications shall not be used on other work without consent of the Architect.

6. Shop Drawings

6.1 The Contractor shall administer Shop Drawings prepared by the Contractor, Subcontractors, suppliers or others to conform to the approved Schedule of the Work. The Contractor shall verify all field measurements, check and authorize all Shop Drawings and schedules required by the Work. The Contractor is the responsible party and contact for the Contractor's work as well as that of Subcontractors, suppliers or others who provide Shop Drawings.

6.2 The Architect shall review and acknowledge Shop Drawings, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents.

00 72 13
General Conditions

- 6.3 The Contractor shall provide monthly updated logs containing: requests for information, information bulletins, supplemental instructions, supplemental sketches, change order proposals, change orders, submittals, testing and deficiencies.
- 6.4 The Contractor shall make any corrections required by the Architect, and shall submit a quantity of corrected copies as may be needed. The acceptance of Shop Drawings or schedules by the Architect shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless the Contractor has called such deviations to the attention of the Architect at the time of submission and secured the Architect's written approval. The acceptance of Shop Drawings or schedules by the Architect does not relieve the Contractor from responsibility for errors in Shop Drawings or schedules.

7. Samples

- 7.1 The Contractor shall furnish for approval, with reasonable promptness, all samples as directed by the Architect. The Architect shall review and approve such samples, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents. The subsequent work shall be in accord with the approved samples.

8. Substitutions

- 8.1 The Contractor shall furnish items and materials described in the Contract Documents. If the item or material specified describes a proprietary product, or uses the name of a manufacturer, the term "or approved equal" shall be implied, if it is not included in the text. The specific item or material specified establishes a minimum standard for the general design, level of quality, type, function, durability, efficiency, reliability, compatibility, warranty coverage, installation factors and required maintenance. The Drawing or written Specification shall not be construed to exclude other manufacturers products of comparable design, quality, and efficiency.
- 8.2 The Contractor may submit detailed information about a proposed substitution to the Architect for consideration. Particular models of items and particular materials which the Contractor asserts to be equal to the items and materials identified in the Contract Documents shall be allowed only with written approval by the Architect. The request for substitution shall include a cost comparison and a reason or reasons for the substitution.
- 8.3 The Architect may request additional information about the proposed substitution. The approval or rejection of a proposed substitution may be based on timeliness of the request, source of the information, the considerations of minimum standards described above, or other considerations. The Architect should briefly state the rationale for the decision. The decision shall be considered final.
- 8.4 The duration of a substitution review process can not be the basis for a claim for delay in the Schedule of the Work.

00 72 13
General Conditions

9. Patents and Royalties

- 9.1 The Contractor shall, for all time, secure for the Owner the free and undisputed right to the use of any patented articles or methods used in the Work. The expense of defending any suits for infringement or alleged infringement of such patents shall be borne by the Contractor. Awards made regarding patent suits shall be paid by the Contractor. The Contractor shall hold the Owner harmless regarding patent suits that may arise due to installations made by the Contractor, and to any awards made as a result of such suits.
- 9.2 Any royalty payments related to the work done by the Contractor for the Project shall be borne by the Contractor. The Contractor shall hold the Owner harmless regarding any royalty payments that may arise due to installations made by the Contractor.

10. Surveys, Layout of Work

- 10.1 The Owner shall furnish all property surveys unless otherwise specified.
- 10.2 The Contractor is responsible for correctly staking out the Work on the site. The Contractor shall employ a competent surveyor to position all construction on the site. The surveyor shall run the axis lines, establish correct datum points and check each line and point on the site to insure their accuracy. All such lines and points shall be carefully preserved throughout the construction.
- 10.3 The Contractor shall lay out all work from dimensions given on the Drawings. The Contractor shall take measurements and verify dimensions of any existing work that affects the Work or to which the Work is to be fitted. The Contractor is solely responsible for the accuracy of all measurements. The Contractor shall verify all grades, lines, levels, elevations and dimensions shown on the Drawings and report any errors or inconsistencies to the Architect prior to commencing work.

11. Permits, Laws, and Regulations

- 11.1 The Owner is responsible for obtaining any zoning approvals or other similar local project approvals necessary to complete the Work, unless otherwise specified in the Contract Documents.
- 11.2 The Owner is responsible for obtaining Maine Department of Environmental Protection, Maine Department of Transportation, or other similar state government project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 11.3 The Owner is responsible for obtaining any federal agency project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 11.4 The Owner is responsible for obtaining all easements for permanent structures or permanent changes in existing facilities.

00 72 13
General Conditions

- 11.5 The Contractor is responsible for obtaining and paying for all permits and licenses necessary for the implementation of the Work. The Contractor shall notify the Owner of any delays, variance or restrictions that may result from the issuing of permits and licenses.
- 11.6 The Contractor shall comply with all ordinances, laws, rules and regulations and make all required notices bearing on the implementation of the Work. In the event the Contractor observes disagreement between the Drawings and Specifications and any ordinances, laws, rules and regulations, the Contractor shall promptly notify the Architect in writing. Any necessary changes shall be made as provided in the contract for changes in the work. The Contractor shall not perform any work knowing it to be contrary to such ordinances, laws, rules and regulations.
- 11.7 The Contractor shall comply with local, state and federal regulations regarding construction safety and all other aspects of the Work.

12. Taxes

- 12.1 The Owner is exempt from the payment of Federal Excise Taxes on articles not for resale and from the Federal Transportation Tax on all shipments, as well as Maine State Sales and Use Taxes. Pricing in all Change Order Proposals from the Contractor and Subcontractors shall not include these taxes.
- 12.2 Maine statute (36 M.R.S.A. §1760) allows "...an exemption from sales and use tax on items which will be physically incorporated in real property of an exempt organization. This exemption only applies to lumber, hardware, doors and windows, nails, insulation and other building materials actually affixed to realty. Tools, wearing apparel, consumable supplies, machinery and equipment used by the Contractor are taxable even if purchased specifically for the exempt job."
- 12.3 The Contractor may contact Maine Revenue Services, 24 State House Station, Augusta, Maine 04333 for guidance on tax exempt regulations authorized by 36 M.R.S.A. §1760 and detailed in Rule 302 (18-125 CMR 302).

13. Labor and Wages

- 13.1 The Contractor shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine.
- 13.2 The Architect shall include a wage determination document prepared by the Maine Department of Labor in the Contract Documents for state-funded contracts in excess of \$50,000. The document shows the minimum wages required to be paid to each category of labor employed on the project.
- 13.3 On projects requiring a Maine wage determination, the Contractor shall submit monthly payroll records to the Owner ("the contracting agency") showing the name and occupation of all workers and all independent contractors employed on the project. The monthly submission must also include the Contractor's company name, the title of the project, hours worked, hourly rate or other method of remuneration, and the actual wages or other compensation paid to each person.

00 72 13
General Conditions

- 13.4 The Contractor shall not reveal, in the payroll records submitted to the Owner, personal information regarding workers and independent contractors, other than the information described above. Such information shall not include Social Security number, employee identification number, or employee address or phone number, for example.
- 13.5 The Contractor shall conform to Maine statute by providing to the Owner a list of all subcontractors and independent contractors on the job site and a record of the entity to whom that subcontractor or independent contractor is directly contracted and by whom that subcontractor or independent contractor is insured for workers' compensation purposes.
- 13.6 The Contractor shall enforce strict discipline and good order among their employees at all times, and shall not employ any person unfit or unskilled to do the work assigned to them.
- 13.7 The Contractor shall promptly pay all employees when their compensation is due, shall promptly pay all others who have billed and are due for materials, supplies and services used in the Work, and shall promptly pay all others who have billed and are due for insurance, workers compensation coverage, federal and state unemployment compensation, and Social Security charges pertaining to this Project. Before final payments are made, the Contractor shall furnish to the Owner affidavits that all such payments described above have been made.
- 13.8 The Contractor may contact the Maine Department of Labor, 54 State House Station, Augusta, Maine 04333 for guidance on labor issues.

14. Insurance Requirements

- 14.1 The Contractor shall not commence work under this contract until the Contractor has obtained all insurance required under this article and such insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to commence work on a subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.
- 14.2 The Owner does not warrant or represent that the insurance required under this paragraph constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor and Subcontractors of every tier shall satisfy themselves as to the existence, extent and adequacy of insurance prior to commencement of work.
- 14.3 The Contractor and any Subcontractor shall procure and maintain for the duration of the Project insurance of the types and limits set forth under this paragraph and such insurance as will protect themselves from claims which may arise out of or result from the Contractor's or Subcontractor's execution of the work, whether such execution be by themselves or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable. The insurance coverage provided by the Contractor and any Subcontractor will be primary coverage.

00 72 13
General Conditions

14.4 Workers' Compensation Insurance

Worker's Compensation insurance for all employees on site in accordance with the requirements of the Workers' Compensation law of the State of Maine.

Minimum acceptable limits for Employer's Liability are:

Bodily Injury by Accident	\$500,000
Bodily Injury by Disease	\$500,000 Each Employee
Bodily Injury by Disease	\$500,000 Policy Limit

14.5 Liability Insurance

a) General Liability Insurance

General liability insurance shall be on a form providing coverage not less than that of the 1996 occurrence version of the Insurance Services Office (ISO) Commercial General Liability Policy. This insurance shall cover bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. It shall include collapse and underground coverage - as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a per location or project basis.

Minimum acceptable limits are:

General aggregate limit.....	\$2,000,000
Products and completed operations aggregate.....	\$1,000,000
Each occurrence limit	\$1,000,000
Personal injury aggregate.....	\$1,000,000

b) Automobile Liability Insurance

Automobile liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers.

Minimum acceptable limit is:

Any one accident or loss.....	\$1,000,000
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c) Owners Protective Liability Insurance

For Contracts exceeding \$50,000 in total Contract amount, Contractor shall secure an Owners Protective Liability policy naming the Owner as the Named Insured.

Minimum acceptable limits are:

General aggregate limit.....	\$2,000,000
Each occurrence limit	\$1,000,000

d) Pollution Liability Insurance

In the event that any disruption, handling, abatement, remediation, encapsulation, removal, transport, or disposal of contaminated or hazardous material is required, the Contractor or its Subcontractor shall secure a pollution liability policy in addition to any other coverages contained in this section. The insurance shall be provided on an occurrence based policy and shall remain in effect for the duration of the Project.

Minimum acceptable limit is:

Each occurrence limit	\$1,000,000
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00 72 13
General Conditions

14.6 Property Insurance

a) New Construction

The Contractor shall procure and maintain Builder's Risk insurance naming the Owner, Contractor and any Subcontractor as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the Owner, the limit of insurance shall not be less than the initial contract amount and coverage shall apply during the entire contract period and until the work is accepted by the Owner.

b) Renovations within or Additions to Existing State Owned Buildings

Insurance shall be provided by the Owner. The State shall notify Maine Risk Management Division concerning the Project and shall provide the dollar value of the Project and the name of the Contractor. Said insurance coverage shall cover the interests of the Contractor and Subcontractor, as their interests may appear. Covered causes of loss form shall be Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage. Theft coverage is not included. Exclusions common to commercial property policies are applicable. The \$500 per occurrence deductible is the responsibility of the Contractor. Should the Contractor or Subcontractor desire coverage in excess of that maintained by the State, it must be acquired by the Contractor and at Contractor expense. A certificate of insurance will be furnished to the Contractor upon request.

- 14.7 The Contractor shall provide four original copies of all certificates of insurance in a form, and issued by, companies acceptable to the Owner prior to commencement of work. The certificates shall name as certificate holder the State of Maine, Bureau of General Services, 77 State House Station, Augusta, Maine 04333-0077. The certificates shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least thirty (30) calendar days prior written notice by registered letter has been given to the Owner.

15. Contract Bonds

- 15.1 When noted as required in the Bid Documents, the Contractor shall provide to the Owner a Performance Bond and a Payment Bond, or "contract bonds", upon execution of the contract. Each bond value shall be for the full amount of the contract and issued by a surety company authorized to do business in the State of Maine as approved by the Owner. The bonds shall be executed on the forms furnished in the Bid Documents. The bonds shall allow for any addition or deductions of the contract.
- 15.2 The contract bonds shall continue in effect for one year after final acceptance of the contract to protect the Owner's interest in connection with the one year guarantee of workmanship and materials and to assure settlement of claims for the payment of all bills for labor, materials and equipment by the Contractor.

00 72 13
General Conditions

16. Allowances

- 16.1 The Contract Price shall include all allowances described in the Contract Documents. The Contractor shall include all overhead and profit necessary to implement each allowance in their Contract Price.
- 16.2 The Contractor shall not be required to employ parties for allowance work against whom the Contractor has a reasonable objection. In such a case, the Contractor shall notify the Owner in writing of their position and shall propose an alternative party to complete the work of the allowance.

17. Assignment of Contract

- 17.1 The Contractor shall not assign or sublet the contract as a whole without the written consent of the Owner. The Contractor shall not assign any money due to the Contractor without the written consent of the Owner.

18. Separate Contracts

- 18.1 The Owner reserves the right to create other contracts in connection with this Project using similar General Conditions. The Contractor shall allow the Owner's other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall coordinate and properly connect the Work of all contractors.
- 18.2 The Contractor shall promptly report to the Architect and Owner any apparent deficiencies in work of the Owner's other contractors that impacts the proper execution or results of the Contractor. The Contractor's failure to observe or report any deficiencies constitutes an acceptance of the Owner's other contractors work as suitable for the interface of the Contractor's work, except for latent deficiencies in the Owner's other contractors work.
- 18.3 Similarly, the Contractor shall promptly report to the Architect and Owner any apparent deficiencies in their own work that would impact the proper execution or results of the Owner's other contractors.
- 18.4 The Contractor shall report to the Architect and Owner any conflicts or claims for damages with the Owner's other contractors and settle such conflicts or claims for damages by mutual agreement or arbitration, if necessary, at no expense to the Owner.
- 18.5 In the event the Owner's other contractors sue the Owner regarding any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense. The Contractor shall pay or satisfy any judgment that may arise against the Owner, and pay all other costs incurred.

00 72 13
General Conditions

19. Subcontracts

- 19.1 The Contractor shall not subcontract any part of this contract without the written permission of the Owner.
- 19.2 The Contractor shall submit a complete list of named Subcontractors and material suppliers to the Architect and Owner for approval by the Owner prior to commencing work. The Subcontractors named shall be reputable companies of recognized standing with a record of satisfactory work.
- 19.3 The Contractor shall not employ any Subcontractor or use any material until they have been approved, or where there is reason to believe the resulting work will not comply with the Contract Documents.
- 19.4 The Contractor, not the Owner, is as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as the Contractor is for the acts and omissions of persons directly or indirectly employed by the Contractor.
- 19.5 Neither the Contract Documents nor any Contractor-Subcontractor contract shall indicate, infer or create any direct contractual relationship between any Subcontractor and the Owner.

20. Contractor-Subcontractor Relationship

- 20.1 The Contractor shall be bound to the Subcontractor by all the obligations in the Contract Documents that bind the Contractor to the Owner.
- 20.2 The Contractor shall pay the Subcontractor, in proportion to the dollar value of the work completed by the Subcontractor, the dollar amount allowed to the Contractor at the time each Contractor's Requisition for Payment is approved by the Owner.
- 20.3 The Contractor shall pay the Subcontractor accordingly if the Contract Documents or the subcontract provide for earlier or larger payments than described in the provision above.
- 20.4 The Contractor shall pay the Subcontractor on demand for subcontract work or materials as far as executed and fixed in place, less retainage, at the time the Contractor's Requisition for Payment is approved by the Owner, even if the Architect fails to certify a portion of the Requisition for Payment for a cause not the fault of the Subcontractor.
- 20.5 The Contractor shall not make a claim for liquidated damages or penalty for delay in any amount in excess of amounts that are specified by the subcontract.
- 20.6 The Contractor shall not make a claim for services rendered or materials furnished by the Subcontractor unless written notice is given by the Contractor to the Subcontractor within ten calendar days of the day in which the claim originated.
- 20.7 The Contractor shall give the Subcontractor an opportunity to present and to submit evidence in any progress conference or disputes involving subcontract work.

00 72 13
General Conditions

- 20.8 The Contractor shall pay the Subcontractor a just share of any fire insurance payment received by the Contractor.
- 20.9 The Subcontractor shall be bound to the Contractor by the terms of the Contract Documents and assumes toward the Contractor all the obligations and responsibilities that the Contractor, by those documents, assumes toward the Owner.
- 20.10 The Subcontractor shall submit applications for payment to the Contractor in such reasonable time as to enable the Contractor to apply for payment as specified.
- 20.11 The Subcontractor shall make any claims for extra cost, extensions of time or damages, to the Contractor in the manner provided in these General Conditions for like claims by the Contractor to the Owner, except that the time for the Subcontractor to make claims for extra cost is seven calendar days after the receipt of Architect's instructions.

21. Supervision of the Work

- 21.1 During all stages of the Work the Contractor shall have a competent superintendent, with any necessary assistant superintendents, overseeing the project. The superintendent shall not be reassigned without the consent of the Owner unless a superintendent ceases to be employed by the Contractor due to unsatisfactory performance.
- 21.2 The superintendent represents the Contractor on the jobsite. Directives given by the Architect or Owner to the superintendent shall be as binding as if given directly to the Contractor's main office. All important directives shall be confirmed in writing to the Contractor. The Architect and Owner are not responsible for the acts or omissions of the superintendent or assistant superintendents.
- 21.3 The Contractor shall provide supervision of the Work equal to the industry's highest standard of care. The superintendent shall carefully study and compare all Contract Documents and promptly report any error, inconsistency or omission discovered to the Architect. The Contractor may not necessarily be held liable for damages resulting directly from any error, inconsistency or omission in the Contract Documents or other instructions by the Architect that was not revealed by the superintendent in a timely way.

22. Observation of the Work

- 22.1 The Contractor shall allow the Owner, the Architect and the Bureau continuous access to the site for the purpose of observation of the progress of the work. All necessary safeguards and accommodations for such observations shall be provided by the Contractor.
- 22.2 The Contractor shall coordinate all required testing, approval or demonstration of the Work. The Contractor shall give sufficient notice to the appropriate parties of readiness for testing, inspection or examination.
- 22.3 The Contractor shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the Architect.

00 72 13
General Conditions

- 22.4 The Architect shall make all scheduled observations promptly, prior to the work being concealed or buried by the Contractor. If approval of the Work is required of the Architect, the Contractor shall notify the Architect of the construction schedule in this regard. Work concealed or buried prior to the Architect's approval may need to be uncovered at the Contractor's expense.
- 22.5 The Architect may order reexamination of questioned work, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to conform to the Contract Documents, the Owner shall pay the expense of the reexamination and remedial work. If the work is found to not conform to the Contract Documents, the Contractor shall pay the expense, unless the defect in the work was caused by the Owner's Contractor, whose responsibility the reexamination expense becomes.
- 22.6 The Bureau shall periodically observe the Work during the course of construction and make recommendations to the Contractor or Architect as necessary. Such recommendations shall be considered and implemented through the usual means for changes to the Work.

23. Architect's Status

- 23.1 The Architect represents the Owner during the construction period, and observes the work in progress on behalf of the Owner. The Architect has authority to act on behalf of the Owner only to the extent expressly provided by the Contract Documents or otherwise demonstrated to the Contractor. The Architect has authority to stop the work whenever such an action is necessary, in the Architect's reasonable opinion, to ensure the proper execution of the contract.
- 23.2 The Architect is the interpreter of the conditions of the contract and the judge of its performance. The Architect shall favor neither the Owner nor the Contractor, but shall use the Architect's powers under the contract to enforce faithful performance by both parties.
- 23.3 In the event of the termination of the Architect's employment on the project prior to completion of the work, the Owner shall appoint a capable and reputable replacement. The status of the new Architect relative to this contract shall be that of the former Architect.

24. Management of the Premises

- 24.1 The Contractor shall place equipment and materials, and conduct activities on the premises in a manner that does not unreasonably hinder site circulation, environmental stability, or any long term effect. Likewise, the Architect's directions shall not cause the use of premises to be impeded for the Contractor or Owner.
- 24.2 The Contractor shall not use the premises for any purpose other than that which is directly related to the scope of work. The Owner shall not use the premises for any purpose incompatible with the proposed work simultaneous to the work of the Contractor.
- 24.3 The Contractor shall enforce the Architect's instructions regarding information posted on the premises such as signage and advertisements, as well as activities conducted on the premises such as fires, and smoking.

00 72 13
General Conditions

24.4 The Owner may occupy any part of the Project that is completed with the written consent of the Contractor, and without prejudice to any of the rights of the Owner or Contractor. Such use or occupancy shall not, in and of itself, be construed as a final acceptance of any work or materials.

25. Safety and Security of the Premises

25.1 The Contractor shall continuously maintain security on the premises and protect from unreasonable occasion of injury all people authorized to be on the job site. The Contractor shall also effectively protect the property and adjacent properties from damage or loss.

25.2 The Contractor shall take all necessary precautions to ensure the safety of workers and others on and adjacent to the site, abiding by applicable local, state and federal safety regulations. The Contractor shall erect and continuously maintain safeguards for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door or stair openings, and falling materials.

25.3 The Contractor shall designate, and make known to the Architect and the Owner, a safety officer whose duty is the prevention of accidents on the site.

25.4 The Contractor shall restore the premises to conditions that existed prior to the start of the project at areas not intended to be altered according to the Contract Documents.

25.5 The Contractor shall protect existing utilities and exercise care working in the vicinity of utilities shown in the Drawings and Specifications or otherwise located by the Contractor.

25.6 The Contractor shall protect from damage existing trees and other significant plantings and landscape features of the site which will remain a permanent part of the site. If necessary or indicated in the Contract Documents, tree trunks shall be boxed and barriers erected to prevent damage to tree branches or roots.

25.7 Damage to the Work, including that which is reasonably protected, shall be repaired or replaced at the expense of the party who caused the damage.

25.8 The Contractor shall not load, or allow to be loaded, any part of the Project with a force which imperils personal or structural safety. The Architect may consult with the Contractor on such means and methods of construction, however, the ultimate responsibility lies with the Contractor.

25.9 The Contractor shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The Architect must approve altering any structural components of the project. The Contractor shall supervise all construction activities carried out by others on site to ensure that the work is neatly done and in a manner that will not endanger the structure or the component parts.

25.10 The Contractor may act with their sole discretion in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Contractor may negotiate with the Owner for compensation for expenses due to such emergency work.

00 72 13
General Conditions

- 25.11 The Contractor shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The Contractor shall regularly keep the spaces "broom clean". See the Close-out of the Work provisions of this section regarding cleaning at the completion of the project.
26. Changes in the Work
- 26.1 The Contractor shall not proceed with extra work without an approved Change Order or Construction Change Directive. A Change Order which has been properly signed by all parties shall become a part of the contract.
- 26.2 A Change Order is the usual document for directing changes in the Work. In certain circumstances, however, the Owner may utilize a Construction Change Directive to direct the Contractor to perform changes in the Work that are generally consistent with the scope of the project. The Owner shall use a Construction Change Directive only when the normal process for approving changes to the Work has failed to the detriment of the Project, or when agreement on the terms of a Change Order cannot be met, or when an urgent situation requires, in the Owner's judgment, prompt action by the Contractor.
- 26.3 The Architect shall prepare the Construction Change Directive representing a complete scope of work, with proposed Contract Price and Contract Time revisions, if any, clearly stated.
- 26.4 The Contractor shall promptly carry out a Construction Change Directive which has been signed by the Owner and the Architect. Work thus completed by the Contractor constitutes the basis for a Change Order. Changes in the Contract Price and Contract Time shall be as defined in the Construction Change Directive unless subsequently negotiated with some other terms.
- 26.5 The method of determining the dollar value of extra work shall be by:
- a) an estimate of the Contractor accepted by Owner as a lump sum, or
 - b) unit prices named in the contract or subsequently agreed upon, or
 - c) cost plus a designated percentage, or
 - d) cost plus a fixed fee.
- 26.6 The Contractor shall determine the dollar value of the extra work for both the lump sum and cost plus designated percentage methods using the following rates. The rates include all overhead and profit expenses.
- a) Contractor - for any work performed by the Contractor's own forces, 20% of the cost;
 - b) Subcontractor - for work performed by Subcontractor's own forces, 20% of the cost;
 - c) Contractor - for work performed by Contractor's Subcontractor, 10% of the amount due the Subcontractor.
- 26.7 The Contractor shall keep and provide records as needed or directed for the cost plus designated percentage method. The Architect shall review and certify the appropriate amount which includes the Contractor's overhead and profit. The Owner shall make payments based on the Architect's certificate.
- 26.8 Cost reflected in Change Orders shall be limited to the following: cost of materials, cost of delivery, cost of labor (including Social Security, pension, Workers' Compensation insurance,

00 72 13
General Conditions

and unemployment insurance), and cost of rental of power tools and equipment. Labor cost may include a pro-ratio share of a foreman's time only in the case of an extension of contract time granted due to the Change Order.

- 26.9 Overhead reflected in Change Orders shall be limited to the following: bond premium, supervision, wages of clerks, time keepers, and watchmen, small tools, incidental expenses, general office expenses, and all other overhead expenses directly related to the Change Order.
- 26.10 The Contractor shall provide credit to the Owner for labor, materials, equipment and other costs but not overhead and profit expenses for those Change Order items that result in a net value of credit to the contract.
- 26.11 The Owner may change the scope of work of the Project without invalidating the contract. The Owner shall notify the Contractor of a change of the scope of work for the Owner's Contractors, which may affect the work of this Contractor, without invalidating the contract. Change Orders for extension of the time caused by such changes shall be developed at the time of directing the change in scope of work.
- 26.12 The Architect may order minor changes in the Work, not involving extra cost, which is consistent with the intent of the design or project.
- 26.13 The Contractor shall immediately give written notification to the Architect of latent conditions discovered at the site which materially differ from those represented in the Drawings or Specifications, and which may eventually result in a change in the scope of work. The Contractor shall suspend work until receiving direction from the Architect. The Architect shall promptly investigate the conditions and respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Architect shall determine if the discovered conditions warrant a Change Order.
- 26.14 The Contractor shall, within ten calendar days of receipt of the information, give written notification to the Architect if the Contractor claims that instructions by the Architect will constitute extra cost not accounted for by Change Order or otherwise under the contract. The Architect shall promptly respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Architect shall determine if the Contractor's claim warrants a Change Order.

27. Correction of the Work

- 27.1 The Contractor shall promptly remove from the premises all work the Architect declares is non-conforming to the contract. The Contractor shall replace the work properly at no expense to the Owner. The Contractor is also responsible for the expenses of others whose work was damaged or destroyed by such remedial work.
- 27.2 The Owner may elect to remove non-conforming work if it is not removed by the Contractor within a reasonable time, that time defined in a written notice from the Architect. The Owner may elect to store removed non-conforming work not removed by the Contractor at the Contractor's expense. The Owner may, with ten days written notice, dispose of materials which

00 72 13
General Conditions

the Contractor does not remove. The Owner may sell the materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the Contractor.

- 27.3 The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any related damage to other work which appears within a period of one year from the date of substantial completion, and in accord with the terms of any guarantees provided in the contract. The Owner shall promptly give notice of observed defects to the Contractor and Architect. The Architect shall determine the status of all claimed defects.
- 27.4 The Architect may authorize, after a reasonable notification to the Contractor, an equitable deduction from the contract amount in lieu of the Contractor correcting non-conforming or defective work.

28. Owner's Right to do Work

- 28.1 The Owner may, using other contractors, correct deficiencies attributable to the Contractor, or complete unfinished work. Such action shall take place only after giving the Contractor three days written notice, and provided the Architect approves of the proposed course of action as an appropriate remedy. The Owner may then deduct the cost of the remedial work from the amount due the Contractor.
- 28.2 The Owner may act with their sole discretion when the Contractor is unable to take action in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Owner shall inform the Contractor of the emergency work performed, particularly where it may affect the work of the Contractor.

29. Termination of Contract and Stop Work Action

- 29.1 The Owner may, owing to a certificate of the Architect indicating that sufficient cause exists to justify such action, without prejudice to any other right or remedy and after giving the Contractor and the Contractor's surety seven days written notice, terminate the employment of the Contractor. At that time the Owner may take possession of the premises and of all materials, tools and appliances on the premises and finish the work by whatever method the Owner may deem expedient. Cause for such action by the Owner includes: if the contractor is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or if a receiver is appointed due to the Contractor's insolvency, or if the Contractor persistently or repeatedly refuses or fails to provide enough properly skilled workers or proper materials, or if the Contractor fails to make prompt payment to Subcontractors or material or labor suppliers, or if the Contractor persistently disregards laws, ordinances or the instructions of the Architect, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.
- 29.2 The Contractor is not entitled, as a consequence of the termination of the employment of the Contractor as described above, to receive any further payment until the Work is finished. If the unpaid balance of the contract amount exceeds the expense of finishing the Work, including compensation for additional architectural, managerial and administrative services, such balance

00 72 13
General Conditions

shall be paid to the Contractor. If the expense of finishing the Work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner. The Architect shall certify the expense incurred by the Contractor's default. This obligation for payment shall continue to exist after termination of the contract.

- 29.3 The Contractor may, if the Work is stopped by order of any court or other public authority for a period of thirty consecutive days, and through no act or fault of the Contractor or of anyone employed by the Contractor, with seven days written notice to the Owner and the Architect, terminate this contract. The Contractor may then recover from the Owner payment for all work executed, any proven loss and reasonable profit and damage.
- 29.4 The Contractor may, if the Architect fails to issue a certificate for payment within seven days after the Contractor's formal request for payment, through no fault of the Contractor, or if the Owner fails to pay to the Contractor within 30 days after submission of any sum certified by the Architect, with seven days written notice to the Owner and the Architect, stop the Work or terminate this Contract.

30. Delays and Extension of Time

- 30.1 The completion date of the contract shall be extended if the work is delayed by changes ordered in the work which have approved time extensions, or by an act or neglect of the Owner, the Architect, or the Owner's Contractor, or by strikes, lockouts, fire, flooding, unusual delay in transportation, unavoidable casualties, or by other causes beyond the Contractor's control. The Architect shall determine the status of all claimed causes.
- 30.2 The contract shall not be extended for delay occurring more than seven calendar days before the Contractor's claim made in writing to the Architect. In case of a continuing cause of delay, only one claim is necessary.
- 30.3 The contract shall not be extended due to failure of the Architect to furnish drawings if no schedule or agreement is made between the Contractor and the Architect indicating the dates which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.
- 30.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Document.

31. Payments to the Contractor

- 31.1 As noted under *Preconstruction Conference* in this section, the Contractor shall submit a Schedule of Values form, before the first application for payment, for approval by the Owner and Architect. The Architect may direct the Contractor to provide evidence that supports the correctness of the form. The approved Schedule of Values shall be used as a basis for payments.
- 31.2 The Contractor shall submit an application for each payment ("Requisition for Payment") on a form approved by the Owner and Architect. The Architect may require receipts or other

00 72 13
General Conditions

documents showing the Contractor's payments for materials and labor, including payments to Subcontractors.

- 31.3 The Contractor shall submit Requisitions for Payment as the work progresses not more frequently than once each month, unless the Owner approves a more frequent interval due to unusual circumstances. The Requisition for Payment is based on the proportionate quantities of the various classes of work completed or incorporated in the Work, in agreement with the actual progress of the Work and the dollar value indicated in the Schedule of Values.
- 31.4 The Architect shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the Owner. The Architect may certify an appropriate amount for materials not incorporated in the Work which have been delivered and suitably stored at the site. The Contractor shall submit bills of sale, insurance certificates, or other such documents that will adequately protect the Owner's interests prior to payments being certified.
- 31.5 In the event any materials delivered but not yet incorporated in the Work have been included in a certified Requisition for Payment with payment made, and said materials thereafter are damaged, deteriorated or destroyed, or for any reason whatsoever become unsuitable or unavailable for use in the Work, the full amount previously allowed shall be deducted from subsequent payments unless the Contractor satisfactorily replaces said material.
- 31.6 The Contractor may request certification of an appropriate dollar amount for materials not incorporated in the Work which have been delivered and suitably stored away from the site. The Contractor shall submit bills of sale, insurance certificates, right-of-entry documents or other such documents that will adequately protect the Owner's interests. The Architect shall determine if the Contractor's documentation for the materials is complete and specifically designated for the Project. The Owner may allow certification of such payments.
- 31.7 Subcontractors may request, and shall receive from the Architect, copies of approved Requisitions for Payment showing the amounts certified in the Schedule of Values.
- 31.8 Certified Requisitions for Payment, payments made to the Contractor, or partial or entire occupancy of the project by the Owner shall not constitute an acceptance of any work that does not conform to the Contract Documents. The making and acceptance of the final payment constitutes a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work or materials appearing within one year from final payment or from requirements of the Drawings and Specifications, and of all claims by the Contractor, except those previously made and still unsettled.
- 31.9 The Owner shall retain five percent of each payment due the Contractor as part security for the fulfillment of the contract by the Contractor. The Owner may make payment of a portion of this "retainage" to the Contractor temporarily or permanently during the progress of the Work. The Owner may thereafter withhold further payments until the full amount of the five percent is reestablished. The Contractor may deposit with the Maine State Treasurer certain securities in place of retainage amounts due according to Maine Statute (M.R.S.A. 5, Section 1746).

00 72 13
General Conditions

32. Payments Withheld

- 32.1 The Architect may withhold or nullify the whole or a portion of any Requisitions for Payment submitted by the Contractor in the amount that may be necessary, in his reasonable opinion, to protect the Owner from loss due to any of the following:
- a) defective work not remedied;
 - b) claims filed or reasonable evidence indicating probable filing of claims;
 - c) failure to make payments properly to Subcontractors or suppliers;
 - d) a reasonable doubt that the contract can be completed for the balance then unpaid;
 - e) liability for damage to another contractor.

The Owner shall make payment to the Contractor, in the amount withheld, when the above circumstances are removed.

33. Liens

- 33.1 The Contractor shall deliver to the Owner a complete release of all liens arising out of this contract before the final payment or any part of the retainage payment is released. The Contractor shall provide with the release of liens an affidavit asserting each release includes all labor and materials for which a lien could be filed. Alternately, the Contractor, in the event any Subcontractor or supplier refuses to furnish a release of lien in full, may furnish a bond satisfactory to the Owner, to indemnify the Owner against any lien.
- 33.2 In the event any lien remains unsatisfied after all payments to the Contractor are made by the Owner, the Contractor shall refund to the Owner all money that the latter may be compelled to pay in discharging such lien, including all cost and reasonable attorney's fees.

34. Indemnification

- 34.1 The Contractor shall indemnify and hold harmless the Owner, its officers, agents, and employees from and against any and all claims, liabilities and costs, including reasonable attorney's fees, for any or all injuries to persons, property or claims for money damages arising from the negligent acts or omissions of the Contractor, its employees or agents, officers or subcontractors in the performance of work under this Agreement.

35. Workmanship

- 35.1 The Contractor shall provide materials, equipment, and installed work equal to or better than the quality specified in the Contract Documents and approved in submittal and sample. The installation methods shall be of the highest standards, and the best obtainable from the respective trades. The Architect's decision on the quality of work shall be final.
- 35.2 The Contractor shall know local labor conditions for skilled and unskilled labor in order to apply the labor appropriately to the Work. All labor shall be performed by individuals well skilled in their respective trades.

00 72 13
General Conditions

- 35.3 The Contractor shall perform all cutting, fitting, patching and placing of work in such a manner to allow subsequent work to fit properly, whether that be by the Contractor, the Owner's Contractors or others. The Owner and Architect may advise the Contractor regarding such subsequent work. Notwithstanding the notification or knowledge of such subsequent work, the Contractor may be directed to comply with this standard of compatible construction by the Architect at the Contractor's expense.
- 35.4 The Contractor shall request clarification or revision of any design work by the Architect, prior to commencing that work, in a circumstance where the Contractor believes the work cannot feasibly be completed at the highest quality, or as indicated in the Contract Documents. The Architect shall respond to such requests in a timely way, providing clarifying information, a feasible revision, or instruction allowing a reduced quality of work. The Contractor shall follow the direction of the Architect regarding the required request for information.
- 35.5 The Contractor shall guarantee the Work against any defects in workmanship and materials for a period of one year commencing with the date of the Certificate of Substantial Completion, unless specified otherwise for specific elements of the project. The Work may also be subdivided in mutually agreed upon components, each defined by a Certificate of Substantial Completion.

36. Close-out of the Work

- 36.1 The Contractor shall remove from the premises all waste materials caused by the work. The Contractor shall make the spaces "broom clean" unless a more exacting cleaning is specified. The Contractor shall wash all windows and glass immediately prior to the final inspection, unless otherwise directed.
- 36.2 The Owner may conduct the cleaning of the premises where the Contractor, duly notified by the Architect, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the Contractor.
- 36.3 The Contractor shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, generally called the "punch list", to be corrected by the Contractor. The Architect shall document the successful completion of the Work in a dated Certificate of Substantial Completion, to be signed by Owner, Architect, and Contractor.
- 36.4 The Contractor shall not call for final inspection of any portion of the Work that is not complete and permanent installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.
- 36.5 The Contractor and all major Subcontractors shall participate in the end-of-warranty-period conference, typically scheduled close to one year after the Substantial Completion date.

37. Date of Completion and Liquidated Damages

- 37.1 The Contractor may make a written request to the Owner for an extension or reduction of time, if necessary. The request shall include the reasons the Contractor believes justifies the proposed completion date. The Owner may grant the revision of the contract completion date if the Work

00 72 13
General Conditions

was delayed due to conditions beyond the control and the responsibility of the Contractor. The Contractor shall not conduct unauthorized accelerated work or file delay claims to recover alleged damages for unauthorized early completion.

- 37.2 The Contractor shall vigorously pursue the completion of the Work and notify the Owner of any factors that have, may, or will affect the approved Schedule of the Work. The Contractor may be found responsible for expenses of the Owner or Architect if the Contractor fails to make notification of project delays.
- 37.3 The Project is planned to be done in an orderly fashion which allows for an iterative submittal review process, construction administration including minor changes in the Work and some bad weather. The Contractor shall not file delay claims to recover alleged damages on work the Architect determines has followed the expected rate of progress.
- 37.4 The Architect shall prepare the Certificate of Substantial Completion which, when signed by the Owner and the Contractor, documents the date of Substantial Completion of the Work or a designated portion of the Work. The Owner shall not consider the issuance of a Certificate of Occupancy by an outside authority a prerequisite for Substantial Completion if the Certificate of Occupancy cannot be obtained due to factors beyond the Contractor's control.
- 37.5 Liquidated Damages may be deducted from the sum due to the Contractor for each calendar day that the Work remains uncompleted after the completion date specified in the Contract or an approved amended completion date. The dollar amount per day shall be calculated using the Schedule of Liquidated Damages table shown below.

<u>If the original contract amount is:</u>	<u>The per day Liquidated Damages shall be:</u>
More than \$100,000 and less than \$2,000,000	\$750
More than \$2,000,000 and less than \$10,000,000	\$1,500
More than \$10,000,000.....	\$1,500 plus \$250 for each \$2,000,000 over \$10,000,000

38. Dispute Resolution

38.1 Mediation

- a) In the event of a dispute between the parties which arises under this Agreement in which the dispute cannot be resolved through informal negotiation, the dispute shall be submitted to a neutral mediator jointly selected by the parties.
- b) Either party may file suit before or during mediation if the party, in good faith, deems it to be necessary to avoid losing the right to sue due to a statute of limitations. If suit is filed before good faith mediation efforts are completed, the party filing suit shall agree to stay all proceedings in the lawsuit pending completion of the mediation process, provided such stay is without prejudice.
- c) In any mediation between the Owner and the Architect, the Owner has the right to consolidate related claims between Owner and Contractor.

00 72 13
General Conditions

38.2 Arbitration

- a) If the dispute is not resolved through mediation, the dispute shall be settled by arbitration. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator; the third arbitrator shall be appointed by the arbitrators selected by the parties. The arbitration shall be conducted in accordance with the Maine Uniform Arbitration Act (“MUAA”), except as otherwise provided in this section.
- b) The decision of the arbitrators shall be final and binding upon all parties. The decision may be entered in court as provided in the MUAA.
- c) The costs of the arbitration, including the arbitrators’ fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.
- d) In any arbitration between the Owner and the Architect, the Owner has the right to consolidate related claims between Owner and Contractor.

00 73 16
Insurance Requirements

PART 1- GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications Sections, apply to this Section.

1.2 Summary

- A. This Section includes the insurance requirements for Contractors and Subcontractors.

1.3 Definitions

- A. None.

1.4 Submittals

- A. The Contractor shall provide to the Owner an original certificate or certificates of insurance for each required insurance policy shown below in a standard form issued by companies acceptable to the Owner prior to commencement of the work.
- B. The certificates shall name as certificate holder the State of Maine, Bureau of General Services, 77 State House Station, Augusta, Maine 04333-0077. The certificates shall reference the name of the project and project number, if known.
- C. The certificates shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless written notice by registered letter has been received by the Owner at least thirty calendar days prior to the cancellation date.
- D. The Contractor shall keep coverage current and resubmit insurance certificates during the time the project is being carried out whenever a policy is renewed or materially changed.

1.5 Requirements

- A. The Contractor shall not commence work under this contract until the Contractor has obtained all insurance required under this article and such insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to commence work on a subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.
- B. The Owner does not warrant or represent that the insurance required under this paragraph constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor and Subcontractors of every tier shall satisfy themselves as to the existence, extent and adequacy of insurance prior to commencement of work.
- C. The Contractor and any Subcontractor shall procure and maintain for the duration of the Project insurance of the types and limits set forth under this paragraph and such insurance as will protect themselves from claims which may arise out of or result from the Contractor's or Subcontractor's execution of the work, whether such execution be by themselves or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable. The insurance coverage provided by the Contractor and any Subcontractor will be primary coverage.
- D. Worker's Compensation insurance for all employees on site in accordance with the requirements of the Workers' Compensation law of the State of Maine. Minimum acceptable limits for Employer's Liability are:

00 73 16
Insurance Requirements

1. Bodily Injury by Accident\$500,000
 2. Bodily Injury by Disease\$500,000 Each Employee
 3. Bodily Injury by Disease\$500,000 Policy Limit
- E. General liability insurance shall be on a form providing coverage not less than that of the 1996 occurrence version of the Insurance Services Office (ISO) Commercial General Liability Policy. This insurance shall cover bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. It shall include collapse and underground coverage - as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a per location or project basis. Minimum acceptable limits are:
1. General aggregate limit.....\$2,000,000
 2. Products and completed operations aggregate\$1,000,000
 3. Each occurrence limit\$1,000,000
 4. Personal injury aggregate.....\$1,000,000
- F. Automobile liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers. Minimum acceptable limit is:
1. Any one accident or loss\$1,000,000
- G. For Contracts exceeding \$50,000 in total Contract amount, Contractor shall secure an Owners Protective Liability Insurance policy naming the Owner as the Named Insured. Minimum acceptable limits are:
1. General aggregate limit.....\$2,000,000
 2. Each occurrence limit\$1,000,000
- H. In the event that any disruption, handling, abatement, remediation, encapsulation, removal, transport, or disposal of contaminated or hazardous material is required, the Contractor or its Subcontractor shall secure a Pollution Liability Insurance policy in addition to any other coverages contained in this section. The insurance shall be provided on an occurrence based policy and shall remain in effect for the duration of the Project. Minimum acceptable limit is:
1. Each occurrence limit\$1,000,000
- I. The Contractor shall procure and maintain Property Insurance for New Construction in the form of Builder's Risk insurance naming the Owner, Contractor and any Subcontractor as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the Owner, the limit of insurance shall not be less than the initial contract amount and coverage shall apply during the entire contract period and until the work is accepted by the Owner.
- J. The Owner shall provide and maintain Property Insurance for Renovations within or Additions to Existing State Owned Buildings. The Owner shall notify the State of Maine, Bureau of General Services, Risk Management Division concerning the Project and shall provide the dollar value of the Project and the name of the Contractor. Said insurance coverage shall cover the interests of the Contractor and Subcontractor, as their interests may appear. Covered causes of loss form shall be Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage. Theft coverage is not included. Exclusions common to commercial property policies

00 73 16
Insurance Requirements

are applicable. The \$500 per occurrence deductible is the responsibility of the Contractor. Should the Contractor or Subcontractor desire coverage in excess of that maintained by the State, it must be acquired by the Contractor or Subcontractor at their expense. A certificate of insurance will be furnished to the Contractor upon request.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

End of Section 00 73 16

SECTION 01 10 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 Summary

- A. **“Maintenance Building Addition and Garage Renovation at NMCC” by Robert J. Kervin, Architect, Job No: 9-14**, consists of all labor, materials, methods, equipment, and products necessary to complete required demolition and new shell construction as described in the written specifications and drawings. Construction includes, but not limited to: any required changes to existing garage interior and exterior to allow for new addition foundation and modifications to existing garage foundation, exterior walls, roofing, windows, doors, flashing, and other exterior finish including siding, brick work, and roofing on new addition, exterior painting, rough-in and stub-up and capped interior plumbing.
- B. Work performed for the completion of this project, to be scheduled so as to least impact the day to day business activities of the Owner and shall allow for normal operations to continue to the maximum extent reasonably possible during demolition and construction. The General Contractor shall coordinate with the Owner appropriate timing for relocation of personnel, as needed to allow for renovation work. Safety of students, college personnel, and the public shall be top priority of the Contractor and his workers during demolition and construction. Removal and delivery of materials shall take place from the North West Campus Entrance and shall be done during periods of least amount of activity such as student movement.
- C. The Owner’s preference is to have all work performed in a logical sequence and so as to least impact day to day operations of the College.

1.2 Demolition

- A. Remove and properly dispose of materials as indicated for removal on plans or as indicated in the specifications.
 - 1. Contractor to remove existing concrete floor as indicated on Demolition Plan for repair of under slab tank and for water/ sewer line work. Removed concrete floor to be patched with concrete and made level with existing floor upon completion of work.
 - 5. Contractor to remove existing wall in garage for connection to new addition and install a temporary exterior insulated door with lock at top of ramp where fire rated door is to be located.

1.3 New Construction

- A. Plans for New Construction show finish Floor Plan, Sections, Details, Schedules, Elevations, Mechanical and Electrical Plans and Details, and Reflected Ceiling Plan. Project Work includes:
 - 1. Site work including water and drainage piping, Earth work, and Foundation work.
 - 2. Furnish and install all under slab plumbing with stub-ups.
 - 3. Furnish and install exterior wall and roof framing, (install exterior wall and roof sheathing provided by donation to Owner).
 - 4. In new addition only provide and install exterior doors, hardware, windows, and exterior trim only.
 - 5. Roofing, siding, exterior insulation to be provided and installed.
 - 6. Interior insulation, flooring, ceilings, drywall, interior painting, accessories, and interior trim not included.
 - 7. Finish plumbing, heating, ventilation, air conditioning, electrical, mechanical not included.
 - 8. Finish cabinetry not included.

1.4 Miscellaneous Work

- A. The Contractor shall provide all other material, equipment and labor necessary to complete the “Shell Construction Work” as specified herein and as required to complete the project.

1.5 Owner provided Items:

- A. One hundred (100) sheets of exterior wall sheathing and one hundred forty five (145) sheets of roof sheathing have been donated to Northern Maine Community College for this project.

1.6 Alternate Bids

B. The following alternate bid is to be provided by the Contractor to allow the Owner a more complete building:

1. Contractor to provide and install fire wall separation as shown on the plans for adjacent wall to new addition and as indicated for ceiling of existing Garage.
2. Provide and install attic insulation in new addition and cover with poly vapor barrier as indicated on plans. Provide and install interior wall framing in new facility only.

No finish electrical, plumbing, heating, ventilation, air conditioning, or mechanical, no interior wall finish, suspended ceilings, finish cabinetry, no interior plastering, painting, or finish floors in new facility under this alternate bid.

No existing garage doors, partitions, or fixtures to be removed from existing garage at this time. Existing siding and shingles to remain or to be patched into new work. Existing garage utilities to remain in use, including water, sewer, and electrical.

END OF SECTION

SECTION 01 31 00
CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 Summary

A. Work Included: Within seven (7) days after the effective date of the Agreement between Owner and Contractor and prior to start of Work, submit to the Architect an estimated progress schedule as specified herein.

B. Form of Schedules:

1. Narrative - Completely describe the construction methods to be employed.
2. Horizontal Bar Chart-
 - a. Provide a separate horizontal bar column for each trade or operation.
 - b. Order: Chronological order of beginning of each trade or operation.
 - c. Horizontal Scale: Identify first work day of each week, allow space for updating and revision.

C. Content of Schedules:

1. Provide complete sequence of construction by activity -
 - a. Shop Drawings, Project Data and Samples:
 - (1) Submittal dates;
 - (2) Dates reviewed copies will be required.
 - b. Decision Dates for:
 - (1) Selection of finishes.
 - c. Produce procurement and delivery dates.
 - d. Dates for beginning and completion of each element of construction.
2. Show the projected percentages of completion for each item of work as of the first day of each month.

D. Updating:

1. Show all changes occurring since previous submissions.
2. Indicate progress of each activity, show completion dates.
3. Include -
 - a. Major changes in scope.
 - b. Activities modified since previous updating.
 - c. Revised projections due to changes.
4. Provide narrative report, including -
 - a. Discussion of problem areas, including current and anticipated delay factors.
 - b. Corrective action taken or proposed.
 - c. Description of revisions that may affect schedule.

1.2 Submittals

- A. Submit periodically updated schedules when requested by the Architect.
- B. Submit three (3) copies of the initial and updated schedules to the Architect.

END OF SECTION

SECTION 01 33 00
SUBMITTALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 Summary

- A. Work Included: Make submittals required by the General Conditions, and as specified herein; and revise and resubmit as necessary to establish compliance with the specified requirements.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 1 of these Specifications.
 - 2. Individual requirements for submittals are also described in pertinent Sections of these Specifications.
- C. The below listed requirements are in addition to the requirements contained in the General Conditions.
- D. Work Not Included:
 - 1. Unrequired submittals will not be reviewed by the Architect.
 - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Architect.

1.2 Quality Assurance

- A. Coordination of Submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conforms in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certifies that this coordination has been performed.
- B. Substitutions:
 - 1. The contract is based on the standards of quality established in the Contract Documents. If proposed substitutions are judged as being acceptable, make all changes to structures, buildings, piping, electrical and other items necessary to accommodate the substitutions at no additional cost to the Owner.
 - 2. Whenever it may be written that an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit which will guarantee replacement of that equipment in the event of failure for the duration of the specified time period.
 - 3. Do not substitute materials, equipment or methods unless such substitution has been specifically approved in writing for this Work by the Architect.
- C. "Or Equivalent":
 - 1. Where the phrase "or equivalent" or "or equivalent as approved by the Architect" occur in the Contract Documents, do not assume that the materials, equipment or methods will be approved as equivalent unless the item has been specifically so approved for this Work by the Architect.
 - 2. The decision of the Architect shall be final.
- D. Only approved materials will be incorporated into the work.

1.3 Submittals

- A. Make submittals of Shop Drawings, Samples, substitution requests and other items in accordance with the provisions of this Section.

END OF SECTION

SECTION 01 41 60
SOIL TESTING

PART 1 - GENERAL

1.1 Summary

- A. This section includes requirements for sieve analysis, moisture density tests and compaction test of soil materials necessary for the completion of the work.
- B. Related Sections:
 - 1. Section 02 20 00 - Earthwork
 - 2. Other sections as applicable.

1.2 References

- A. American Society for Testing and Materials (ASTM), Selected Standards, Latest Edition.
- B. Standard Specifications for Highways and Bridges, Maine Department of Transportation (MDOT Specifications), Latest Revision.

1.3 Submittals

- A. The Contractor shall notify the Architect of all sources of material proposed for incorporation into the work.
- B. Material samples shall receive sieve analysis and moisture density tests (ASTM D1557, Method C or D) at a laboratory employed by the Contractor and approved by the Architect.
- C. Test results shall be submitted to the Architect prior to materials being incorporated into the work.
- D. Only materials meeting the requirements of this section and appropriate related sections of the specifications shall be used in the work.
- E. The cost for the above initial testing shall be paid by the Contractor.

PART 2 - PRODUCTS

(not applicable)

PART 3- EXECUTION

3.1 Field Control Testing

- A. Field control testing will be provided by the Architect and paid for by the Owner, except where otherwise specified. Contractor to provide minimum of 48 hours notice.
- B. Either the sand cone method (ASTM D1556) or the nuclear density method (ASTM D2992) shall be used to determine the percentage of material compaction. A sufficient number of tests shall be conducted to insure that the specified density is being obtained. A minimum of one test shall be taken for each 12" layer of fill for the following areas:
 - 1. Trench areas - for each 100 linear feet of continuous trench area or part thereof.
 - 2. Foundation Wall Excavations - 1 every 100 linear feet, minimum of 1 each side.
 - 3. Below Concrete Slabs - 1 every 1,000 sf and a minimum of three tests for each individual slab.
 - 4. Below Paved Area - within each 2,000 square feet of continuous area or part thereof.
- C. Compaction tests shall be arranged by the Architect in cooperation with the Contractor and paid for by the Owner. Copies of test results shall be distributed to the Owner, the Architect and the Contractor.
- D. The specific location for each test to be taken and the number of tests to be taken shall be as designated by the Architect at the time of testing.
- E. Testing performed exclusively for the Contractors convenience shall be the sole responsibility of the Contractor and shall be at no cost to the Owner.

3.2 Retesting

- A. The Architect may require periodic sieve analysis and/or moisture density testing to be done to insure the material is in conformity with the initial tests submitted. If test results meet specifications and closely resemble initial test results, the cost of the testing shall be paid for by the Owner. If test results indicate a significantly different material or fail to meet specifications, the Contractor shall reimburse the Owner according to the schedule in the following paragraph.
- B. If any test results fail to meet specifications, the Contractor shall correct the situation and obtain a passing test. The Contractor shall reimburse the Owner for each additional test necessary (including compaction tests, sieve analysis, and moisture density tests) when correcting a failing test.

END OF SECTION

SECTION 01 73 20
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 Summary

- A. The Contractor to provide all tools, equipment, and labor for removal and proper disposal of items and materials indicated on the Demolition Plan and listed as Contractor's Work in the following list:
1. Owner will relocate existing compressor in Garage.
 2. Contractor to remove existing exterior wall framing, doors, partitions and ceiling framing as indicated and/ or needed.
 3. Electrical Contractor to remove existing lighting and electrical outlets in Garage (114) and provide temporary lighting in entire Maintenance Building as needed. Existing lights and outlets to be delivered to Owner and reinstalled upon completion of required gypsum wallboard installation in Garage.
 4. Plumbing contractor to remove existing plumbing fixtures in Garage and relocate them in new Maintenance Building Toilet Room 108 only upon completion of Room 108.
 5. Contractor to remove concrete floor around existing oil separator. If possible Contractor to repair tank for proper use. If not able to repair tank, Owner to provide new tank for Contractor installation.
 6. Take care not to damage floor or wall finish beyond required Work Areas. See New Floor Plans and Finish Schedule.
- B. Items and materials identified as being removed by Contractor are to be removed from NMCC campus and taken to a recycle facility, or are to become Contractor's salvage.

END OF SECTION

SECTION 01 77 00
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 Description of Requirements

- A. **Definitions:** Closeout is defined to include general requirements near end of Contract time, in preparation for final acceptance, final payment, normal termination of Contract, occupancy by OWNER and similar actions evidencing completion of the Work. Time of closeout is directly related to "Substantial Completion", and therefore may be either a single time period for entire Work or a series of time periods for individual parts of the Work which have been certified as Substantially Complete at different dates. Time variation (if any) shall be applicable to other provisions of this Section.

1.2 Prerequisites to Substantial Completion

- A. **General:** Prior to requesting Architect's inspection for certification of Substantial Completion complete the following and list known exceptions in request:
1. Include supporting documentation for completion as indicated in these Contract Documents.
 2. Advise OWNER of pending insurance change-over requirements.
 3. Submit specific warranties, final certifications and similar documents.
 4. Deliver spare parts, extra stocks of materials, and similar physical items to OWNER.
 5. Remove from project site all temporary facilities and services, along with construction tools and facilities, and similar elements.
- B. **Inspection Procedures:** Upon receipt of CONTRACTOR's request, ARCHITECT will either proceed with inspection or advise CONTRACTOR of prerequisites not fulfilled. Following initial inspection, ARCHITECT will either prepare Certificate of Substantial Completion, or advise CONTRACTOR of Work which must be performed prior to issuance of certificate, and repeat inspection when requested and assured that Work has been substantially completed. Results of completed inspection will form initial "punch list" for final acceptance.

1.3 Prerequisites to Final Acceptance

- A. **General:** Prior to requesting ARCHITECT's final inspection for certification of final acceptance and final payment, as required by General Conditions, complete the following and list known exceptions (if any) in request:
1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted.
 2. Submit updated final statement, accounting for final changes to Contract Sum. A final change order may be necessary to adjust Contract accounts, (bid items).
 3. Submit copy of ARCHITECT's final punch list of itemized Work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by ARCHITECT.
 4. Submit Record Drawings and all other record documents.
 5. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.
 6. Submit evidence of compliance with requirements of governmental agencies including, but not limited to, "Certificates of Inspection", and "Certificates of Occupancy".
- B. **Reinspection Procedure:** Upon receipt of CONTRACTOR's notice that Work has been completed, including punch list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, ARCHITECT will reinspect Work. Upon completion of reinspection, ARCHITECT will either prepare "Certificate of Substantial Completion" or advise CONTRACTOR of Work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure will be repeated.

1.4 Record Document Submittals

- A. **General:** Specific requirements for record documents are indicated in individual sections of these Specifications. Do not use record documents for construction purposes. Provide access to record documents for ARCHITECT's reference during normal working hours.
- B. **Record Drawings:** Maintain a white-print set (blue-line or black-line) of Contract Drawings and shop drawings in clean, undamaged condition, with mark-up of actual installations which vary substantially from the Work as originally shown, for continuous updating during the course of the project. Record all changes, differences, modifications, and substitutions of the Drawings and Contract Documents. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross reference at corresponding location on working Drawings. Mark with red erasable pencil. Give particular attention to concealed Work, which would be difficult to measure and record at a later date. Note related change order numbers where applicable. Organize Record Drawing sheets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
- C. **Record Specifications:** Maintain one copy of Specifications, including Addenda, Change Orders and similar modifications issued in printed form during construction, and mark-up variations (of substance) in actual Work in comparison with text of Specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on Work where it is concealed or cannot otherwise be readily discerned at a later date. Note related Record Drawing information and product data, where applicable.
- D. **Record Product Data:** Maintain one copy of each product data submittal, and mark-up significant variations in actual Work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned at a later date. Note related Change Orders and mark-up of Record Drawings and Specifications.
- E. **Warranties and Bonds:**
 - 1. Provide fully executed warranties and bonds including builders warranties where specified.
 - 2. Guarantee on all completed work (materials, installed equipment, workmanship, etc.):
 - a. Contractor shall warranty the work for one year from the date of substantial completion, except for items completed after that date.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 Closeout Procedures

- A. **General Operating /Maintenance Instructions:** Arrange for each installer of Work requiring continuing maintenance or operation, to meet with OWNER's personnel, at project, site, to provide basic instructions needed for proper operation and maintenance of entire Work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, identification system, control sequences, hazards, cleaning and similar procedures and facilities. Review maintenance and operations in relation with applicable warranties, agreements to maintain and similar continuing commitments.

3.2 Final Cleaning

- A. **General:** Final clean-up requirements are as followed:
 - 1. Remove labels which are not required as permanent labels.
 - 2. Removing substances which are noticeable as vision-obscuring on transparent materials. Replace broken glass and damaged transparent materials.

3. Clean exposed interior hard-surfaced finishes, to a dirt-free condition, free of dust, stains, films, and similar substances.
 4. Wipe surfaces of mechanical and electrical equipment clean; remove excess lubricant and other substances.
 5. Clean floors in non-occupied spaces broom clean.
 6. Clean light fixtures and lamps so as to function with full efficiency.
 7. Clean project site impacted by Work, of litter and foreign substances. Remove stains, petro-chemical spills and other foreign deposits.
- B. **Removal and Protection:** Except as otherwise requested by ARCHITECT, remove temporary protection devices and facilities which were installed during course of Work.
- C. **Disposal of Wastes:** Do not burn waste materials at site, or bury debris or excess materials on OWNER's property, or discharge volatile or other harmful or dangerous materials into drainage system. Remove waste materials from site and dispose of in a lawful manner.

END OF SECTION

SECTION 01 78 39
RECORD DOCUMENTS

PART 1 - GENERAL

1.1 Summary

- A. This work shall include all labor, materials and equipment necessary to complete the Project Record Documents.

PART 2 - PRODUCTS

2.1 Contract Documents

- A. Contractor shall maintain one (1) copy of the Contract Documents, Drawings, Shop Drawings, Test Reports, Change Orders, etc., for continuous updating during the course of the Project. All material shall be kept in a secure and dust free environment and shall only be used for record document purposes.

PART 3 - EXECUTION

3.1 Recording

- A. Record all changes, differences, modifications, substitutions of the Drawings and Contract Documents.
- B. Record locations of all utility lines and fixtures including depths and horizontal locations. Use swing ties or similar methods approved by the Architect.
- C. Indicate on Drawings manufacturer, trade name, catalog number and supplier of products and equipment actually installed.

3.2 Submittals

- A. Upon completion of the Project, submit to Architect for Owner completed Record Drawings and Documents.
- B. Provide Owner **two (2) sets** of all Manufacturer's Information, Assembly and Operating Instructions, Warranties, Repair Parts Lists, and similar materials in 3 ring binders with appropriate labels. Also, provide **two (2)** copies of all operations manuals describing the use operation and maintenance of the plant, structure, or process (as applicable). Operations manuals shall include sufficient narrative to completely describe any and all major processes for the particular project, along with all manufacturer's care and maintenance requirements- suitably bound in 3 ring binders.

END OF SECTION

SECTION 01 81 00
PERMITS AND INSPECTION CERTIFICATES

PART 1 - GENERAL

1.1 Summary

- A. All permits required for the construction of this project shall be identified and obtained prior to beginning any construction work.
- B. Inspection Certificates shall be obtained from local Code Enforcement officials or other appropriate entities.
- C. Contractor shall secure and pay for all permits unless otherwise specified or advised by the Architect.

PART 2 - PRODUCTS

2.1 Applicable Permits and Inspection Certificates

- A. Applicable permits may be:
 - 1. Building permit (Municipal).
 - 2. Plumbing Permit (Municipal).
 - 3. Electrical Permit (Municipal or State).
- B. Applicable Inspection Certificates may be:
 - 1. Building - Inspection Certificate (Certificate of Occupancy)(Municipal).
 - 2. Plumbing - Inspection Certificate.
 - 3. Electrical - Inspection Certificate.

PART 3 - EXECUTION

3.1 Submittals

- A. Permits - Submit three (3) copies of all applicable permits to Architect prior to construction plus one [1] original copy to Owner.
- B. Inspection Certificate - Submit three (3) copies of all applicable Inspection Certificates to Architect immediately after issuance of certificate from inspection official. An original copy of all certificates shall be submitted to Owner.

END OF SECTION

SECTION 02 20 00
EARTHWORK

PART 1 - GENERAL

1.1 Description of Work

- A. Work Included: All excavating, dewatering, filling, backfilling, and removal of materials. Earthwork for utilities is included in this Section.
- B. Related Work Specified Elsewhere Includes:
 - 1. Section 02 21 00 - Slope Protection and Temporary Erosion Control
 - 2. Section 02 92 50 - Loaming, Seeding and Mulching

1.2 Protection

- A. Paved Surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the specified limits of Work which become damaged shall be repaved by the CONTRACTOR at no additional cost to OWNER.
- B. Maintain excavations with approved barricades, lights, and signs to protect life and property until excavation is filled and graded to a condition acceptable to the ARCHITECT.
- C. Protect structures, utilities, sidewalks, pavements, property monuments, monitoring wells, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. The CONTRACTOR shall be responsible for actual cost of repair or replacement of any items damaged as a result of construction activities. This cost shall include any professional services required for inspection of repairs or replacement.

1.3 Quality Assurance

- A. Standards: 29 CFR 1926/1910 - OSHA Safety and Health Standards; Standard Specification for Highways and Bridges, Maine Department of Transportation, current revision.
- B. Testing and Inspection: See Section 01 41 60 for general requirements. The OWNER shall be responsible for all quality control testing, unless otherwise noted. The CONTRACTOR shall be responsible for quality control coordinating with ARCHITECT to allow for testing to be performed at the frequencies specified. A minimum of 48 hours notice for in-place testing shall be given to allow proper scheduling by ARCHITECT.
- C. Inspection of Material Sources: The ARCHITECT may inspect off-site sources of materials and order tests of these materials to verify compliance with these Specifications.

1.4 Testing Standards

- A. Laboratory and Field Testing: Procedures for testing earthwork shall be performed in accordance with the following standards:
 - 1. Sieve Analysis.....ASTM D422
 - 2. Field Density.....ASTM D2922
 - 3. Field Moisture Content.....ASTM D3017
 - 4. Moisture/Density (Proctor) Tests.....ASTM D698

1.5 Submittals

- A. Material Test Reports: Submit reports on material gradations (sieve analysis) and maximum laboratory moisture density, (proctor).

1.6 Site Conditions

- A. CONTRACTOR may make his own borings, hand probes, explorations and observations to determine soil, water and other subsurface conditions at no cost to OWNER. Coordinate with OWNER prior to start of additional investigative work.
- B. Existing Utilities: Locate existing underground utilities within limits of Work and provide adequate means of support and protection during earthwork operations, if utilities are indicated to remain in place. Coordinate with utility companies for actual locations and shut-off services, if lines are active. Demolish and completely remove from site existing underground utilities indicated to be removed.

PART 2 - PRODUCTS

2.1 Materials

- A. General: All materials utilized for this project shall be obtained from a source approved by ARCHITECT. The CONTRACTOR shall be required to submit evidence of compliance with specifications. The CONTRACTOR shall pay for all gradation and proctor testing to prove compliance with specifications. Testing responsibility shall be as outlined in Section 01400. This shall be performed each time soil is obtained from a new source, or the material characteristics change or as determined by the ARCHITECT.
 - 1. Suitable Materials: Materials complying with ASTM D2487 soil classification groups GW, SM, SW, and SP or AASHTO M145 soil classification groups A-1, A-2-4, 1-2-5, and A-3.
 - 2. Unsuitable Materials: Material containing excessive amounts of water, blue or plastic clay, vegetation, organic matter, debris, pavement, stones or boulders greater than 12 inches in any dimension, frozen material, and material which, in the opinion of the ARCHITECT, will not provide a suitable foundation or subgrade.
 - 3. On-Site Material: Any suitable material from on-site excavation.
 - 4. Material for embankments and general fills may contain pieces of excavated ledge having a greatest dimension of up to 12 inches, if approved by the ARCHITECT.
 - 5. Sieve Analysis: Performed in accordance with ASTM D422-63.

- B. Gravel: Hard, durable stone with coarse to fine sand. Sieve analysis by weight:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
3"	100
1/4"	25-70
No. 40	0-30
No. 200	0-5

- C. 3/4" Crushed Stone: Durable, clean angular rock fragments obtained by breaking and crushing rock material. Sieve analysis by weight:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
1"	100
3/4"	95-100
1/2"	35-70
3/8"	0-20
No. 200	0-5

- D. Aggregate Base (MDOT 703.06) Type A: Hard durable gravel containing only particles passing the 2 inch sieve. Sieve analysis by weight:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
2"	100
½"	45-70
1/4"	30-55
No. 40	0-20
No. 200	0-5

- E. Aggregate Base (MDOT 703.06) Type B: Hard durable gravel containing only particles passing the 4 inch sieve. Sieve analysis by weight:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
4"	100
½"	35-75
1/4"	25-60
No. 40	0-25
No. 200	0-5

- F. Aggregate Base (MDOT 703.06) Type C: Hard durable gravel containing only particles passing the 6 inch sieve. Sieve analysis by weight.:

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
6"	100
1/4"	25-70
No. 40	0-30
No. 200	0-5

- G. Aggregate Subbase (MDOT 703.06) Type D: Hard durable stone with coarse to fine sand containing only particles which will pass a 6" square mesh screen. Sieve analysis by weight for the portion passing the 3" sieve.

<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
1/4"	25-70
No. 40	0-30
No. 200	0-7

H.	Sand: Granular material free from organic matter. Sieve analysis by weight:	
	<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
	1"	100
	½"	75-100
	No. 4	50-100
	No. 20	15-80
	No. 50	0-15
	No. 200	0-5

I.	Select Borrow: Sieve analysis by weight:	
	<u>Sieve Size</u>	<u>Max. % Passing by Weight</u>
	3"	100
	1"	95-100
	No. 4	75-100
	No. 40	50-85
	No. 200	30-60

- J. Common Borrow: Earth suitable for embankment or general fill construction, free from frozen material, plastic clay, vegetation, perishable rubble, peat and other unsuitable materials. The moisture content shall be sufficient to provide required compaction and stable embankment. In no case shall the moisture content exceed 4% above optimum as determined by ASTM D698.
- K. Refill Material: 3/4" crushed stone, for refilling excavation below normal grade, rock excavation or refilling excavated unsuitable material, unless otherwise directed by the ARCHITECT.
- L. Select Backfill: Use gravel or 3/4" crushed stone as directed by the ARCHITECT.

PART 3- EXECUTION

3.1 Excavation

- A. General: Remove all materials encountered to the limits shown on the Drawing, or designated in the Specifications.
- B. Classifications: The following classifications of excavation will be made and paid for on a unit cost basis:
1. Rock Excavation for trenches and pits.
 2. Rock Excavation for open excavation.
 3. Excavation below normal grade.
 4. Select backfill.
- C. Earth Excavation: Remove and dispose of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
- D. Excavation for Structures: Conform to elevations and dimensions shown, within a tolerance of ±0.10', and extending sufficient distance from footings and foundations to permit placing and removal of concrete form work, installation of services, other construction, and for inspection. While excavating for structures, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work. Use shoring and bracing where sides of excavation will not support itself.
- E. Rock Excavation for Trenches and Pits: Includes removal and disposal of materials and

obstructions encountered that cannot be excavated with modern, track-mounted, heavy-duty excavating equipment without drilling, ripping or blasting; includes boulders larger than 2 cubic yards each. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.

Do not perform rock excavation or excavation of unsuitable materials until material to be excavated has been cross-sectioned and classified by the ARCHITECT. Predrilling and blasting of bedrock through overburden may be allowed. If this method is used, the rock excavation quantities will be adjusted downward in proportion to the ground swell from this blasting method. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

- F. Rock Excavation in Open Excavations: Includes removal and disposal of materials and obstructions encountered not in a trench or pit that cannot be dislodged and excavated with modern, track-mounted, heavy-duty excavating equipment without drilling, blasting, or ripping. Do not perform rock excavation or excavation of unsuitable materials until material to be excavated has been cross-sectioned and classified by ARCHITECT. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
- G. Rock Payment Limits:
 - A. Two feet outside of concrete work for which forms are required, except footings, base slabs, or anti-floatation slabs.
 - B. One-and-a-half feet outside perimeter of footings, base slabs, anti-floatation slabs, and manholes (precast concrete and HDPE).
 - C. Pipe trenches as shown on Drawings.
 - D. Neat outside dimensions of concrete work where no forms are required.
- H. Excavation in Paved Areas: Sawcut pavement prior to excavation to provide a clean, uniform edge. Minimize disturbance of remaining pavement. Cut and remove the minimum amount of pavement required to do the work.
- I. Excavation for Trenches: Excavate to widths shown on the Drawings and depths indicated or required to establish indicated slope and invert elevations. Produce an evenly graded, flat trench bottom at the subgrade elevation required for installation of pipe and bedding material. Place backfill material directly into trench or excavation. Do not stockpile material to be used as backfill along edges of trenches.
- J. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of ARCHITECT. Unauthorized excavation, refilling shall be at the CONTRACTOR'S expense.
- K. Refilling Unauthorized Excavation:
 - 1. Trenches: Use 3/4" crushed stone as directed by ARCHITECT.
 - 2. Under Concrete Footings: Use concrete of similar strength as structure, see Specification Section 03300.
 - 3. Elsewhere: Backfill and compact unauthorized excavations as specified for authorized Excavations of same classifications, unless otherwise directed by ARCHITECT.
- L. Excavation of Unsuitable Materials: When excavation has reach required subgrade elevations, notify ARCHITECT to allow for an inspection of conditions. If unsuitable bearing materials are encountered, carry excavations deeper as directed by ARCHITECT and replace excavated material with: 3/4" crushed stone.
- M. Material Storage: Stockpile and maintain suitable surplus excavated materials for re-use as backfill within the project limits, as directed by ARCHITECT. Place, grade and shape stockpiles for proper drainage.

3.2 Stability of Excavations

- A. Slope sides of excavations to comply with OSHA Regulations and local codes. Shore and brace where sloping is not possible due to space restrictions or stability of material excavated. Maintain sides and slopes of excavation in safe condition until completion of backfilling.

3.3 Dewatering

- A. General: Perform all Work in the dry. Prevent surface water and subsurface or groundwater from flowing uncontrolled into excavations and resulting in the flooding of the Work and surrounding area.
B. Do not allow water to accumulate in excavations. Provide and maintain all necessary pumps, hoses, pipes, well pont dewatering system, and all other required components necessary to convey water away from excavations.
C. Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
D. Provide all necessary means to prevent erosion and sedimentation and the discharge of soil matter into a waterbody.

3.4 Backfill and Fill

- A. General: Place acceptable soil material in layers to required elevations as shown on the Drawings. Fill, backfill, and compact to produce minimum subsequent settlement of the material and provide adequate support for the surface treatment or structure to be placed on the material. Place material in approximately horizontal layers, beginning at lowest area to be filled. Do not impair drainage.
B. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Scarify surfaces so that fill material will bond with existing surface.
C. Placement: Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers, unless otherwise indicated. Do not place backfill or fill material on surfaces that are wet, frozen, or contain frost or ice.
D. Backfilling Pipe Trenches: Bed pipe in crushed stone. Maintain a minimum of 6 inches of material around piping to obtain an envelope unless otherwise indicated.

3.5 Compaction

- A. Methods: Use methods which produce the required degree of compaction throughout the entire depth of material without damaging the material which has previously been place.
B. Degree of Compaction: Compact to the following minimum densities:

Table with 2 columns: Area Classification and Density. Rows include Road & Parking Area Base and Subbase (95% of max), Embankments (including slopes) (92% of max), Pipe Bedding (95% of max), From invert to 1 foot above pipe (95% of max), Beside Structure walls, manholes, retaining walls, tank walls, etc. (not below structures, embankments, paved areas, etc.) (92% of max), Below structure floor slabs and footings (95% of max).

Maximum Density: ASTM D698 (Standard Proctor)
Field Density Tests: ASTM D2922

- C. Testing: See Soils Testing, Specification Section 01416. Costs for initial in-place tests shall be paid by OWNER, unless otherwise specified. Subsequent retests will be paid by CONTRACTOR. Perform additional Work to obtain proper compaction if in-place densities do not meet the specified densities.

D. Minimum Number of Tests:

3.6 Grading

- A. Grading: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Finish surfaces free from irregular surface changes and shall be finished to required elevation 0.1 feet in 5 feet.
- C. Compaction: After grading, compact subgrade surfaces to the percentage of maximum density for each area classification.

3.7 Maintenance

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.8 Disposal of Excess Materials

- A. Disposal of excess material shall be disposed of off-site in a lawful manner.
- B. Keep roads traveled by construction vehicles free of debris. Use suitable watertight vehicles for hauling wet materials over roads and streets. Clean up materials dropped from or spread by construction vehicles promptly or when directed by the ARCHITECT.

END OF SECTION

SECTION 02 21 00
SLOPE PROTECTION AND TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.1 Description of Work

- A. Provide and maintain devices to control erosion, siltation, sedimentation and dust that occurs during construction operations. Undertake every reasonable precaution and do whatever is necessary to avoid erosion of soil and to prevent silting of wetland areas, drainage ditches, and lakes.
- B. Provide measures to control dust caused whether on or off the Project site.
- C. Deficiencies in erosion control measures indicated by failures or erosion shall be immediately corrected by providing additional measures or different techniques to correct the situation and prevent subsequent erosion.
- D. Exposure of soils on embankments, excavations, and graded areas shall be kept as short as possible. Initiate seeding and other erosion control practices as soon as reasonably possible.
- E. Install erosion control measures in any ditch, swale or channel before water is allowed to flow in the waterway.
- F. Related Work Specified Elsewhere Includes: Division 2, Site Work, all sections.

1.2 Quality Assurance

- A. Conform to all requirements of applicable federal, state and local permits, and Contract Documents, and conform to the recommendations of the Erosion Control Handbook (see Part C below) whether the measures are specifically noted herein, or not.
- B. Meet with the ARCHITECT to discuss erosion control requirements prior to the start of construction.
- C. Standards: "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices" prepared by the Cumberland County Soil and Water Conservation District, dated March 1991, hereinafter referred to as Erosion Control Handbook.

1.3 Submittals

- A. Submit design calculations and Drawings for Sedimentation basin, for ARCHITECT's approval prior to the start of earthwork. Design shall be based on maximum flow rate of all ground water pumps that may be employed on the project.

PART 2 - PRODUCTS

2.1 Materials

- A. Use the following materials to implement and construct erosion control measures. Other materials require approval of the ARCHITECT.
 - 1. Siltation Fence: Mirafi Environfence, AMCO 1380 Silt Stop, or Supac 3WS.
 - 2. Mulch: Type and use as specified by the Erosion Control Handbook.
 - a. Long fibered hay or straw in dry condition and which are relatively free of weeds and foreign matter detrimental to plant life.
 - b. Mulch Binder: An asphalt emulsion mulch binder of type acceptable to the ARCHITECT.
 - c. Mulch Netting: Plastic or nylon mesh netting with approximate openings of 1/4" to 1", or other netting approved by the ARCHITECT.
 - 3. Temporary Erosion Control Matting: Type and use as specified by the Erosion Control Handbook.
 - a. Rolled matting blanket consisting of excelsior wood fiber, jute, straw, or paper bound with a weave of twisted craft paper, cotton cord or plastic mesh.

- b. Provide staples for fastening matting to the ground. Staples shall be fabricated in a "U" shape from 11 gage or heavier stiff galvanized steel wire, 6 to 12 inches in length and 1 to 2 inches across.
- 4. Temporary Seed: Seed variety and applied rate are selected based upon the date of application, and as determined by the following table. Equivalent seed mixture based on its suitability for use in controlling erosion of the various soil types and slopes may be used as approved by the ARCHITECT.

<u>DATES</u>	<u>SEED</u>	<u>APPLIED RATE</u>
4-1 to 7-1	Oats	1.8 lb/1000 sq.ft.
8-15 to 9-15		
4-1 to 7-1	Annual Ryegrass	0.9 lb/1000 sq.ft.
5-15 to 8-1	Sudangrass	0.9 lb/1000 sq.ft.
9-15 to 10-15	Winter Rye	2.6 lb/1000 sq.ft.

- 5. Sod:
 - a. Grown from certified seed of adapted varieties to produce high quality sod free of any serious thatch, insects, diseases and other pest problems.
 - b. At least 15 months old and not older than 3 years. Cut with a 1/4" to 1/2" layer of soil.
- 6. Hay Bales: Rectangular shaped bales of hay or straw weighing at least 40 lbs/bale; free from noxious weed seeds and rough or woody materials.
- 7. Drains:
 - a. Flexible drains consisting of collapsible neoprene pipe, minimum 8" diameter.
 - b. Corrugated metal pipe and inlet of a gauge consistent with the loading conditions, minimum 12" diameter.
- 8. Filter Fabric: Provide Mirafi 500X woven textile or equal.
- 9. Geotextile Fabric: Equal to Propex 4545 by Amolco Fabrics Co., or approved equal.
- 10. Riprap: Sound, durable rock which will not disintegrate due to exposure to water or weather; angular in shape such as rough, unhewn quarry stone or fragments obtained by blasting, breaking or crushing natural rock. Rounded boulders or cobbles will not be permitted. Flat, platy stones and shale or slate rock with its largest length dimension three times greater than its shortest dimension will not be permitted.

Stone size will correspond to the inch dimension indicated on Drawings. The D₅₀ of the stone size represent 50% of the stone passing the D₅₀ dimension sieve screen. The D₂₀ stone size, (20% passing) shall be one half the D₅₀ dimension. The maximum size limit, D₁₀₀, shall be twice the D₅₀ stone size dimension.

D ₂₀	=	20% passing 1/2 D ₅₀ dimension sieve
D ₅₀	=	50% passing D ₅₀ dimension sieve
D ₁₀₀	=	100% passing 2D ₅₀ dimension sieve

PART 3 - EXECUTION

3.1 Construction

A. Silt Fence:

- 1. Install silt fence prior to any earthwork including grubbing.
- 2. Place where shown on Drawings or as directed by the Architect. Install parallel to contours where possible, prior to site clearing and grading activities.

3. Bury lower edge of fabric at least 8" below ground surface to prevent underflow, as noted in the Erosion Control Handbook.
 4. Curve ends of fence uphill to prevent flow around ends.
 5. Inspect frequently; repair or replace any damaged sections.
 6. Remove fence only when adequate grass catch has been established as determined by the ARCHITECT.
- B. Mulch:
1. Undertake immediately after each area has been properly prepared.
 2. When seed for erosion control is sown prior to placing the mulch, place mulch on the seeded areas within 48 hours after seeding.
 3. Apply mulch at 1.5 to 2.0 tons per acre. Mulch applied between the dates of December 1 through March 31 for winter stabilization shall be applied at 3.0 to 4.0 tons per acre.
 4. Blowing chopped mulch will be permitted.
 5. Hay mulch should cover the ground enough to shade it, but the mulch should not be so thick that a person standing cannot see ground through the mulch.
 6. Remove matted mulch or bunches.
- C. Temporary Erosion Control Matting
1. Surface Preparation:
 - a. Conform to grades and cross sections for slopes and ditches shown on the Drawings.
 - b. Finish to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed.
 - c. Loosen soil surface to permit bedding of the matting.
 - d. Unless otherwise directed, apply seed prior to placement.
 2. Installation:
 - a. Place strips lengthwise in the direction of the flow of water.
 - b. Where strips are laid parallel or meet as in a tee, overlap at least 4".
 - c. Overlap ends at least 6" in a shingle fashion.
 - d. The up-slope end of each strip of the matting shall be turned down and buried to a depth of not less than 6" with the soil firmly tamped against it.
 - e. The ARCHITECT may require that any other edge exposed to more than normal flow of water be buried in a similar manner.
 - f. Build check slots at right angles to the direction of the flow of water. Space so that one check slot or one end occurs within each 50 feet of slope length. Construct by placing a tight fold of the matting at least 6" vertically into the ground, and tamp the same as up-slope ends.
 - g. Bury edges of matting around the edges of catch basins and other structures.
 - h. When ordered, additional seed shall be spread over matting, particularly at those locations disturbed by building the slots. Matting shall then be pressed onto the ground with a light lawn roller or by other satisfactory means.
 - i. Drive staples vertically into the ground flush with the surface.
 - j. On slopes flatter than 4:1, space staples not more than 3 feet and one row, alternately space, down the center.
 - k. On grades 4:1 or steeper, place staples in the same three rows, but spaced 2 feet apart.
 - l. On all overlapping or butting edges, double the number of staples, with the spacing halved; all ends of the matting and all required check slots shall likewise have staples spaced every foot.
- D. Temporary Seeding::
1. Seed with appropriate seeds and application rates from the table in paragraph 2.1.4 of this Section. Seed shall be sown at the rate indicated, on the pure live seed basis.
 2. Mulch areas where temporary seeding has been applied. Do not mulch seeded areas where matting will be immediately installed.

3. If temporary seeding does not achieve adequate growth by December 1, an additional layer of mulch shall be applied at that time.
- E. Topsoil Storage:
1. Topsoil which is stockpiled on the site for use in loam applications shall be placed out of natural drainages, in piles not more than 8 feet in height, which have side slopes of 2:1 to 1.5:1.
 2. A trench, depth as required, shall be constructed around the base of the pile to prevent eroding soil from washing into drainages.
 3. Any topsoil piles which are to remain for a period of 1 month or more shall be covered with temporary seed and mulch immediately following stockpiling.
- F. Hay Bales:
1. Place as ordered to provide for temporary control of erosion, and in ditches at 100 foot minimum intervals.
 2. Install as directed by ARCHITECT, and stake with required stakes.
- G. Sodding:
1. Lay sod strips on the prepared soil, perpendicular to the slope or direction of water flow, starting at the lowest elevation. Butt the edges and ends of the side strips together and tamp or roll. Stagger joints.
 2. Staple sod strips at ends and at 3 foot intervals along the center of the strip.
 3. Irrigate sodded area immediately after installation.
- H. Dust Control:
1. Utilize the application of sprinkled water to reduce the emission of airborne soil particulates from the Project site. Calcium chloride shall not be permitted for use, unless acceptable to ARCHITECT.
- I. Temporary Berms:
1. Construct temporary barriers along the toes of embankments using side drains as required.
- J. Temporary Slope Drains:
1. Collapsible pipe with corrugated metal pipe inlet.
- K. Sedimentation Basins:
1. Construct sedimentation basins adequate to avoid siltation of surface water bodies. Submit design calculations and Drawings for approval.
- L. Other Temporary Measures:
1. Utilize other temporary erosion control measures as directed by the ARCHITECT.
 2. Type and use shall be as specified in the Erosion Control Handbook.
- M. Riprap:
1. Subgrade Preparation: Grade and compact, where possible, areas to receive protection to a uniform slope. Allow for depth of protection stone layer.
 2. Filter Fabric Placement: Filter fabric may be used under the riprap in lieu of aggregates as shown on the Drawings. Filter fabric is to be placed in one continuous piece. Sew all seams as per manufacturer's recommendation.
 3. Riprap Placement: Place required riprap to full depth shown on Drawings measured perpendicular to the face of the slope to obtain a uniform appearance true to line and grade. Place larger stones at bottom of slope. Place stones in close contact, with interlocking of face stones and backing stones. Fill openings between stones with smaller rocks or coarse gravel.

3.2 Maintenance

- A. Inspect erosion control practices immediately after each rainfall and at least daily during prolonged rainfall or snow melt for damage. Provide maintenance and make appropriate repairs or replacement at no additional cost to the OWNER, until Project acceptance or as required to comply with maintenance requirements if longer.

- B. Remove silt from silt fence when it has reached one foot above grade or prior to expected heavy runoff or siltation.
 - C. Repair matting if any staples become loosened or raised, or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.
- 3.3 Removal of Temporary Erosion Control
- A. Remove temporary materials and devices when permanent soil stabilization has been achieved. Reuse materials in good condition, if approved by the ARCHITECT.
 - B. Level and grade to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with operation of or access to the permanent works.
 - C. Remove unsuitable materials from site and dispose of in a lawful manner.

END OF SECTION

SECTION 02 92 50
LOAMING, SEEDING AND MULCHING

PART 1 - GENERAL

1.1 Summary

- A. The Conditions of the Contract and applicable Sections of Division 1 are hereby made a part of this Section.
- B. Coordinate work with that of other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of the work.

1.2 Description

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section on all disturbed areas and/or as shown on the drawings which includes, but is not limited to:
 - 1. Preparation of subgrade in areas to receive topsoil.
 - 2. Supply and place topsoil and finish grade for seeded areas including restoration work.
 - 3. Seeding by mechanical or hydraulic spray method.
 - 4. Protecting and maintaining all seeded areas until Final Acceptance.
 - 5. Cleaning up.

1.3 Submittals

- A. Samples of any material shall be submitted for inspection and approval upon the Architect's request. Analyses shall be certified by the manufacturer, dealer or testing laboratory, whichever is appropriate. Samples shall include the following:
 - 1. Commercial Fertilizers - 1-lb. bag showing analysis.
 - 2. Ground Limestone - 1-lb. bag showing analysis.
 - 3. Topsoil - 1 cu.yd. from each source/ test samples showing any amendment recommendations from soils laboratory.
 - 4. Seed - 1 pint/test lot showing analysis.

1.4 Quality Assurance

- A. All work under this Section shall be performed by workmen experienced in this type of work and under the full time supervision of a qualified foreman.

1.5 Testing

- A. If required by the Architect, have soil samples tested for pH, N, P₂O₅, and K₂O with recommendations for liming and fertilizing. Testing shall be performed by a laboratory approved by the Architect.

1.6 Storage of Material

- A. Deliver material to the site in original unopened packages showing weight, manufacturer's name and guaranteed analysis.
- B. Store materials in such a manner that their effectiveness and usability will not be diminished or destroyed and shall be uniform in composition, dry, unfrozen and free-flowing. The Architect reserves the right to reject any material which has become caked or otherwise damaged or does not meet specified requirements.

PART 2 - PRODUCTS

2.1 Topsoil

- A. Suitable stockpiled topsoil previously removed from the project sit shall be reused in this Contract at no additional cost to the Owner. If additional topsoil is required for the work of this Section, it shall be from approved off-site sources. Provide topsoil for seeding of all disturbed areas within or outside the Contract limit line.
- B. Topsoil borrow shall be a natural, fertile, friable loam, typical of cultivated topsoils of the locality, containing at least 3% and not more than 20% organic matter. Topsoil shall be taken from a well-rained, arable site and shall be good, rich, uniform grade without admixtures of subsoil, stones, earth, clods, sticks, stumps, clay lumps, roots or other objectionable extraneous matter or debris.
- C. Before any topsoil is delivered to the site, submit a sample of one cubic yard of topsoil from each source of supply for Architect's inspection and approval. Delivery may begin upon such approval. The approved sample shall be stored on the site until the supply from its source is exhausted or until no more topsoil is required.
- D. Representative samples of stockpiled topsoil and topsoil borrow shall be tested for acidity, fertility and general texture by a recognized commercial or government agency. Furnish copies of the testing agency's report of findings and recommendations to the Architect.
- E. The Contractor shall make any and all additions to or amendments to topsoil as required to remedy any deficiency shown in these tests.
- F. No topsoil shall be delivered in a frozen or muddy condition.

2.2 Topsoil Additives

- A. Commercial Fertilizer: Shall be a complete fertilizer and shall be a standard product complying with the State and United States fertilizer laws. Fertilizer shall be delivered to the site in the original unopened containers which shall bear the manufacturer's name and guaranteed statement of analysis. At least 40% by weight of the nitrogen content of the fertilizer shall be derived from organic materials. Fertilizer shall contain not less than 10% nitrogen, 10% phosphorus, and 10% potash by weight of ingredients or as otherwise indicated by topsoil test results.
- B. Superphosphate: Shall be finely ground phosphate rock as commonly used for agricultural purposes and shall contain not less than 18% available phosphoric acid.
- C. Ground Limestone: Shall be dolomitic limestone and contain not less than 85% of total carbonates and magnesium and shall be ground to such fineness that 50% will pass through a 100-mesh sieve and 90% will pass through a 20-mesh sieve. Coarser material will be accepted provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve.
- D. Water: Shall be furnished by the Contractor and shall be suitable for irrigation and free from ingredients harmful to plant life. Hose and all other watering equipment required for the work shall be furnished by the Contractor.

2.3 Seed

- A. Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an approved method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Contractor shall furnish to the Architect the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.
- B. Seed shall be purchased from a recognized distributor and shall be composed of the following varieties mixed in the proportions indicated. Seed shall test to minimum percentages of purity and germination specified.
- C. Each variety of seed shall have a percentage of germination of not less than 80, a percentage of purity of not less than 85 and shall have not more than one percent of weed content.
- D. Seed mixtures shall consist of seeds proportioned percent by weight as follows:

Lawn Mixture

Creeping Red Fescue - 45%
Common Kentucky Bluegrass - 30%
Perennial - 15% (or)
Red Top - 10%

2.4 Mulch

- A. New crop dry hay relatively free of seed weed or other approved mulch if mechanical method is used.
- B. Conwed Hydro Mulch Fibers by Conwed Corp., P.O. Box 43237, St. Paul, MN, or approved equivalent, if hydraulic spray method is used.

PART 3 - EXECUTION

3.1 Preparation of Subgrade

- A. After Architect's acceptance of subgrade work performed under Earthwork Section, or other appropriate Sections, do whatever additional grading is necessary to bring the sub-grade to a true, smooth slope parallel and, except where otherwise indicated, six (6") inches below finish grade for all areas to receive top-soil. Other subgrades shall be as indicated. All areas to receive topsoil shall be compacted to a maximum dry density of 90%.
- B. Immediately before placing topsoil, harrow or otherwise, loosen the surface of the subgrade to a depth of 3". Subgrade shall be inspected and approved by the Architect before placing of topsoil.
- C. Provide and set sufficient grade stakes as determined by the Architect to insure correct line and grade of finish grade.

3.2 Placing Topsoil

- A. Place and spread topsoil over approved areas to a depth sufficiently greater than the depth required (4" min., unless otherwise shown on the drawings) for seed areas so that, after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated and shall assure proper drainage in an uninterrupted pattern free of hollows and pockets.
- B. After topsoil has been spread, prepare it carefully by scarifying or harrowing and raking. Remove all stiff clods, lumps, brush, roots, stumps, litter and other foreign material, and stones over 1" in diameter and dispose of legally off the site. Topsoiled areas shall also be free of smaller stones in excessive quantities as determined by the Architect. Roll the entire surface with a hand roller weighing a minimum of 100 pounds per foot of width. During the rolling, fill all depressions caused by settlement with additional topsoil and then regrade and roll until the surface presents a smooth, even and uniform finish and is up to the required grade.

3.3 Application of Topsoil Additives

- A. Applying fertilizers: Apply commercial fertilizer and work thoroughly into the topsoil in two (2) applications. The first application shall be within one week before the seeding, at the rate of twenty-five (25) pounds per thousand square feet, harrowed into the top 2" of seed bed. The second application shall be as determined by the test results.
- B. Applying Superphosphate: Incorporate superphosphate into the topsoil with the first application of commercial fertilizer at the rate of 20 pounds per thousand square feet or at the rate determined from the test results.
- C. Applying Ground Limestone: After the topsoil has been spread, and graded, and if recommended as a result of the soil analysis, apply ground limestone at the rate of 100 pounds per one thousand square feet or at the rate recommended by the testing laboratory.

3.4 Seeding Season

- A. The dates for seeding shall be April 15 to June 15 and August 15 to September 1.
- B. Seeding at any other times shall be allowed only when authorized by the Architect to control erosions or when the Contractor submits a written request for permission to do so and permission

is granted by the Architect. Newly seeded areas must be continuously watered according to good practice if seeding is done between June 15 and August 15. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted as here-in-after specified and for a period of one year thereafter.

3.5 Sowing of Seed

- A. Seeding: Seeding shall consist of soil preparation, seeding, raking, rolling, weeding, watering and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf.
- B. Sowing of Seed, Mechanical Method: Immediately before any seed is sown, the ground shall be scarified, harrowed and raked until the surface is smooth, friable and of uniformly fine texture. No seeding shall be done during windy weather. Sow seed in two directions at right angles to each other. Sow the seed evenly with approved seeding device at the rate of four (4) pounds per 1000 square feet. Cover seed with a thin layer of topsoil by light raking or other approved method. Compact the seed bed immediately after or during seeding with a roller, cultipacker or other equipment approved by the Architect.
- C. Sowing of Seed, Hydraulic Method: At the option of the Contractor, the specified seed, fertilizer, mulch and water may be applied in accordance with MDOT 618.07.

3.6 Mulching

- A. Immediately after seeding, cover the entire area with one to two tons per acre of hay, straw or cellulose mulch. Distribute mulch evenly and do not leave large gaps or mats.
- B. Mulch may be applied by hand or with a mulch blower. Cellulose mulch may be applied by hydroseeder if approved by the Architect.
- C. Immediately after or during mulching operation, apply a mulch binder to prevent mulch from blowing. Apply at rates approved by the Architect.

3.7 Watering

- A. Water newly seeded areas daily or as necessary to maintain moisture to a minimum depth of 5" with a fine spray to supplement natural rainfall.
- B. Suitable water for planting and maintenance of lawns shall be provided by the Contractor. Contractor shall provide all necessary watering equipment.
- C. Watering activities shall continue until seeded areas have sustained a uniform growth, as approved by the Architect, (See Part 3.9 - Inspection for Acceptance and Cleanup).

3.8 Maintenance

- A. Maintenance shall begin immediately after each area is seeded and shall continue in accordance with the following requirements.
- B. Maintenance shall consist of providing protection by placing necessary signs and barriers and by repairing damaged areas as approved. Damaged areas and areas which do not produce a satisfactory stand of grass shall be repaired to re-establish the condition and grade of the area prior to the original seeding and then re-fertilized, re-seeded and re-mulched as specified for the original work as many times as necessary to produce satisfactory results. Seeded areas will be accepted only upon attainment of a reasonably thick, uniform stand of grass free from sizeable thin or bare spots. Prior to acceptance, damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, tamping, re-fertilization, and re-seeding.
- C. Contractor shall control erosion until permanent cover is established. Maintenance includes mowing all lawn areas two consecutive times prior to acceptance.

3.9 Inspection for Acceptance and Cleanup

- A. Upon written request by the Contractor, the Architect shall inspect all seeded areas to determine completion of Contract work. This request must be submitted at least ten (10) days prior to the anticipated date. The seeded areas will become acceptable when they show uniform, thick, well-developed stand of grass.

- B. Architect's inspection shall determine whether the seeded areas are acceptable or not.
- C. Any deficiencies found by the Architect shall be corrected by the Contractor before acceptance of the seeded areas.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 Summary

- A. This work shall consist of furnishing and constructing all cast-in-place concrete as shown on the Drawings, as specified herein, and as required to complete the work. This work includes all steel reinforcement, form work, anchor bolts, sleeves, insulation, vapor barriers, and any other additives or accessories necessary to complete the work.
- B. Concrete installation to commence only after all under slab plumbing work has been installed and approved by Plumbing Inspector.
- C. Coordinate size and location of required concrete cutting and patching in existing Garage with Plumbing Contractor for new oil separator tank and under slab pipe drainage line installation.

1.2 References

- A. All work shall comply with the applicable provisions of the following codes:
 - 1. American Concrete Institute ACI-318-11 "Building Code Requirements for Reinforced Concrete".
 - 2. American Concrete Institute ACI-301-10 "Specifications for Structural Concrete for Buildings."
 - 3. Concrete-Reinforcing Steel Institute CRSI Handbook 1996.
 - 4. ASTM C94 Standard Specification For Ready-Mixed Concrete.
 - 5. The IBC (International Building Code- 2009).

1.3 Submittals

- A. Contractor shall furnish four (4) copies of proposed mix design along with copies of previous test results. Indicate pounds of cement per cubic yard.
- B. The Contractor shall provide the Architect with at least four (4) copies of shop drawings for all reinforcing steel and other accessories to be cast-in-place. Shop drawings shall be submitted at least fifteen (15) days in advance of concrete placement and shall be reviewed by the Architect prior to placement.

1.4 Testing

- A. Concrete Testing shall be at the request of the Owner. The Contractor shall coordinate all required field tests performed by a certified Maine Concrete Testing Technician.
- B. Concrete not meeting standards implied in these specifications or as indicated on the Drawings shall be removed and replaced by the Contractor at Contractor's expense.
- C. Concrete test results shall be available to the Owner and Architect by the Architect approved testing laboratory on the same day test results are made available.
- D. Compressive strength test reports shall contain the project name and number, date of concrete placement, concrete type and class, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for 7, 14, and 28 day tests.
- E. The Contractor shall notify the Architect at least 48 hours in advance of pouring any concrete.
- F. The Contractor shall arrange for all standard tests to be performed by the testing laboratory.
- G. The testing technician making the compressive strength cylinders will be responsible for delivery of the test cylinders to the testing laboratory within 24 to 48 hours of making the specimen.
- H. Cost for initial testing will be paid for by the Owner. All costs of testing above and beyond the initial concrete tests as a result of failing initial test shall be reimbursed to the Owner by the Contractor. Testing above and beyond the initial concrete tests to be performed by the Architect approved testing laboratory.

1.5 Test Results

- A. If slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed the requirements of the specification.
- B. When the temperature of the concrete is below 40F. or above 80F., the concrete shall be subject to refusal.
- C. The strength level of the concrete will be considered satisfactory if the average of all the tests equal or exceed the design strength, and no individual test falls below the specified design strength by more than 500 psi.

PART 2 - PRODUCTS

2.1 Concrete

- A. Cement
 - 1. Cement shall be Portland Cement conforming to ASTM C-150 for Type I, II or III as specified. If not specified, Type II shall be used.
- B. Aggregates: Concrete aggregates shall conform to ASTM Specification C-33. All aggregates shall be free from frozen materials and other impurities.
 - 1. Fine aggregate shall be clean sand free from frozen materials, clay, loam, and other deleterious substances and shall meet the following gradation:

<u>Sieve Designation</u>	<u>Percentage by Weight Passing Square Mesh Sieves</u>
3/8 inch	100
No. 4	95-100
No. 8	70-95
No. 16	45-80
No. 30	25-55
No. 50	10-30
No. 100	2-10
No. 200	5 Maximum

- 2. Coarse aggregate shall be durable, clean, crushed stone or gravel-free from clay, loam and other deleterious substances and shall meet the following gradation:

<u>Concrete</u>	<u>Sizes</u>	<u>2"</u>	<u>1-1/2"</u>	<u>1"</u>	<u>3/4"</u>	<u>1/2"</u>
AA	3/4			100	90-100	45-80
A	1		100	95-100	70-95	25-60
B	1-1/2	100	95-100	60-85	35-70	15-45

- C. Water
 - 1. Water shall be clean and potable containing no deleterious impurities which may be harmful to concrete or accessories.
- D. Admixtures
 - 1. Synthetic Fibers: nylon fiber conforming to ASTM C-1116. Synthetic fibers shall be installed in all concrete slabs, exposed exterior concrete and special structures unless otherwise indicated.
 - 2. Water Reducing, Retarding Admixture: "Eucon Retarder-75" by the Euclid Chemical Company, "Pozzolith 100XR" by Master Builder, or "Plastiment" by Sika Chemical Corporation. The admixture shall conform to ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.
 - 3. High Range Water Reducing Admixture (Superplasticizer): "Eucon 37" by The Euclid Chemical Company or "Sikament" by Sika Chemical Corporation. The admixture shall conform to ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.

4. Non-Corrosive, Non-Chloride Accelerator: "Accelguard 80" by The Euclid Chemical Company, or approved equal. The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have a long-term, non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures.
5. Air Entraining Admixture: Conform to ASTM C260.
6. Prohibited Admixture: Calcium chloride, thiocyanates or admixture containing more than 0.05% chloride ions are **not** permitted.
7. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the USA admixture manufacturer prior to mix design review by the Architect.

2.2 Steel

- A. Reinforcing steel shall conform to ASTM A-615 and be of an approved manufacturer. All bars shall be new, grade 60 and shall be at the sizes shown on the Drawings.
- B. Welded wire mesh or fabric (WWF) shall conform to ASTM A-185 and shall be at the sizes and dimensions as shown on the Drawings, and fabricated in accordance with ACI-315 (Latest).
- C. Steel accessories shall be at the sizes and types as shown on the Drawings unless otherwise specified and shall include all spacers, chairs, ties and other devices for properly spacing, supporting and fastening reinforcement in place.

2.3 Accessories

- A. Concrete Contractor to provide all required accessories for concrete work.
- B. Vapor Barriers:
 1. Vapor barriers shall be 10 mil poly with joints in both directions lapped 6".
 2. Vapor barrier provided and installed by Concrete Contractor.
- C. Non-shrink Grout shall be portland cement based, non-metallic, as manufactured by U.S. Grout Corporation - "Five Star Grout"; Dayton Superior Corporation - "Sure-Grip Utility Grout"; or approved USA manufacturer equivalent. Non-shrink grout shall conform to ASTM C-827.
- D. No concrete sealer to be used on new concrete floors to receive tile, carpet, or other floor finishes.

2.4 Joint Sealants

- A. Epoxy jointing compounds shall be two component, 100% solids, moisture insensitive, with a minimum shore A hardness of 75; "Euco 700" by the Euclid Chemical Company; "Sikalur 51 SL" by the Sika Chemical Corporation, or other product approved by Architect.

PART 3 - EXECUTION

3.1 Concrete Proportioning

- A. Concrete shall be Ready-Mix conforming to ACI-301-72 Para. 7.1.B. Strength, cement and water requirements:

Slab Min Strength 28 - day - psi	Max Size Coarse Agg	%Air (+ 1%)	Min/ Max Slump	Min Cem. Fac.	Max W/C	Fiber Reinf
4,000	1"	6	2 - 4	611#/CY	.45	1 ½ # / CY

B. Air content shall be 5-7 % after mixing.

3.2 Protection of Concrete

A. Curing - Exposed concrete slab shall be kept continuously moist for at least 7 days after placement. Slab to be covered with burlap, plastic sheeting, or other approved materials and be sprinkled as required to prevent rapid drying.

3.3 Finishing

- A. Floor slab shall be float finished and steel troweled with a troweling machine once the concrete has set sufficiently. The finish shall be smooth, uniform and hard. Surface tolerance shall be not more than 1/4 inch under a 10 foot straight edge. Slab in area where floor drain occurs shall be pitched to drain with a uniform gradual pitch in all directions with no slope greater than 1/4"/ 1'-0" nor less than 1/8"/ 1'-0".
- B. After a minimum of 21 days curing time for new concrete has passed, prepare new and concrete floor to receive finish. For floors to receive epoxy finish follow manufacturer's recommendations for proper installation. Broom on and rinse off solution of water and muriatic acid by Parks or approved equal to roughen concrete finish for epoxy floor finish bonding. Room must be well ventilated during this procedure.
- C. Any slab penetrations by pipes and/or drains having gaps at slab surface shall be sealed with non-shrink grout around entire penetration to provide a watertight finish.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Face brick.
2. Mortar and grout.
3. Ties and anchors.
4. Work of this section is to include through-wall flashing consisting of stainless steel drip edge and membrane wall flashing at the base of masonry wall; heads of doors, windows and other wall openings. Miscellaneous masonry accessories.

B. Related Sections:

1. Division 07 92 00 Section "Sealants and Caulking" for sealing control and expansion joints in unit masonry.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Selection:

1. Face brick, in the form of straps of five or more bricks.
2. Pigmented mortar, make Samples using same sand and mortar ingredients to be used on NMCC Maintenance Building Project.

C. Material Certificates: For each type and size of the following:

1. Masonry units.
 - a. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - b. For exposed brick, include test report for efflorescence according to ASTM C 67.
2. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
3. Grout mixes. Include description of type and proportions of ingredients.

4. Moisture resistant additives utilized in Grout mixes during installation of all exterior masonry.
5. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
3. Include test reports, according to ASTM E 514, for grout mixes required to comply with water penetration and leakage through masonry requirement.

E. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years experience.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548, will be contracted by the Owner.

C. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

E. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect windows, doors, and frames, as well as surfaces of similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates or setting beds. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with the following requirements:

1. Cold-Weather Construction: When the anticipated daytime low temperature is within the limits indicated, use the following procedures:
 - a. 40 to 32 deg F: Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F.
 - b. 32 to 25 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Heat masonry units to 40 deg F. Maintain mortar and grout above freezing until used in masonry. Use heat on both sides of walls under construction.
 - c. 25 to 20 deg F: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F.
 - d. 20 deg F and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F. Heat grout materials to produce grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F.

2. Cold-Weather Protection: When the anticipated daytime low temperature is within the limits indicated, coordinate with the General Contractor to provide the following protection. This is in addition to construction procedures specified above:
 - a. 40 to 32 deg F: Cover masonry with insulating blankets for 48 hours after construction.
 - b. 32 deg F and Below: Provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 72 hours after construction.
3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.

E. Hot-Weather Requirements: Coordinate with the General Contractor to protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.

1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: Facing brick complying with ASTM C 216.

1. Grade: SW.
2. Type: FBS.
3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 8000 psi .
4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
6. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
7. Application: Use where brick is exposed unless otherwise indicated.
8. Available Product:
 - a. Brick: Morin waterstruck College Blend, Full Range (all common sets), Modular Cored by Morin Brick Company; or as selected by architect.

2.3 MORTAR AND GROUT MATERIALS

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide type S mortar for all applications stated unless another type is indicated.

C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

D. Portland Cement: ASTM C 150, Type I or II.

E. Hydrated Lime: ASTM C 207, Type S.

F. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

1. Available Products:

- a. Blue Circle Cement, Inc.: Eaglebond High Strength Type "S".
- b. Cement Quebec, Inc.: Portland and Lime / Type S.
- c. Dragon Cement and Concrete: Type S Masonry Cement.

G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Pigments shall not exceed 10 percent of Portland cement by weight.
2. Brick Mortar Pigment Color: As selected by Architect.
3. Precast Concrete Mortar Pigment Color: As selected by Architect.
4. Products: Subject to compliance with requirements, provide one of the following :
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.

H. Aggregate for Mortar: ASTM C 144.

I. Aggregate for Grout: ASTM C 404.

J. Water: Potable.

K. SGT Mortar: Shall conform to ASTM C-270.

2.4 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this section that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer and have at least 5/8-inch cover from face of finish brick. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
2. Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire.

D. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated .

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

F. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Heckmann Building Products Inc.; No. 75-TC Thermal Pos-I-Tie.
 - b. Anchor Section: Zinc-alloy barrel section with adjustable plastic flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing.
 - c. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch-diameter, hot-dip galvanized steel wire.

G. Dovetail Slot and Anchor

1. Dovetail Slot.
 - a. Heckmann No. 100 standard dovetail anchor slot
 - 1) Size: 1 inch (25 mm) wide by 1 inch (25 mm) deep by 5/8 inch (16 mm) throat. Metal Thickness: 22 gage
2. Dovetail Anchor
 - a. Heckman No. 103 dovetail triangle tie 12 gage clip factory assembled to a 3/16 inch diameter

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing:

1. Provide metal flashing at base of masonry walls and at steel lintels over doors, windows and louvers, as follows:
 - a. Metal Drip Edges: Fabricate from 26 gage stainless steel. Extend at least 3 inches into wall and 3/16 inch out from wall, with outer edge bent down 30 degrees.
 - b. Available Product: DA1525 by Heckman Building Products Inc.

B. Flexible Flashing: Use the following unless otherwise indicated:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.

a. Products: Subject to compliance with requirements, provide one of the following:

- 1) Advanced Building Products Inc.; Peel-N-Seal.
- 2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
- 3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall □ Flashing.
- 4) Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall □ Flashing.
- 5) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
- 6) Hohmann & Barnard, Inc.; Textroflash.
- 7) W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
- 8) Polyguard Products, Inc.; Polyguard 400.

b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

C. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is fully concealed, use flexible flashing.

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

1. Available Products:

- a. Holmann & Barnard: #NS – Closed Cell Neoprene.
- b. Wire Bond: 3000 Horizontal.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep Hole/Vent Products: Use the following unless otherwise indicated:

1. Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to

seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect from Manufacturer's full range.

- a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Hohmann & Barnard, Inc.; #343 Louvered Weep Hole.
 - 2) Williams Products, Inc.; Williams-Goodco Brick Vent.
 - 3) Wire-Bond; Louvered Weepholes.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide one of the following :
 - a. Advanced Building Products Inc.; Mortar Break II.
 - b. Mortar Net USA, Ltd.; Mortar Net, Model MN10-2.

2.9 CAVITY-WALL INSULATION

A. Extruded-Polystyrene Board Insulation 1" thick as indicated on plans: ASTM C 578, Type IV, closed-cell R-5 product extruded with an integral skin.

B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.10 MASONRY CLEANERS

H. Job-Mixed Detergent Solution: Solution of 1/2-cup dry measure tetrasodium polyphosphate (Spic and Span) and 1/2-cup dry measure laundry detergent dissolved in 1 gal. of water.

I. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available Manufacturers:
 - a. 202V Vana-Stop; Diedrich Technologies, Inc.
 - b. Sure Klean Vana Trol; ProSoCo, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that built-in items are in proper location and ready for roughing into masonry work.

4. Examine wall framing and sheathing to verify that stud locations are suitable for spacing of veneer anchors and that installation will result in a weatherproof covering.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.
2. Conceal all irregular fired stack marks.

F. Bracing Walls During Construction: It is the sole responsibility of the masonry contractor to design and provide temporary bracing of masonry walls during construction. Refer to NCMA Tek Bulletin 3-4B and applicable OSHA standards. Provide 3' vinyl construction fencing around Restricted Zones.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4- inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Tool joints in masonry to receive air barrier slightly concave, filling all joints, free of voids and lumps. Clean around ties, providing smooth surface free of mortar droppings.

H. Review requirements with the air barrier installer. Inspect completed masonry backup installation with the air barrier installer.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.5 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through insulation, air barrier, and sheathing to wall framing with metal fasteners of type indicated.
2. Embed tie sections in masonry joints. Provide not less than 1 inch of air space between back of masonry veneer and face of insulation sheathing.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally, with not less than 1 anchor for each 1.77 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

B. Anchor masonry veneers to structural masonry back-up wythe with wire ties designed to engage pintle- eye assembly incorporated in joint reinforcement.

1. Use individual adjustable metal ties installed in horizontal joints to bond wythes together. Provide ties shown, but not more than 16 inches vertically and 16 inches o.c. horizontally with not less than 1 anchor for each 1.77 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
2. Engage pintles form ties into eyes connected to joint reinforcement.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control joints in unit masonry where indicated. Provide control joints in masonry partitions at changes in wall heights, at control joints in the wall bottom support material, within 8' of wall corners or intersections for walls greater than 16', and at not less than 24' on center for straight walls. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Install control joints in veneer masonry as indicated on the drawings or, if not indicated, at a maximum spacing of 24 feet on center. Locate joints at door and window jambs inasmuch as possible.

1. Provide joints at both sides of windows and doors 6 foot wide or wider.

C. Form control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.

D. Form expansion joints in brick as follows:

1. Build in compressible joint fillers and set back from face of veneer to form open joint 3/4 inch deep and not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 92 00 Section "Sealants and Caulking."

3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Fold flashing back over itself 1/2 inch to form hem.
3. Extend flexible flashing over metal flashing through outer wythe, across air space and insulation, turned up a minimum of 8 inches and adhering to air barrier membrane.
4. Apply a continuous bead of termination mastic along rubberized-asphalt top and side edges in contact with air barrier system.
5. At lintels and shelf angles, extend flashing a minimum of 8 inches into masonry at each end. At heads and sills, extend flashing 8 inches at ends and turn up not less than 2 inches to form end dams.

C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.

D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.

1. Space vents 24 inches o.c.

3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Protect floor deck from contact with cleaner by covering with polyethylene film
5. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
6. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20 Revised, and manufacturer's printed instructions.
7. Clean concrete masonry with job-mixed detergent solution by cleaning method indicated in NCMA TEK 8-2A and as applicable to type of stain on exposed surfaces.
8. SGT units to be cleaned with a masonry detergent or as recommended by the Manufacturer.

3.11 MASONRY WASTE DISPOSAL

A. Excess Masonry Waste: Remove excess clean masonry waste and legally dispose of off Owner's property.

END OF SECTION

SECTION 05 40 00
FORMED METAL FRAMING

PART 1 - GENERAL

1.1 Description

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

- A. This Section includes non-load-bearing steel framing members for the following applications:
1.1 Interior framing systems(e.g., supports for partition walls, framed soffits, furring, etc.)
- B. Work includes all labor, materials and equipment necessary to complete metal framing as shown on the Drawings and as specified herein.

1.3 Standards

- A. Specification and installation details shall conform to the American Iron and Steel Institute's "Specifications for the Design of Light Gauge Cold Formed Steel Structural Member's" latest edition. Formed metal framing shall be manufactured and erected in accordance with the recommendations of these standards.

1.4 Quality Assurance

- B. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent agency.

1.5 Submittals

- A. Submit Complete Shop Drawings in accordance with General Conditions.
- B. Product Data: For each type of product to be installed.

PART 2 - PRODUCTS

2.1 Materials

- A. Materials to be as provided by Dietrich Metal Framing, a Worthington Industries Company; Marino Ware, Division of Ware Industries Inc.; or approved equal.
- B. All studs and accessories shall be of the type, size, steel thickness, and spacing shown on plans. Studs, bracing, track runners, and bridging shall be manufactured per ASTM spec C- 955.
- C. All galvanized studs, joists, accessories shall be formed from steel that conforms to the requirement of ASTM A 653 with a minimum yield of 50 ksi. Galvanizing shall be a minimum G-50 coating.
- E. Physical properties and allowable load capacities of members shall be developed in accordance with "AISI Specifications for the Design of Light Gauge Cold Formed Steel Structural Member's" latest edition.
- F. Fasteners:
1. Metal exterior track to metal stud– Tekpin type with a 0.109 helical knurled shank and length of 3/4" by Ramset (Installer to be certified). Or use corrosion-resistant-coated, self-drilling, self-threading steel drill screws, as recommended by steel stud manufacturer.
 2. Metal to masonry block– Corrosion-resistant-coated, self-tapping, by Tapcon or approved equal.

PART 3 - EXECUTION

3.1 Erection

- A. Connections shall be accomplished with corrosion proof fasteners.
- B. All member cuts shall be square and accurate to provide full bearing for load transfers.
- C. Studs shall be plumb, aligned, and securely attached to the flanges of webs of lower and upper tracks. Axially loaded studs shall be seated squarely in both bottom and top tracks.
- D. Where splicing of tracks is necessary between stud spacing, over lap track joint with section track and fasten properly. Studs and other structural members shall not be spliced.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

- 1.1 Summary
A. This work consists of all labor, materials and equipment necessary to complete the work as shown on the Drawings and as specified herein.
- 1.2 References
A. BOCA National Building Code, 1999 Edition.
B. American Wood Products Association (AWPA U1 Standards), 2012 Edition.
- 1.3 Workmanship
A. Only experienced personnel shall be engaged in this work.
- 1.4 Delivery, Storage and Handling
A. Deliver the materials to the job site and store in a safe area, out of the way of traffic, shored up off the ground surface and covered to protect from the weather.

PART 2 - PRODUCTS

- 2.1 Dimension Lumber
A. Dimension lumber shall be Eastern Spruce or other wood approved by the Architect and shall comply with grading requirements of the Northeastern Lumber Manufacturers Association for Common, Number 2 or better, and shall bear the grade stamp.
B. When specified on the Plans or in Part 4, stress grade structural lumber shall be provided. Stress grade lumber shall bear appropriate stamp for the specified grade and species.
C. Wood for pressure treating and special installation shall be southern yellow pine meeting the requirements of the Southern Pine Inspection Bureau (SPIB) for Number 2 or better.
D. All lumber shall not exceed 19% moisture content.
- 2.2 OSB Wall & Roof/ Floor Sheathing
A. All plywood shall be 4/5-ply minimum and shall comply with U.S. Product Standard PS-1 for softwood plywood and shall bear the specified grade and stamp of the American Plywood Association.
B. Unless otherwise shown on the Drawings, sheathing shall meet the following requirements:
- | <u>Use</u> | <u>Thickness</u> | <u>Grade</u> | <u>Glue</u> | <u>Span Rating</u> |
|-----------------------|------------------|--------------|-------------|--------------------|
| Wall Sheathing | 7/16" | Structural 1 | Exterior | 24/16 |
| Roof/ Floor Sheathing | 23/32" | ---- | Exterior | 40/20 |
| Electrical Backboard | 3/4" | BC (plywood) | Exterior | ---- |
- 2.3 Exterior Wall & Roof Sheathing
A. All exterior wall sheathing provided by Owner (sheathing donated to Northern Maine Community College by Louisiana Pacific) and installed by Contractor.
B. All roof sheathing provided by Owner (sheathing donated to Northern Maine Community College by Louisiana Pacific) and installed by Contractor.
C. Provide bridging support at all edges of sheathing. Attach wall boards using 1 3/4" galvanized nails with a 7/16" diameter head and 0.128" diameter shank, spaced 8" on center at edges and at intermediate studs.
D. Wall sheathing on exterior face to be placed with 8'-0" dimension on the horizontal and must be staggered a minimum of 16" from sheathing on the interior face. Install all boards staggered 48" on center at vertical stacked seams.

2.3 Engineered Lumber

- A. Laminated Veneer Lumber (LVL) to have a minimum size as shown on plans and designed with 2.0E (modulus of elasticity).
- B. Acceptable LVL manufacturers are:
 - 1. Boise Cascade
 - 2. Georgia-Pacific
 - 3. Approved equal
- C. Open web wood floor trusses to be designed with a live load of 100# and a dead load of 10#. Maximum depth of floor trusses to be 16", spaced at 19.2" O.C. See Floor Framing Plan.

2.4 Accessories

- A. Nails shall be new, bright, common nails of appropriate lengths and sizes to adequately join the wood. Use galvanized where exposed to weather or where shown on the Drawings.
- C. Joist hangers, framing anchors shall be 18-gauge, galvanized steel such as manufactured by Kant Sag, Simpson, or approved equivalent.
- D. Special nails shall be used where shown on the Drawings or as recommended by manufacturer.
- E. Glue shall be an all purpose sub-floor and construction adhesive, suitable for interior and exterior use, as manufactured by DAP, GE, Ohio Sealants, or approved equivalents.

2.5 Pressure Treated Lumber (P.T.)

- A. Lumber or plywood in contact with ground or fresh water shall be treated in accordance with AWWA (Standard U1) and shall be rated 0.60 retention.
- B. Lumber in direct contact with concrete, masonry, or steel, not in contact with soil or fresh water shall be treated in accordance with AWWA (Standard U1) and shall be rated 0.40 retention.
- C. Pressure treatment shall not include arsenic preservatives.
- D. Wood shall be dried after treatment.

PART 3 - EXECUTION

3.1 Preparation

- A. Carefully select individual lumber pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing.
- B. Cut out and discard defects which render a piece unable to serve its intended function.
- C. Lumber will be rejected by the Architect if it is excessively warped, twisted, bowed, mildewed or molded, as well as if it is improperly installed.

3.2 Erection

- A. All framing work shall produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. All framing and fastening shall equal or exceed HUD Minimum Property Standards, Manual of Accepted Practices and the requirements of the BOCA National Building Code.
- C. Do not shim any framing member.
- D. Install horizontal and sloped members with crown up.
- E. Do not notch, cut or bore members for pipes, ducts, conduits, or for any other reason, except as shown on the Drawings and as approved by the Architect.
- F. Bearing surfaces on which structural members rest shall provide a full, even support.
- G. Joists, rafters, trusses, and similar members shall be fastened with at least two (2) galvanized steel hangers or anchors and nailed completely.
- H. Install solid block bridging at midpoint of joists or as shown on the Drawings.
- I. Provide all shims, blocking and bracing as shown on the Drawings and as approved by the Architect to complete the work.
- J. In addition to normal framing operations, install wood blocking or backing required to support the work of other trades.

3.3 Roof, Wall, & Floor Sheathing

- A. Unless otherwise specified or approved by the Architect, install sheathing with the face grain perpendicular to framing and center joints over supports. Leave a 1/16-inch gap where adjacent panels meet.
- B. Stagger plywood joints so that all joints do not lie on the same support. Nail as shown in the recommended fastening schedule in this Section.
- C. On roofs, install metal plywood H-clips in joints between supports.
- D. On floors, plywood shall be glued at all supports and nailed as shown in the recommended fastening schedule in this Section.

3.4 Nailing

- A. Use common wire nails except as otherwise indicated. Make tight connections between members. Countersink nail heads on exposed carpentry work and fill holes.
- B. Install fasteners without splitting wood; pre-drill as required.
- C. All nailing shall comply with BOCA National Building Code, Recommended Fastening Schedule (included in this Section), unless special requirements are shown on the Drawings.

3.5 Concrete Bearing

- A. All wood which bears against concrete, earth, steel or masonry shall be pressure treated as specified on the Drawings or as approved by the Architect.

PART 4 - SUPPLEMENTAL SPECIFICATIONS

4.1 Recommended Fastening Schedule (Based on BOCA National Building Code, 1999)

<u>Building Element</u>	<u>Nail Size & Type</u>	<u>Number & Location</u>
Stud to sole plate	8d common	4 toe nail or
	16d common	2 direct nail
Stud to cap plate	16d common	2 toe nail or 2 direct nail
Double studs	10d common	12" o.c. direct
Corner studs	16d common	24" o.c. direct
Sole plate to joist or blocking	16d common	16" o.c.
Double cap plate	10d common	16" o.c. direct nail
Cap plate laps	10d common	2 direct nail
Ribbon strip, 6" or less	10d common	2 each direct bearing
Ribbon strip, 6" or more	10d common	3 each direct bearing
Roof rafter to plate	8d common	3 toe nail
Roof rafter to ridge	16d common	2 toe nail or direct nail
Jack rafter to hip	10d common	3 toe nail or
	16d common	2 direct nail
Floor joists to studs	10d common	5 direct or
(No ceiling joists)	10d common	3 direct
Floor joists to studs	10d common	2 direct
(With ceiling joists)		
Floor joists to sill or girder	8d common	3 toe nail
Ledger strip	16d common	4 each direct joist
Ceiling joists to plate	16d common	3 toe nail
Ceiling joists	10d common	3 direct nail
(laps over partition)		
Ceiling joists	10d common	3 direct nail
(parallel to rafter)		
Collar beam	10d common	3 direct

Bridging to joists	8d common	2 each direct end
Diagonal brace (to stud & plate)	8d common	2 each direct bearing
Tail beams to headers (when nailing permitted)	20d common	1 each end 4 sq.ft. floor area
Header beams to trimmers (when nailing permitted)	20d common	1 each end 8 sq.ft. floor area
1" roof decking (6" or less in width)	8d common	2 each direct rafter
1" roof decking (over 6" in width)	8d common	3 each direct rafter
1" subflooring (6" or less)	8d common	2 each direct joist
1" subflooring (8" or more)	8d common	3 each direct joist
2" subflooring	16d common	2 each direct joist
1" wall sheathing (8" or less in width)	8d common	2 each direct stud
1" wall sheathing (over 8" in width)	8d common	3 each direct stud
Plywood roof and wall sheathing (1/2" or less)	6d common	6" o.c. direct edges and 6" o.c. intermediate
(5/8" or greater)	8d common	6" o.c. direct edges and
Plywood Subflooring:		
(1/2")	6d common	6" o.c. direct edges and
	6d annular or spiral thread	10" o.c. intermediate
(5/8", 3/4")	8d common or 6d annular or spiral thread	6" o.c. direct edges and 10" o.c. intermediate
(1", 1-1/8")	10d common or 8d ring shank or 8d annular or spiral thread	6" o.c. direct edges and 6" o.c. intermediate
Built-up girders and beams	20d common	32" o.c. direct
Continuous header to stud	8d common	4 toe nail
Continuous header, two pieces	16d common	16" o.c. direct
1/2" fiber board sheathing	1-1/2" galvanized roofing nail or 6d common nail	3" o.c. exterior edge, 6" o.c. intermediate
25/32" fiber board sheathing	1-3/4" galvanized roofing nail or 8d common nail	3" o.c. exterior edge 6" o.c. intermediate
Gypsum sheathing	12 gage 1-1/4" large head corrosion resistive	4" o.c. on edge, 8" o.c. intermediate
Shingles, wood*	No. 14 B&S Gage corrosion resistive	2 each bearing
Weather boarding	8d corrosion resistive	2 each bearing

*Shingle nails shall penetrate not less than 3/4 inch into nailing strips, sheathing or supporting construction except as otherwise provided in Sections 2104.4 and 2305.1 of the BOCA Code.

END OF SECTION

SECTION 06 19 00
WOOD TRUSSES

PART 1 - GENERAL

1.1 Summary

- A. Work Included: Provide wood roof trusses where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 1 of these Specifications.
 - 2. Section 06 10 00 - Rough Carpentry.

1.2 Quality Assurance

- A. Truss fabrication and installation shall comply with the requirements and recommendations of the following Truss Plate Institute (TPI) publications:
 - 1. "Design Specification for Metal Plate Connected Wood Trusses".
 - 2. "Commentary and Recommendations for Handling and Erecting Wood Trusses".
 - 3. "Commentary and Recommendations for Bracing Wood Trusses".
 - 4. "Quality Control Manual".
- B. Trusses and metal truss connector plates shall be manufactured by a firm which practices a quality control program comparable to the TPI "Quality Control Manual".
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 Submittals

- A. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit to the Architect:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings showing species, sizes, and stress grades of lumber proposed to be used; pitch, span, camber configuration, and spacing of trusses; connector type, thickness, size, location, and design value; and bearing details.
 - 4. Submit two (2) copies of shop drawings showing types and sizes of metal tie down anchors and any other accessories.
 - 5. These submittals shall be provided on Shop Drawings signed and stamped by a structural Engineer licensed to practice in the State of Maine.

1.4 Delivery Storage and Handling

- A. Handle and store trusses with care and in accordance with manufacturer's instructions and TPI recommendations, to avoid damage from bending, over-turning, or other cause for which trusses are not designed to withstand.
- B. Time delivery and erection of trusses to avoid extended on-site storage.

PART 2 - PRODUCTS

2.1 Wood Trusses

- A. Design wood trusses for loads required by current codes or if more stringent- as shown on the Drawings. Modify the trusses at chimneys, attic access locations, and other openings as required .

- B. Fabrication:
 - 1. Cut truss members to accurate lengths, angles and sizes to produce close fitting joints with proper wood-to-wood bearing in assembled units.
 - 2. Connect truss members by means of metal connector plates accurately located and securely fastened to wood members.
- C. Lumber:
 - 1. All lumber used in the fabrication of wood trusses shall not exceed 19% moisture content.

2.2 Permanent Bracing

- A. Provide 2x diagonal bracing of vertical truss members and continuous lateral bracing of intermediate truss members as shown on Shop Drawings, Structural Drawings, and as approved by the Architect. Also note the requirement of added "X" bracing at two (2) locations along center vertical truss member in attic as shown on the Roof Framing Plan.

2.3 Other Materials

- A. Provide other materials, not specifically described but required for a complete and proper installation, subject to the approval of the Architect.

2.4 Metal Tie Down Anchors and Hangers

- A. Provide metal tie down anchors and hangers that are nailed to the truss bottom chord, top wall plate and wall stud.
- B. Acceptable Products:
 - 1. Simpson Strong Tie
 - 2. Kant-Sag
 - 3. Approved equivalents

PART 3 - EXECUTION

3.1 Surface Conditions

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 Installation

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, and recommendations of the manufacturer and the Truss Plate Institute, as approved by the Architect, anchoring all components firmly into position.
 - 1. Hoist the trusses into position with proper bracing secured at Truss Manufacturer's designated lifting points.
 - 2. Exercise care to keep bending of trusses to a minimum.
 - 3. Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing is installed.
 - 4. Install permanent bracing and related components prior to application of loads to trusses.
 - 5. Anchor trusses securely at all bearing points and install metal tie down anchors as shown on the Drawings or specified elsewhere.
 - 6. Restrict construction loads to prevent over stressing of truss members.
 - 7. Do not cut or remove truss members in the field without approval of Architect and truss manufacturer.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 - GENERAL

1.1 Summary

- A. This work shall include all labor, materials and equipment necessary to complete the finish carpentry work which includes wood trim and cabinetry that is exposed to view and is non-structural, as shown on Drawings and as specified herein.

1.2 Submittals

- A. The Contractor shall submit samples of all materials to be used to the Architect fifteen (15) days prior to incorporation into the work. All materials shall be approved by the Architect.

1.3 Quality Assurance

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. All work shall meet Architectural Woodworking Quality Standards Institute.

1.4 Delivery, Storage and Handling

- A. Protect finish carpentry materials during transit, delivery, storage, and handling to prevent damage, soiling and deterioration.
- B. Do not deliver finish carpentry materials to the site until operations that could damage the woodwork have been completed in installation areas.

PART 2 - PRODUCTS

2.1 Plywood

- A. Plywood for unexposed work such as shelves shall be Grade A-B Interior and conform to requirements of the American Plywood Association. Thickness and size shall be as shown on Drawings.
- B. MDO plywood to be of the size and thickness shown on plans.
- C. Plywood for built-in cabinets, doors and other uses such as exposed shelving shall be natural oak veneer Grade A-2. Thickness shall be as shown on Drawings.

2.2 Finish Lumber, Wood Trim, Wood Moldings

- A. Finish lumber and wood trim shall be NELMA Common Finish Grade Eastern White Pine or other wood approved by the Architect. Wood moldings shall be NELMA D select or better. Finish lumber shall be free of knots, pitch pockets, dark streaks and other objectionable defects. Provide the sizes, thicknesses and dimensions as shown on Drawings or as specified herein.

2.3 Counter top and Window Sill

- A. Counter top for base cabinet and other locations to be pre-molded by Formica or approved equal with 4" backsplash where shown on interior elevations. Colors to be selected by Owner. Finish face of counters to be 1 1/2".
- B. Window sill to be one piece 1" thick face- Classic Profile by Sill-Rite solid surface vinyl. Color to be white.
- C. Secure counter top and window sill according to manufacturer's recommendations and requirements.

2.3 Fasteners

- A. Screws shall be brass or brass-plated wood screws of the size and type appropriate to the work.

- B. Nails:
 - 1. Finish nails of the appropriate size shall be used on all finish work and wood trim.
 - 2. Finish nails shall be 4d, 6d, or 8d (or other sizes as appropriate), coated or galvanized for interior work.

2.4 Hardware

- A. Hardware shall be high quality and of the material type, size and finish as shown on Drawings or specified herein.
- B. Acceptable Manufacturers:
 - 1. Sargent
 - 2. Schlage
 - 3. Yale
 - 4. Amrock
 - 5. Liberty
 - 6. Approved equivalent
- C. Provide submittal of cabinet hardware to Architect for hinge, catch, door and drawer pull for style selection by Owner thirty (30) days prior to incorporation into the work.

2.5 Glue

- A. Glue shall be high quality wood bonding agents such as Elmers' Weldwood or other approved products.
- B. Butt joints of Azek trim to be secured with PVC glue.

2.6 Molding

- A. Unless otherwise shown, all wood door and window with wood frames to have wood trim 3/4" x 3-1/2" clear pine and have the same profile as shown on the Drawings. All wood trim to be paint finished. See Trim Details on drawings.
- B. Corner boards 5 1/2" wide, fluted, with foam filled centers Super Corners without surface nails. See Exterior Corner Detail and Exterior Elevations.

2.7 Vinyl Soffits

- A. Double 5" Perforated, white finish, .044 thickness, 6.2 square inches/ square foot net free air.
- B. Acceptable Manufacturers:
 - 1. Georgia-Pacific
 - 2. Certain Teed
 - 3. Approved equivalent

PART 3 - EXECUTION

3.1 Preparation

- A. Back prime lumber for painted finish exposed on the exterior (soffits, fascia) or to moisture and high relative humidity on the interior (bathroom, laundry trim, etc.).

3.2 Installation

- A. Discard units of material which are unsound, warped, bowed, twisted, or which are of defective manufacture with respect to surfaces, sizes, or pattern.
- C. Install the work plumb, level, true and straight with no distortions.
- D. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood. On exposed work, set nails for putty.

END OF SECTION

SECTION 06 41 20
CABINETS AND COUNTER TOPS

PART 1 - GENERAL

1.1 Summary

- A. This work includes all labor, materials and equipment necessary to install cabinets and counter tops as shown on the drawings and as specified herein.

1.2 Submittals

- A. Contractor shall submit three (3) copies of shop drawings and samples of all cabinets, counter tops, and hardware to the Architect for selection and approval thirty (30) days prior to installation. Contractor shall be responsible for field verifying all measurements before ordering cabinets. Samples shall be submitted with manufacturers specifications for approval and color selection. All materials and colors shall be selected and approved by the Architect and Owner.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

- A. Merillat - Classic, maple
- B. Sutton Cliffs Square doors
- C. Blum Tandem Plus
- D. Approved equivalents

2.2 Cabinets

- A. All cabinets shall be of the size, type and style as shown on the interior elevation drawings.
- B. Drawer mounts to be undermount with quiet shut style guides
- C. Cabinets shall be installed complete with hardware approved by the Architect.
- D. All cabinets shelving shall be adjustable.
- E. Cabinets shall be sturdily constructed with provision for installing adjacent cabinets flush and true to match.
- F. Hardware shall be prefinished metal handles, 2 1/2" long, installed on all doors, drawers, and as approved by Owner. Drawer glides shall have concealed, neoprene roller system with latched stops.
- G. Color to be selected by Owner.

2.3 Counter tops

- A. Counter tops shall be of the size and profile as shown on the drawings.
- B. Preformed counter tops in break room, and other locations shall have integral back splash with continuous curved laminated plastic covering by Formica or approved equivalent.
- C. Wall surfaces in break room, which are to be covered with laminated plastic shall receive Formica Brand or approved equivalent finish. Laundry Room to have all walls finished from floor to 6'-0" above floor with Melamine wall finish over MRGWB wall sheathing.
- D. All colors to be selected by Owner.

2.4 Adhesives and Accessories

- A. Use non-toxic adhesives for plastic laminate as approved by the laminate manufacturer and Architect.
- B. Provide matching face and end plates at exposed locations and any other necessary matching trim to complete the work.

PART 3 - EXECUTION

3.1 Preparation

- A. Insure that all surfaces to receive cabinets or counter tops are properly prepared.
- B. Provide necessary shims, blocking, etc., to securely attach cabinets and counter tops.

3.2 Installation

- A. Follow manufacturer's recommendations and Architect's plans.
- B. Install all units plumb, level, straight and snugly fitted together.
- C. Take care not to damage prefinished units. Defects in surface finish such as hammer marks, scratches, chips, etc., which cannot be repaired to the satisfaction of the Architect shall be rejected and replaced at no cost to the Owner.

3.3 Cleanup and Protection

- A. Clean all units and adjacent areas of dirt, glue, debris and other objectionable materials.
- B. Protect cabinets and counter tops and other finished surfaces until accepted by Owner.

END OF SECTION

SECTION 07 21 00
BUILDING INSULATION

PART 1 - GENERAL

1.1 Summary

- A. This work includes all labor, materials and equipment necessary to insulate building and appurtenances as shown on the plans and as specified herein.
- B. Related work: Cast- in- Place Concrete, Section 03 30 00, insulation.

1.2 Submittals

- A. Contractor shall furnish Architect satisfactory identification of "R" value for all insulation being installed.

PART 2 - PRODUCTS

2.1 Fiberglass Batts

- A. Batts for walls and ceilings and other applications shall be fiberglass and of the thickness and "R" value specified on the plans and of suitable dimensions to fit tightly between studs, roof trusses, or joists.
- B. Batt facing shall be Kraft faced on insulation adjacent to gypsum wall board.
- C. Acceptable manufacturers are Owens-Corning, Certain-Teed, or as approved by the Architect.

2.2 Rigid Insulation

- A. Extruded Polystyrene Plastic Foam Board:
 - 1. "R" value of at least 5 per inch at 40F mean temperature.
 - 2. Closed cell type foam board.
 - 3. Approved Manufacturers:
 - a. Dow (Styrofoam Board, SM or TG)
 - b. Owens Corning Foamular
 - c. Other approved by Architect
- B. Polyisocyanurate Foam Board:
 - 1. Aged product "R" value of 7 per inch at 40F mean temperature.
 - 2. Acceptable Manufacturers:
 - a. NRG Barriers
 - b. Celotex-Thermax
 - c. Approved equivalent

2.3 Blown Insulation

- A. Loose fill, blown insulation shall be installed in thickness required as shown on the Drawings. Install blown insulation over fiberglass insulation in attic as shown on plans.
- B. Acceptable Manufacturers:
 - 1. Certain Teed - Insul-Safe II
 - 2. Manville - blowing wool
 - 3. Approved equivalent

2.4 Mineral Wool & Sound Insulation

- A. Mineral wool and sound insulation shall be 3" thick Safe'n' Sound installed where shown on the Drawings.
- B. Acceptable Manufacturers:
 - 1. Roxul
 - 2. Approved equal

2.5 Sill Insulation

- A. Insulation strips shall be installed between all wood sill plates and concrete, and at any other

- location shown on the drawings.
- B. Insulation strips shall be 1/4" x 5-1/2" styrofoam as manufactured by Dow, "Sill Seal", or approved equal.

2.6 Insulation Baffles

- A. Insulation baffles shall be corrugated polystyrene, Accuvent Soffit Ventilation System, plywood and blocking or rigid insulation and blocking as shown on the Drawings or as approved by the Architect.

2.7 Vapor Barriers

- A. Use 6 mil poly on warm side of stud walls and directly under gypsum wallboard sheathing with unfaced batts as a substitute for Kraft faced batts.
- B. Use an air barrier such as Tyvar and unfaced batt insulation in attic as a substitute for Kraft faced batts in ceilings. No poly vapor barrier shall be installed in ceilings.

PART 3 - EXECUTION

3.1 Installation

- A. Installation shall be in accordance with manufacturers recommendations.
- B. Insure tight fit of all batts and rigid insulation.
- C. Apply spray foam insulation by DAP tex brand, Great Stuff, or approved equal to fill all irregular crevices and cavities. Follow manufacturers recommendations and instructions completely. Apply where shown on the Drawings and /or where approved by the Architect.
- D. Install insulation baffles as shown on the Drawings and so as to not obstruct the ventilation flow from soffit to ridge vent or louvers. If not shown otherwise on the Drawings, a minimum of 2" clear air space above insulation shall be maintained at the eaves.

3.2 Cleanup

- A. Remove all excess material and debris from site.
- B. Repair all tears in Kraft faced insulation with approved tape.

END OF SECTION

SECTION 07 31 00
ASPHALT SHINGLES AND FLASHING

PART 1 - GENERAL

1.1 Summary

- A. This work consists of all labor, materials and equipment necessary to complete Roofing and Flashing as shown on the drawings and as specified herein.

1.2 Submittals

- A. The Contractor shall submit samples of all roofing materials to the Architect for review and color selection. Samples shall be accompanied by a label or certification. Provide three (3) copies of product information.

PART 2 - PRODUCTS

2.1 Organic Based Asphalt Shingles

- A. Organic based asphalt shingles shall be heavyweight, laminated, architectural shingles, 12" x 36", mineral surface, self-sealing shingles. All shingles shall have a UL Class C rating for fire and wind resistance, and a 30 year warranty.
- B. Shingles shall be CertainTeed, GAF/ ELK, Owen's Corning, or approved equivalent.

2.2 Drip Edge

- A. Drip edge shall be .032 aluminum, 8-inch wide with preformed double lip shape installed on all eaves and rakes.

2.3 Roofing Felt Underlayment

- A. Roofing felt shall be standard 15 pound asphalt saturated felt paper, CertainTeed WinterGuard ShingleFelt 30, Typar Roof Wrap 30, or approved equal.
- B. Ice & Water Shield to be installed from eave up 6'-0" along roof slope and continuous from rake overhang to rake overhang or to wall. Also install Ice & Water Shield in all valleys up 6'-0" from valleys (on both sides of valley) and from eave to wall.

2.4 Roofing Nails

- A. Roofing nails shall be 12-gauge, hot dipped, galvanized (3/8") large head roofing nails of appropriate length to provide at least 3/4" penetration of roof sheathing. Nails shall be at least 1-1/4" inch long. Install five (5) nails minimum per shingle unless otherwise approved by Architect. Staples are not acceptable.

2.5 Flashing

- A. Unless otherwise shown on the Drawings, metal flashing shall be 24-gauge galvanized steel or aluminum of 0.032 thickness subject to approval of the Architect.

2.6 Ice and Water Shield

- A. Ice and water shield shall be self-adhering, 40 mil. (minimum) thickness, with a minimum membrane tensile strength of 250 psi.
- B. Acceptable manufacturers:
- A. Certain Teed - WinterGuard
 - B. W.R. Grace & Co. - Bituthene
 - C. Approved equivalents.

2.7 Ridge Ventilation

- A. Ridge vent shall be a shingle - over style, crush proof polypropelene with 13.4 square inches of free air per lineal foot above office, main entry areas.
- B. Ridge vent shall be Cor-a-Vent V-600 or approved equivalent ridge vent.
- C. Building Contractor to provide and install Roof Ventilators on building ridge above shop, storage spaces where shown on the Exterior Elevations. Roof Ventilators to be Model #301-24, bronze in color, by Ventilation Maximum Ltd., 9229 Pierre Bonne, Montreal, Canada.
(www.ventilation-maximum.com)

PART 3 - EXECUTION

3.1 Installation

- A. Unless otherwise shown on the Drawings, Ice and Water Shield shall be installed in 6' wide strips at all eaves and in all valleys, and 3' wide along all rakes. Ice and water shield shall be installed in strict accordance with manufacturer's recommendations.
- B. Install drip edge at eaves, rake, under underlayment and shingles at eaves and over underlayment at rake.
- C. Lap roofing underlayment at all edges at least 2 inches for roof pitches of 4 in 12, or steeper.
- D. Install asphalt shingles 5 inches to the weather, following manufacturer's recommendations completely. Provide starter course over drip edge at eave. Use at least 5 nails per shingle.
- E. Place roofing cement under tabs of starter course to insure adhesion. Also place spots of roofing cement along all rakes to prevent wind uplift.
- F. Install ridge vent in accordance with manufacturer's recommendations.

3.2 Flashing

- A. Install flashing as shown on the drawings and specified herein.
- B. Caulk all joints of roof penetrations not otherwise sealed with silicone sealant.
- C. Solder all seams in galvanized metal with lead free solder or lap so as to prevent water migration to the interior of the building.
- D. Take care not to damage flashing provided by and installed by other trades or divisions of work, such as vent stack, air intake curb, chimneys, etc.
- E. Replace damaged flashing occurring or noted during installation of roof shingles.

END OF SECTION

SECTION 07 46 00
SIDING

PART 1 - GENERAL

1.1 Summary

- A. This work shall consist of all labor, materials and equipment necessary to install siding as shown on the Drawings and as specified herein.

1.2 Submittals

- A. The Contractor shall provide the Architect with samples of all types and colors of siding to be used on the Project prior to installation. All siding and colors shall be reviewed by the Architect. Provide three (3) copies of product information fifteen (15) days prior to incorporation into work.

PART 2 - PRODUCTS

2.1 Vinyl Siding

- A. Siding shall be vinyl Insulated Double 6" horizontal lap with .044" thickness unless otherwise specified.
- B. Acceptable Manufacturers:
1. Certain Teed Cedar Boards, double 6" exposure
 2. Georgia-Pacific Caliber, double 6" exposure
 3. Approved equivalent
- C. Fasteners as recommended by manufacturers written instructions. Siding over 1" rigid insulation.
- D. Fasteners shall be furnished in longer lengths where required to penetrate into secure framing.

2.3 Underlayment

- A. Underlayment shall be Tyvar building wrap or approved equivalent.

2.4 Water Table Trim

- A. Install 3/4"x 6" Azek water table trim at base of siding. Cover top of water table with .032 aluminum drip edge prior to installing siding.

2.5 Corner Boards & Freeze Board

- A. Install 1/2" MDO plywood where indicated in Exterior Elevations and/ or Wall Details.
- B. See Section 06 20 00 Finish Carpentry Part 2.2.6.B for corner boards. Corner Boards to be white.
- C. Cover pine freeze boards with prefinished coil stock. Confirm color shad with Owner before installing.

2.6 Thin Brick

- A. Adhere lightweight brick to rigid insulation on exterior of building where indicated on Exterior Elevations with mortar joints.
- B. Acceptable Manufacturers:
1. Cultured Brick by Cultured Stone
 2. Brick by Ply Gem
 3. Approved equivalent

PART 3 - EXECUTION

3.1 Preparation

- A. Ensure that surface under siding is secure and ready for siding installation.
- B. Install building wrap where indicated - overlapping at least 2 inches at all joints.

3.2 Installation

- A. Install exterior wall finish according to manufacturer's written instructions and with high quality workmanship. Keep finish level and plumb.
- B. Install corner trim, fascia, soffits, etc., securely.
- C. Nail siding so as to allow some movement due to temperature changes.
- D. Install caulking where required to insure water tightness of entire wall.

3.3 Quality Control

- A. Remove and replace any defective materials or incorrectly installed materials at no cost to Owner.
- B. Clean up and remove excess materials from the site. Clean all siding after installation.
- C. Provide Owner with 100 linear feet of siding for future use.

END OF SECTION

SECTION 07 92 00
SEALANTS AND CAULKING

PART 1 - GENERAL

- 1.1 Summary
- A. Provide all labor, materials and equipment to complete sealing and caulking as shown on the drawings and as specified herein.
- 1.2 Scope of Work
- A. Sealing and caulking shall be performed on all exterior joints including but not limited to:
1. Around door, frames and windows.
 2. Joints around wall, ceiling and penetrations such as electrical boxes, pipes, etc.
 3. Joints between dissimilar building materials such as brick and wood, wood and metal, etc., where water might enter.
- B. Interior caulking of all wall, floor, and ceiling penetrations.
- C. Sealing of concrete joints is covered in Section 03 30 00 Cast -In-Place Concrete.
- 1.3 References
- A. All sealants and caulking shall comply with ASTM C920, Standard Specification for elastomeric joint sealants.

PART 2 - PRODUCTS

- 2.1 Exterior Caulking
- A. Exterior caulking between prefinished surfaces shall be a one component silicone joint sealant; "Spectrum 1" by Tremco Sealant Systems, Dow Corning "795 Silicone Building Sealant", or approved equivalent.
- B. Exterior caulking for use on paintable surfaces shall be an acrylic latex joint sealant; "Tremco Acrylic Latex Caulk", Bostik "Chem-Caulk 600", or approved equivalents.
- 2.2 Interior Caulking
- A. Interior caulking for bedding electrical boxes, outlets, pipes or other wall penetrations and around interior doors, frames and windows shall be a non-hardening sealant; "Tremco Acoustical Sealant", Bostik "Chem-Caulk 600", or approved equivalents.
- B. Interior caulking for penetrations through fire walls or smoke barriers such as conduits, pipes and ducts shall be a one component fire resistant caulk or putty; 3M Fire Barrier Caulk "CP25" or Putty "303", or approved equivalents.
- 2.3 Joint Filler
- A. Joint filler for backing caulking shall be non-absorbent precompressed foam sealant; "Will-Seal 150", by Will-Seal Construction Foams, "York-Seal 100" by York Manufacturing, Inc., or approved equivalents.

PART 3 - EXECUTION

- 3.1 Preparation
- A. All joints and spaces to be caulked shall be dry, clean and free from dust and loose materials.
- B. If necessary mask or otherwise protect adjacent surfaces.
- 3.2 Installation
- A. All sealants and caulking shall be installed according to the manufacturer's recommendations.
- B. Caulking shall be applied with suitable equipment such as with a caulking gun.

- C. Use foam backing for joints deeper than ½-inch. Pack into joint allowing at least 1/4-inch for caulking.
- D. Caulking shall be applied so that surfaces are slightly concave, tight and smooth. Joints shall be air and water tight.
- E. Caulk or putty around fire and smoke wall penetrations shall be applied so as to provide a complete fire barrier sealing system.
- F. Remove excess caulking and clean adjacent surfaces with approved cleaners.

END OF SECTION

SECTION 08 11 00
METAL DOORS AND FRAMES

PART 1 - GENERAL

- 1.1 Summary
A. This work shall include all labor, materials and equipment necessary to complete the work as shown on the drawings and as specified herein. Door schedule is shown on Drawings.
- 1.2 Submittals
A. Contractor shall submit three (3) copies of shop drawings to the Architect 15 days prior to installation. Only door and hardware for which there are reviewed shop drawings shall be incorporated into the work.
- 1.3 Quality Assurance
A. Only experienced skilled workers shall be engaged in this work.
- 1.4 Delivery Storage and Handling
A. Deliver door units and all necessary equipment in manufacturer's unopened containers.
B. Store materials in a protected area to prevent damage.
C. Protect door and equipment during and after installation from damage including splashing or the accumulation of paint, concrete, mortar, or other foreign material.

PART 2 - PRODUCTS

- 2.1 Acceptable Manufacturers
A. Amweld
B. Curries MFG
C. Steelcraft
D. Karona
E. Hagar
F. LCN
G. Sargent Lock Co.
H. Stanley
I. McKinney
J. Medeco
K. Approved equivalents
- 2.2 Metal Doors
A. New metal door and frames shall be paintable primed steel unit. Door shall be flush 1-3/4 inches in thickness, with molded polystyrene core insulation and of the size as shown on the drawings and as specified herein. New exterior door and frame shall be minimum 18 or 16 gauge steel conforming to ASTM 525. Exterior door slab shall be insulated to provide an R value of 10 or better and constructed with thermal break between panels; reinforced for door hardware including door closer.
B. Exterior door units shall be complete with metal frame, HC sill, weatherstripping, and hardware including door closer and lockset.
- 2.3 Glass
A. Tempered insulated safety glass shall be used in door units.
B. Install glass with glazing tape and trim below bead.

- 2.4 Door Hardware
- A. Door hardware shall be equivalent to Sargent key-in lever cylindrical locks or approved equal.
 - B. All hardware shall be lever-style handles with a stainless steel finish.
 - C. Hinges shall be full mortise type, 4" x 4", concealed ball bearing, stainless steel, three (3) per door, equivalent to Hager Tri Con Hinges #BB800.
 - D. Door stops shall be as manufactured by H.B. Ives, wall mounted #65 door stop, aluminum finish.
 - E. Door closer shall be equivalent to LCN.1460T with DS cover
 - F. All locking cylinders by Medeco with **no substitution** allowed. Keyed by Owner.
 - G. See Hardware Schedule on drawings.
- 2.6 Weatherstripping and Thresholds
- A. Acceptable Manufacturers:
 - A. National Guard Products, Inc.
 - B. Recse
 - C. Approved equivalents.
 - B. Head and jamb weatherstripping bulb vinyl gasket, equivalent to National Guard Products #160V.
 - C. Door bottom seal shall be equivalent to National Guard Products surface mount vinyl sweep 102.
 - D. Aluminum HC thresholds shall be installed on exterior door unit. Thresholds shall be flush with adjacent structures and meet ANSI 117.1 maximum ½" at 2:1 slope. Thresholds shall be equivalent to National Guard Products, Thermal Barrier Thresholds #8426.

PART 3 - EXECUTION

- 3.1 Doors and Frames
- A. Install units as listed in Door Schedule and in compliance with the manufacturer's specifications and as approved by Architect.
 - B. Frames must be rigid and present a neat appearance.
 - C. Frames must be installed with not less than three wall anchors per jamb and an anchor to the floor at each jamb.
 - D. Anchors for metal doors shall be at least 18-gauge steel.
 - E. Install unit plumb, level, straight and snugly fitted.
 - F. Take care not to damage units. Defects in surface finish such as hammer marks, scratches, chips, etc., shall be repaired to the satisfaction of the Architect and Owner.
 - G. Insure that door unit is not put under strain which may cause breakage of glass or door binding.
- 3.2 Hardware
- A. Install hardware on door as listed on plans in Door Hardware Schedule and as specified herein.
 - B. Install doorstops for all doors at heights recommended by the manufacturer.
 - C. Provide necessary shims and blocks to properly install units.
- 3.3 Finish
- A. Paint factory primed doors as shown in Finish Schedule of the Specifications, Section 09 91 00.
 - B. All colors and products to be approved by the Architect.
- 3.4 Cleanup and Protection
- A. Clean all doors completely. Wash all windows with Windex or other approved glass cleaner.
 - B. Protect all door units, replacing any breakage or defective parts at no additional cost to Owner, until accepted by Owner.

END OF SECTION

SECTION 08 14 00
WOOD DOORS

PART 1 - GENERAL

- 1.1 Summary
- A. This work shall include all labor, materials and equipment necessary to complete the work as shown on the drawings and as specified herein. Door schedule is shown on the Drawings.
- 1.2 Submittals
- A. Contractor shall submit three (3) copies of shop drawings to the Architect at least 15 days prior to installation. If factory finished wood doors are to be incorporated into work, provide samples of factory finish options for Owner selection of finish. Only doors for which there are reviewed shop drawings shall be incorporated into the work.
- 1.3 Quality Assurance
- A. Only experienced skilled workmen shall be engaged in this work.
- 1.4 Delivery Storage and Handling
- A. Deliver doors and all necessary equipment in manufacturer's unopened containers.
- B. Store materials in a protected area to prevent damage.
- C. Protect doors and equipment during and after installation from damage including splashing or the accumulation of paint, joint compound, or other foreign material.

PART 2 - PRODUCTS

- 2.1 Acceptable Manufacturers
- A. Jeldwen Solid Wood Block Core with hardwood edge strips
- B. Medeco locksets
- C. Hager hinges
- D. Amweld slip on frames
- E. Approved equivalents
- 2.2 Wood Doors and Frames
- A. Wood doors shall be solid core Oak wood doors, 1-3/4" thick, of the sizes and type as shown on the drawings and as specified herein.
- B. Frames shall be 18 gauge steel with a minimum of 3 drywall anchors in each side jamb.
- C. Doorstops, latches, doorknobs, hinges, fasteners, etc., for all doors installed shall be provided by the Contractor.
- D. See Door Schedule on the Drawings.
- 2.3 Door Hardware
- A. Door hardware shall be Medeco key-in lever cylindrical locks, keyed alike and to match master key system. Locksets keyed by Owner.
- B. All hardware shall be lever-style handles with a stainless steel finish.
- C. Hinges shall be full mortise type, 4" x 4", concealed ball bearing, stainless steel, three (3) per door, equivalent to Hager Tri Con Hinges #BB800.
- D. Door stops shall be as manufactured by H.B. Ives, wall mounted #65 door stop, stainless steel finish.
- E. Door closers shall be equivalent to LCN.1460T with DS cover.
- F. See Hardware Schedule on Drawings.

PART 3 - EXECUTION

3.1 Doors and Frames

- A. Install units in compliance with the manufacturer's specifications and as approved by Architect.
- A. Frames must be rigid and present a neat appearance.
- B. Frames must be installed with not less than three drywall anchors per side jamb and an anchor to the floor at each side jamb.
- C. The partition shall enter the frame so that the two work as a unit.
- D. Install all units plumb, level, straight and snugly fitted.
- E. Take care not to damage prefinished units. Defects in surface finish such as hammer marks, scratches, chips, etc., shall be repaired to the satisfaction of the Architect and Owner.
- F. Insure that doors are not put under strain which may cause breakage of glass or binding.

3.2 Hardware

- A. Install hardware on all doors as listed on plans in Door Hardware Schedule and as specified herein.
- B. Install doorstops for all doors at heights recommended by the manufacturer.
- C. Provide necessary shims and blocks to properly install units including door closers and door stops.

3.3 Finish

- A. Paint all doors as shown in Finish Schedule of the Specifications, Section 09 91 00.
- B. All colors to be selected and approved by the Owner.

3.4 Cleanup and Protection

- A. Clean all doors completely.
- B. Protect all door units, replacing any damaged or defective parts until accepted by Owner.

END OF SECTION

SECTION 08 41 00
ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

- 1.1 Summary
A. This work shall include all labor, materials and equipment necessary to complete the work as shown on the drawings and as specified herein. Door schedule shown on the Drawings.
- 1.2 Submittals
A. Contractor shall submit three (3) copies of shop drawings to the Architect at least 15 days prior to installation. Only doors for which there are reviewed shop drawings shall be incorporated into the work.
- 1.3 Quality Assurance
A. Only experienced skilled workers shall be engaged in this work.
- 1.4 Delivery Storage and Handling
A. Deliver doors and all necessary equipment in manufacturer's unopened containers.
B. Store materials in a protected area to prevent damage.
C. Protect doors and equipment during and after installation from damage including splashing or the accumulation of paint, concrete, mortar, or other foreign material.

PART 2 - PRODUCTS

- 2.1 Acceptable Manufacturers
A. Tubelite
B. Vistawall
C. Kawneer
D. Embassy
E. Medeco
F. Sargent
G. Approved equivalents
- 2.2 Glass
A. Tempered insulated safety E-4 glass shall be used in all door and window lights of the entire unit.
B. Install glass with glazing tape and trim below bead.
- 2.3 Door Hardware
A. Door panic hardware shall be equivalent to Sargent 90 Series, stainless steel touchbar with standard pull handle on outside.
B. All hardware shall be a stainless steel finish.
C. Hinges shall be full mortise type, 4" x 4", concealed ball bearing, stainless steel, three (3) per door, equivalent to Hager Tri Con Hinges #BB800.
D. Door closer shall be equivalent to Tubelite P4040.
E. Locking cylinder by Medeco with no substitution allowed. Keyed by Owner.
F. See Hardware Schedule on Drawings.
- 2.4 Weatherstripping and Thresholds
A. Acceptable Manufacturers:
1. National Guard Products, Inc.
2. Reese
3. Approved equivalents.

- B. Head and jamb weatherstripping shall be bulb vinyl gasket, equivalent to National Guard Products #160V.
- C. Door bottom seal shall be equivalent to National Guard Products and surface mount nylon brush gasket #D608DKB.
- D. Aluminum thresholds shall be installed at exterior doors. All thresholds shall be flush with adjacent structures and meet ANSI 117.1 maximum 1/2" at 2:1 slope. Thresholds shall be equivalent to National Guard Products, Thermal Barrier Thresholds #8426.

PART 3 - EXECUTION

3.1 Doors and Frames

- A. Install units in compliance with the manufacturer's specifications and as approved by Architect.
- B. Frames must be rigid and present a neat appearance.
- C. Frames must be installed with not less than three wall anchors per jamb and an anchor to the floor at each jamb and have extra support for each door closer at head jamb.
- D. Install all units plumb, level, straight and snugly fitted.
- E. Take care not to damage prefinished units. Defects in surface finish such as hammer marks, scratches, chips, etc., shall be repaired to the satisfaction of the Architect and Owner.
- F. Insure that doors are not put under strain which may cause breakage of glass or binding.
- G. Sealant around door unit to be neutral in color or match unit color and be as indicated in Section 07 92 00 Sealants and Caulking.

3.2 Hardware

- A. Install hardware on all doors as listed on plans in Door Hardware Schedule and as specified herein.
- B. Provide necessary shims and blocks to properly install units.

3.3 Finish

- A. All aluminum doors and window frames as shown in Door Schedule to be prefinished bronze.
- B. All products and colors approved by Architect and Owner.

3.4 Cleanup and Protection

- A. Clean all doors completely. Wash all windows with Windex or approved glass cleaner.
- B. Protect all door units, replacing any breakage or defective parts until accepted by Owner.

END OF SECTION

SECTION 08 54 13
WINDOWS

PART 1 - GENERAL

- 1.1 Summary
- A. This work shall include all labor, materials and equipment necessary to install windows and accessories as shown on the drawings and as specified herein.
- 1.2 Submittals
- A. Contractor shall furnish three (3) copies of shop drawings for all windows to the Architect for review 15 days prior to incorporation into the work.
 - B. Only reviewed materials shall be incorporated into the work.

PART 2 - PRODUCTS

- 2.1 Exterior Wall Windows
- A. Acceptable Manufacturers:
 - 1. Anderson A-Series with grilles between glass top sash only.
 - 2. Marvin Integrity Ultrex with grilles between glass top sash only.
 - 3. No other approved equivalents for bid purposes.
 - 4. See Exterior Elevations and Window Schedule.
 - B. All windows shall be double glazed, low-E4 with Argon insulate glass with screens, where units are operable.
 - C. Windows shall be complete with all hardware, weatherstripping, and mounting flanges.
 - D. All windows shall be complete with necessary operating hardware.
 - E. Frames and sashes shall be white fiberglass or fiberglass composite covered wood on exterior and prefinished white on interior.
 - F. Mull multiple units together vertically (side by side) where indicated in Window Details and Window Schedule.
- 2.2 Interior Windows
- A. Interior windows to be 1/4" safety glass with metal frames to match primed metal door frames. See Window Schedule.

PART 3 - EXECUTION

- 3.1 Preparation
- A. Follow manufacturer's recommendations for installation for all window units.
 - B. Provide necessary flashings, shims and blocking required to properly install windows.
- 3.2 Installation
- A. Follow manufacturer's recommendations for installation for all window units.
 - B. Install all windows plumb, level, square, straight and flush to present a finished appearance and properly working unit.
 - C. Install all required trim, jamb extensions and other required accessories as shown on plans, as indicated in specifications, or as required by manufacturer to complete the installation.
 - D. Flash, seal and caulk all windows as recommended by the manufacturer and as approved by the Architect. All window units shall be completely weather tight.
 - E. Insure that windows are not put under strain which may cause breakage of glass or binding of opening units.

3.3 Interior Trim and Moulding in Exterior Walls

- A. Head and jambs returns- 5/8" gypsum wallboard with rounded 90 degree 3/4" drywall corners by Clark Dietrich- vinyl bullnose 0.028 PVC corner bead.
- B. Sills - 3/8" Solid Surface Vinyl by Sill-Rite, Classic Profile, with 1" face, white in color or approved equal.
- C. Apron trim 3/8" Solid Surface Vinyl as shown on drawings.

3.4 Cleanup and Protection

- A. Clean all window glass completely removing all stickers, paint, dirt, grease, etc. Wash all windows with Windex or other approved glass cleaner.
- B. Protect all window units replacing any breakage or defective parts until acceptance by Owner.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD

PART 1 - GENERAL

1.1 Summary

- A. This work includes all labor, materials and equipment necessary to install gypsum board as shown on the Drawings and as specified herein.

1.2 Handling

- A. Protect gypsum board from moisture, dents and breaks. Use only skilled workmen for installation.

PART 2 - PRODUCTS

2.1 Gypsum Board Panels

- A. Supply gypsum board panels of the sizes, types and thicknesses as shown on the Drawings. All panels shall have tapered edges suitable for taping.
- B. Acceptable Manufacturers:
1. U.S. Gypsum.
 2. Georgia-Pacific
 3. Certainteed
 4. Approved Equivalent
- C. Reference to moisture resistant gypsum wallboard on the Drawings to be 5/8" USG, Certainteed, Georgia-Pacific or approved equivalent **moisture and mold** resistant gypsum wallboard.

2.2 Joint Materials

- A. Tape shall be of a type recommended as compatible by the panel manufacturer.
- B. Joint Compound to be All Purpose Joint Compound by USG or approved equal.
- C. Materials subject to approval by the Architect.

2.3 Accessories

- A. Fasteners shall be as recommended by the panel manufacturer or shall be sheetrock screws of appropriate length and spacing as recommended by gypsum board manufacturer for fastening to metal stud or wood stud framing, unless otherwise specified or approved by the Architect.
- B. At exterior window heads and jambs install Vinyl bullnose 0.028 PVC corner bead by Clark Dietrich rounded 90 degree 3/4 round drywall corners or equal, and as approved by the Architect.
- C. At all other outside GWB corners install metal corner bead as appropriate and recommended by the panel manufacturer and approved by the Architect.
- D. Other accessories shall be used as appropriate and recommended by the panel manufacturer and approved by the Architect.

PART 3 - EXECUTION

3.1 Coordination With Other Trades

- A. Insure that framing and backup is adequate for installation of panels and other mounted accessories.
- B. Cooperate with other trades to insure that installation of panels does not interfere with electrical or communication wiring, heating, ventilation, or other items.

3.2 Installation

- A. Install all panels level, square and with vertical and/or horizontal joints insuring that all seams are properly backed by framing.
- B. Make all cuts smooth and straight taking care not to damage the panel.
- C. Fasten as recommended by the manufacturer of the panels. Countersink heads slightly below surface without breaking surface paper.

- D. Install metal or vinyl accessories where required and at transitions in materials where appropriate. Use corner beads, "J" trim, and control joints as indicated on drawing details, as required, or as specified herein.
 - E. Unless otherwise shown, minimum fastener spacing shall be: Horizontal and vertical screws - 12" o.c.
- 3.3 Jointing and Finishing
- A. Maintain 55 F, temperature during all jointing work.
 - B. Apply joint compound to panel joints, press in joint tape, let dry and cover with a second coat of joint compound. Use wide taping knives to set and smooth. Insure that tape is completely set top and bottom in joint compound and is smooth and wrinkle-free. Feather all angles.
 - C. Apply joint compound to all countersunk fastener heads and other depressions.
 - D. Allow joint compound to dry then sand between coats. Apply a total of three coats of joint compound allowing successive applications to dry and then be sanded. Completely fill all joint depressions to present a smooth wall suitable for painting or other treatments.
- 3.4 Cleanup
- A. Insure that all spattering and debris is cleaned up from adjacent areas.
 - B. Protect floors and other surfaces where necessary from accumulations of joint compound and other materials.

END OF SECTION

SECTION 09 31 00
CERAMIC TILE

PART 1 - GENERAL

1.1 Summary

- A. Work included: Provide ceramic tile flooring where shown on Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work: Documents affecting work of this Section include, but are not necessarily limited to General Conditions and Sections in Division 1 of these Specifications.
- C. This Section includes the following:
 - 1. Slip-resistant 12"x 12" floor tile in Toilet Room, Laundry, and Main Entry as shown on Room Finish Schedule and on Floor Tile Plans.

1.2 Submittals

- A. Submittals shall comply with requirements of the Division 1- Submittals and Substitutions and the individual sections specifying the work.
- B. Three (3) weeks prior to installation provide shop drawings indicating manufacturer's recommended installation instructions. Provide Owner with samples for tile and grout color selection prior to ordering materials. Architect shall approve installation methods, material, and samples **prior to Contractor ordering materials.**

1.3 Quality Assurance

- A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain all other products specified in the Section from one source and by a single manufacturer for each product. No mixing and matching of a products from different manufacturers, lots, or batches allowed.

1.4 Project Conditions

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with installation standards and manufacturer's written instructions.

1.5 Maintenance

- A. Deliver extra ceramic tile to Owner. Materials to match products installed, packaged with protective covering for storage, identified with appropriate labels, equal to at least 15% of amount installed, and consist of full-size units.

PART 2 - PRODUCTS

2.1 Manufacturers

- A. Products: Subject to compliance with specification requirements, provide ceramic tile where indicated in Drawings.
- B. Manufacturers to provide products by the following or approved equal:
 - 1. a. American Olean Tile Company
 - b. Tec, Full Flex latex modified thin
 - c. Mapei Corporation, Kerapoxy

2.2 Setting Materials

- A. Latex-Portland Cement Mortar: ANSI A118.4 for floor tile, composed as follows:
 - 1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, re-dispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
- B. Organic Adhesive: ANSI A136.1, Type 1 for wall installation.

2.3 Grouting Materials

- A. Epoxy Grout for materials composed as follows:
 - 1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, re-dispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:
 - a. Sanded grout mixture for joints 1/8" and wider.

2.4 Thresholds and Transitions

- A. Where SVT or other types of floor finish butts ceramic tile, install metal joiner bar such as Schiene or Rondec by Schluter Systems (according to which style works best for the situation or height differences). Joiner bar to be installed under ceramic tile.

2.5 Tile Underlayment

- A. No tile underlayment required for this project.

2.6 Miscellaneous Materials

- A. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.7 Mixing Mortars and Grout

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add dry materials and liquid in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 Examination

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 Preparation

- A. Remove coatings, including curing compounds, existing setting beds and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty

wire brush. Remove protrusions, bumps, and ridges by sanding or grinding.

3.3 Installation

- A. Extend tile work into recesses for a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting door frame for straight aligned joints.
- C. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints where adjoining floors tiles are the same size. Provide uniform joint widths, unless otherwise indicated.

3.4 Cleaning and Protecting

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion..
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile work. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and ware.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 Description

- A. Suspended ceilings as indicated in the Room Finish Schedule and shown on Reflected Ceiling Electrical Plan.

1.2 Submittals

- A. Submittals shall comply with requirements of the Division 1- Submittals and Substitutions and the individual sections specifying the work.
- B. Three (3) weeks prior to installation provide shop drawings indicating manufacturer's recommended installation instructions. Architect shall approve installation methods, material, and samples **prior to ordering materials**.

1.3 Maintenance

- A. Deliver extra ceiling tile to Owner. Materials to match products installed, packaged with protective covering for storage, identified with appropriate labels, equal at least 15% of amount installed, and consist of full-size units.

PART 2 - PRODUCTS

2.1 Materials

- A. 24"x 24" x 7/8" thick, white lay in mineral fiber units, Cirrus by Armstrong..
- B. 24"x 24" x 5/8" thick, white lay in mineral fiber units, Cortega by Armstrong.
- C. Approved equal.
- D. Exposed grid mounting system - Standard steel tee sections with 9/16" or 15/16" wide exposed faces and white enameled finish by Chicago Metallic, or approved equal. Main tees shall be heavy duty, minimum of 1 1/2" deep. Supporting wires shall be of size and spacing recommended by the manufacturer.
- E. See Room Finish Schedule for location of ceiling tile panel types and tee widths.

PART 3 - EXECUTION

3.1 Installation

- A. Install tile and grid system specified with competent workmen as recommended by the manufacturer. Ceilings shall be level and true. Tile and grid cuts shall be accurate and neat. Layout shall conform to detailed reflected ceiling on Electrical Plan.
- B. Installer shall coordinate his work with electrician in areas having recessed lights in ceilings. Confirm full support for each light fixture to wood strapping attached to roof trusses as needed or directly attach to roof trusses where possible, prior to installing ceiling tiles.

3.2 Cleaning

- A. On completion, clean all material and accessories. Leave ceilings free of finger marks, dirt, in perfect condition and acceptable to the Architect.
- B. Replace abraded or damaged materials as directed by the Architect.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 - GENERAL

1.1 Summary

- A. Work included: Provide resilient tile flooring and base where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 1 of these Specifications.

1.2 Quality Assurance

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 Submittals

- A. Product Data: At least three (3) weeks prior to scheduled installation, Contractor to submit three (3) copies of the following information to Architect for review:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Samples of each item, color, and pattern available in the specified grades from the proposed manufacturer.
 - 4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.4 Maintenance

- A. Deliver to the Owner for his use in future modifications an extra stock of approximately 15% of each color and pattern in each material installed under this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.1 Materials, General

- A. Provide colors and patterns as selected by the Owner from standard colors and patterns of the approved manufacturer in the specified type.
- B. Adhesives:
 - 1. Provide waterproof and stabilized type adhesive as recommended by the manufacturer of the material being installed.
 - 2. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.
- C. Concrete slab primer: Provide non-staining type as required and as recommended by the manufacturer of the material being installed.

2.2 Resilient Materials

- A. Solid Vinyl Tile (SVT):
 - 1. Dimension: Provide 17.7"x17.7"x.120", 18"x 18"x .120", or 4" plank x .120" thickness.
 - 2. Acceptable Products:
 - a. Toli Lightstone- Toli is a division of CBS (America) Corp. Architect proposes use of three (3) color/ pattern selection. Final choice in color/ pattern to be made by Owner.

- b. Or Mannington Commercial Luxury Vinyl Tile/ Nature's Paths Select Tile, 18"x 18"x 100 mils. Architect proposes use of three (3) color/ pattern selection. Final choice in color/ pattern to be made by Owner.
 - c. Toli Lightwood- 4" planks. Architect proposes use of three (3) color/ pattern selection. Final choice in color/ pattern to be made by Owner.
 - d. Approved equivalent products when approved in advance by the Architect. Solid vinyl tile made from polyvinyl esters and inorganic fillers materials Class III. Interior floor finish to be Class I.
 - e. See Floor Tile Plan and Room Finish Schedule for type of solid vinyl tile to use, placement of color/ pattern, and location of tile to be installed.
- B. Vinyl Base:
- 3. Dimension - 1/8" thick x 4" high.
 - 4. Acceptable Products:
 - a. Johnsonite Vinyl Wall Base.
 - b. Approved equivalents.
- C. Provide other materials, including adhesives, transition strips, and joint covers not specifically described but required for a complete and proper installation, subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 Surface Condition

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 Preparation

- A. Subfloors:
 - 1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8" in 10'-0" variation from level or as shown on the drawings.
 - 2. Metal joint cover plates shall be installed over all floor joints over 1/8" in width.
 - 3. Prior to laying materials, broom clean or vacuum the surfaces to be covered, and inspect the subfloors.
- B. Priming:
 - 1. Apply concrete slab primer if so recommended by the resilient flooring manufacturer.
 - 2. Apply in accordance with the manufacturer's recommendations as approved by the Architect.

3.3 Installation

- A. General:
 - 1. Install materials only after finishing operations, including painting, have been completed and after permanent heating system is operating.
 - 2. Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturer's of the materials used.
 - 3. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as are existing or marked in the subfloor or concrete. Use chalk or other non-permanent marking device.
- B. Installing Resilient Tiles:
 - 1. Place units with acrylic adhesive cement with low-emitting materials including low VOC in strict compliance with the manufacturer's recommendations and approved by the Architect. Any required sealants to also have low VOC.
 - a. Butt units tightly to vertical surfaces, nosings, edgings, and thresholds.

- b. Scribe as necessary around obstructions and to produce neat joints.
 - c. Place tiles tightly laid, even, and in straight parallel lines.
 - d. Extend units into toe spaces, door reveals, and in closets and similar spaces.
 - 2. Lay units from center marks established with principal walls, discounting minor offsets, so that units at opposite edges of the room are of equal width.
 - a. Adjust as necessary to avoid use of cut widths less than 3" wide at room perimeters.
 - b. Lay units square to axes of the room or space.
 - 3. Match units for color and pattern by using materials from cartons in the same sequence as manufactured and packaged.
 - 4. Lay in ashlar pattern using two (2) colors or tile patterns where shown on the Floor Tile Plan, with grain in all units running the same direction, unless otherwise approved by the Architect.
 - 5. Place resilient edge strips tightly butted to units and secured with adhesive. Provide edge strips at all unprotected edges unless otherwise shown.
 - C. Installing Base:
 - 1. Install vinyl base where shown on the drawings.
 - 2. Use factory - preformed exterior corners and factory- preformed or job-mitered interior corners.
- 3.4 Cleaning and Protecting
 - A. Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.
- 3.5 Warranty
 - A. A minimum of ten (10) year non-prorated Limited Warranty to be free from defects in material and workmanship under normal use and service, to repair or replace all defective tile flooring including reasonable labor.

END OF SECTION

SECTION 09 91 00
PAINTING

PART 1 - GENERAL

1.1 Summary

- A. This work shall consist of all labor, materials and equipment necessary to complete painting as shown on the Drawings and as specified herein.
- B. In general, all unfinished surfaces shall be painted unless otherwise specified. No staining required.
- C. See Room Finish Schedule.

1.2 Submittals

- A. Contractor shall submit color samples, manufacturer and paint specifications to the Architect for review fifteen (15) days prior to incorporation into the work. Provide three (3) copies of product information.

1.3 Scope of Work

- A. This work shall include prefinishing and painting of all exposed surfaces and specified unexposed surfaces, except factory or prefinished surfaces. Also included is touching up of prefinished surfaces as required and/or as approved by the Architect.

PART 2 - PRODUCTS

2.1 Paint

- A. All materials shall be top quality products of the type and texture as shown on the Drawings and/or as specified in Part 4 of these specifications.
- B. Acceptable manufacturers include: Glidden, Olympic, California, Benjamin Moore, Sherwin Williams, and other approved equivalents.
- C. All colors shall be as selected by the Owner from samples submitted by the Contractor.
- D. Epoxy-Coat 100% Solids Cycloaliphatic Epoxy information and kits may be obtained from *EPOXY-COAT.com* or by calling: Tel # 1-800-841-5580.
- E. State of Maine approved thermal barrier by International Fireproof Technology Inc. DC333, TPR2 Fireshell F10E, Cafco TB415, or State of Maine approved equal.

2.2 Painting Accessories

- A. Turpentine shall be pure gum spirits conforming to ASTM DB-65.
- B. Putty shall be as recommended by paint or stain manufacturers and as approved by the Architect.

2.3 Primer and Base Coats

- A. Type as recommended by paint manufacturer for finish paint selected.
- B. Re-coat primed surfaces if and where there is evidence of unsealed areas in first coat.
- C. New concrete floor to be properly prepared by Contractor to allow bonding of epoxy floor finish system under Section 03 30 00 Cast-In-Place Concrete.
- D. Shellac shall be bleached white shellac, four pound cut, conforming to ASTM D-360-71.

PART 3 - EXECUTION

3.1 Preparation

- A. Prior to painting insure that all surfaces are finished and ready for application.
1. Wood Surfaces:
 - a. Sand to smooth finish and clean all dust from surfaces. Fill all nail holes, cracks and other irregularities with approved putty. Pre-color all putty to be used under natural finish wood.
 - b. Shellac all knots and pitch streaks or pockets to prevent bleeding.
 - c. Apply prime coat as recommended by manufacturer. Sand lightly where necessary to smooth surface.
 2. Sheetrock Surfaces:
 - a. Prepare as specified in Section 09 29 00 GYPSUM BOARD.
 - b. Touch up with joint compound any surface imperfections and allow to dry.
 3. Metal Surfaces:
 - a. Clean all grease, rust and dirt from surface. Feather edges of chipped paint on pre-painted items.
 - b. If so approved by the Architect, sandblast or wire brush all metal surfaces to obtain a suitable surface for painting. This procedure will normally be required for refinishing previously painted surfaces which are chipping or peeling.
 - c. Prime metal surfaces with approved metal primers.
 - d. Galvanized and prefinished surfaces shall not be painted unless specified in Painting Schedule.
 4. Concrete Floor Surface:
 - a. Allow new concrete slab to cure a minimum of thirty (30) days and/ or after Building Contractor's receipt of any required acceptable and final concrete strength test results from Testing Lab before preparing entire floor area for painting. Prior to applying epoxy two part finish coat system to floor, confirm that new concrete floor is sufficiently clean, dry and that entire floor is ready for floor finish to bond to slab.
 - b. Allow time for proper drying between surface preparation and between paint coats as recommended by manufacturer.
 - c. **Water based system not acceptable** for floor finish. Two part floor paint system manufactured by Epoxy-Coat, **no substitution**.

3.2 All Surfaces

- A. Apply paint only to clean, dry surfaces. Do not paint in the rain or in very humid conditions.
- B. Use masking tape, drop cloths and other means of protection to adequately protect adjacent surfaces from drips, spatters and overruns.

3.3 Application

- A. Apply paint as recommended by the manufacturer on properly prepared surfaces according to the paint schedule on the Drawings and in Part 4 of these Specifications.
- B. Thoroughly brush or roll all coats to achieve a uniformly smooth coverage.
- C. Allow each coat to dry 48 hours or longer if recommended by manufacturer before applying subsequent coats.
- D. Do not apply paint or shellac when temperatures are below 45F unless provision for heating is made.
- E. All finishes shall be smooth, free from runs and sags, streaks, brush fibers and other defects. All edges shall be straight and sharp.
- F. Refinish and paint to match any existing adjacent areas which were disturbed as a result of the work.

3.4 Cleanup and Protection

- A. Clean all areas of drippings, spatters and debris. Remove all masking tape and clean glass and other areas as required.
- B. Touch up all defective areas to the satisfaction of the Architect.
- C. Protect all surfaces until acceptance by the Owner.

3.5 Touch-Up Materials

- A. Provide Owner with at least one (1) unopened gallon can of all types and colors, except Epoxy - Coat. Partially used cans shall also be left with the Owner.

PART 4 - SUPPLEMENTAL SPECIFICATIONS

4.1 Paint Schedule

SURFACE	PRIMER	FINISH
Gypsum Board Walls	1 coat acrylic latex	2 coats acrylic latex-semi gloss
New Gypsum Board Ceilings	1 coat acrylic latex	2 coats flat latex ceiling-Bright White
Existing Gypsum Board Ceiling	---	One coat Thermal Barrier
Concrete floors in Shop Areas and Storage Rooms	Basecoat as recommended for concrete floors by Epoxy-Coat	100% Solids- Epoxy Floor Finish System by Epoxy-Coat with flakes, no substitution
Interior Metal Trim and Doors	Factory primed	2 coats acrylic latex all surface enamel by Sherwin Williams or equal
Exterior Metal Trim and Doors	Factory primed	2 coats acrylic latex all surface enamel by Sherwin Williams or equal
Interior wood trim	1 coat acrylic latex	2 coats acrylic latex-semi gloss

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 **Summary**

- A. Provide and install toilet room accessories as shown on the Plans and as specified herein. The Owner shall provide toilet paper holders, soap dishes, and paper towel dispensers. Contractor to provide proper blocking for accessories.

1.2 **Quality Assurance**

- A. Acceptable Manufacturers:
1. Bobrick
 2. ASI
 3. Bradley

1.3 **Submittals to the Architect**

- A. Provide three (3) copies of shop drawings to the Architect for review and approval at least fifteen (15) days prior to incorporation into the work.

PART 2 - PRODUCTS

2.1 **Toilet and Bath Specialty Schedule**

ITEM	QUANTITY	ACCEPTABLE PRODUCTS
Toilet Paper Holder	1	Installed by Owner
Soap Dispenser	1	Installed by Owner
Paper Towel Dispenser	1	Installed by Owner
Automatic Hand Dryer	0	
Mirror	1	Bobrick B-165
Grab Bars	1 set	Bobrick 5806x36 & 5806x42

PART 3 - EXECUTION

3.1 **Installation**

- A. Install all equipment straight, level and plumb.
 B. Equipment is to be securely attached to studs or blocking with suitable screws to provide at least 1-1/2" penetration into the wood.

3.2 **Cleaning**

- A. Clean all equipment of dirt, grease, tags, etc.
 B. Damaged or scratched items shall be replaced at no expense to the Owner.

END OF SECTION

SECTION 22 00 00
PLUMBING SYSTEMS

Part I - GENERAL

- 1.01 DESCRIPTION: Provide and furnish all necessary labor and materials in connection with a complete plumbing system as described in this section and as shown on drawings. This project shall consist of the new Addition and Garage renovation work.
- 1.01.1 Commissioning: Time shall be allotted of this project for commissioning of systems, equipment, devices, etc,. Plumbing Contractor, as well as all involved Sub-Contractors, shall collaborate with Commissioning process.

1.02 WORK SPECIFIED IN THIS SECTION:

- A. Plumbing fixtures and trim.
- B. Sanitary waste, vent, storm drain systems.
- C. Hot and cold water system.
- D. Piping insulation.
- E. Hangers, supports, sleeves, escutcheons, etc.
- F. Pipe identification.
- G. Testing of systems.
- H. Domestic Hot Water sundries, and piping.
- I. Demolition.

1.03 WORK SPECIFIED ELSEWHERE

- A. Section 05 41 00: Light Metal Framing
- B. Section 07 53 10: Roofing & Flashing
- C. Section 07 92 00: Sealants
- D. Section 09 90 00: Painting.
- E. Section 23 00 00: Heating & Ventilation
- F. Section 26 00 00: Electrical

1.04 REFERENCES:

Unless otherwise specified or indicated, materials and workmanship shall conform with the latest edition of the following standards and specifications:

- 1. American National Standards Institute (ANSI).
- 2. Underwriters Laboratories, Inc. (U.L.).
- 3. American Society for Testing and Materials (ASTM).
- 4. National Fire Protection Association (NFPA).
- 5. State of Maine Plumbing Code

1.05 SUBMITTALS:

- A. Submit shop drawings in accordance with the requirements of the General Conditions. Submittals shall include manufacturer's specifications and installation instructions on all specified items.

B. Provide submittals on the following items:

1. Plumbing fixtures and associated faucets & trim
2. Domestic Hot & Cold Water Piping & Specialties
3. Insulation
4. Valves and Piping
5. Miscellaneous Equipment

C. Provide warranties and guarantees for standard manufactures products specified in the section.

Part II - PRODUCTS

2.01 PLUMBING FIXTURES:

- A. Plumbing fixtures shall be provided as indicated on Drawings. Unless otherwise noted, all areas, provide commercial grade heavy duty wall carriers for applicable wall hung lavatory fixtures. Owner shall provide fixtures WC-1 & LAV-1. Contractor shall clean fixtures.
- B. Fixture trims, faucet, traps, waste pipe, and escutcheons that are exposed in finished areas shall be polished chromium plated over nickel finish, brass pipe. Floor drain strainers and sanitary floor clean out covers shall be satin finish brass.
- C. All fixtures shall have the manufacturer's label and guarantee.
- D. All vitreous fixtures shall be white in color, thoroughly vitrified, fused and free from pores.
- E. Stainless steel ware shall be commercial grade manufactured.
- F. Air gaps shall be provided between the level of each supply opening and the flood rim of the fixture receptacle. The minimum air gap distance shall not be less than twice the diameter of the waste pipe.
- G. All hot and cold water supplies to fixtures and equipment shall be fitted with stops in addition to faucet, bibbs, etc. All trim, supplies, traps exposed piping at fixtures and escutcheons shall be chrome- plated on finished brass, bronze, or copper unless otherwise noted. Non siphon traps shall be provided where required by code or law.
- H. The following catalog numbers apply to non detention type fixtures as manufactured by American Standard; unless otherwise noted; but fixtures equal in design and quality may be substituted when submitted for approval. The Architect shall establish mounting height for all plumbing fixtures.
- I. Final locations of fixtures shall be determined from architectural drawings, refer to architectural and plumbing drawings for the quantities of fixtures under this section.
 1. WC1 Water Closet: (Provided by Owner) ADA Floor-mounted, American Standard, "Madera", #3043.102, vitreous china water saver type flushes on 1.6 gallons, siphon jet action 17" high elongated bowl, 1-1/2" top spud, with 10" rough in, 2 bolt caps.

Contractor to provide new Sloan Optima Plus #8111 automatic flush valve with manual override button, battery operated, top spud, or approved equal, with valve mounted infrared detector. Provide new open front plastic seat with cover. Provide floor flange with nuts, bolts, washers, and wax sealing ring. Contractor responsible to clean fixture.

2. LAV 1 Lavatory: Wall hung, (Owner Provided) AS #0355.012, "Lucerne", vitreous china lavatory with front overflow. "D" shaped bowl, self-deck area with contoured back and side splash shields. Contractor responsible to clean fixture.

Contractor to provide new American Standard 2385.130, centerset lavatory faucet with brass grid strainer drain, Washerless ceramic disc valving on 4" centers, 3/8" male threaded inlets, .5 gpm vandal-resistant flow device, drain with 1 1/4" tail piece, with Vandal-resistant long metal lever handle with metal pop up drain. Provide integral perforated grid drain and wall carrier support. Provide wall supplies with loose key stops, trap and nipple to suit code. Drain and supplies to provide with protective cover kits, for ADA requirements.

Lavatories and urinals shall receive an approved white silicone sealing grout applied between Fixtures and room structure. Sealant specified in Section 07900.

3. SK-2 - Sink: Break: Counter top drop-in, Elkay #DLR-1919 single bowl, 3 hole, fitting ledge, 18 ga., stainless steel, self rimming sink. Provide strainer, and trap, Elkay #LK-36, bottom mount. Provide Delta faucet, #27T3834, chrome finish, 11" Hi goose neck spout, four inch center, single mount, two lever handle with aerator, cast brass spout and brass escutcheon plate, comply with ANSI A112.18.1.
4. SK-3 – Janitor's Mop Basin: 24" x 24" x 10" mop basin with 6" front, Fiat series model #TSB-3010 without shelf. Provide faucet #830-AA with wall brace, hose & bracket #832-AA and 24" x 3" mop hanger #889-CC-24, stainless steel wall back slash, and faucet #830-AA.
5. SK-1 – Wall Sink Basin: 20" x 17" x 13" deep basin, wall mounted; Fiat series model #L-1 wall hung Serv-A-Sink. Provide wall mounting brackets, faucet #830-AA with wall brace, hose & bracket #832-AA and faucet #830-AA. Weight capacity 600 lbs.

2.02 BACKFLOW PREVENTER:

Provide and install one 1-1/4" reduced pressure back-flow preventer, Febco #825Y or approved equal. Double check type for non-toxic service, continuous pressure operation, possible back pressure. Assembled unit shall have bronze body, SS dura check assembly, test ports and valves, main shut off valves.

2.03 EYE/FACE WASH STATION: EWS-1

Emergency Eyewash Station: wall mount type, Bradely model #S220CB, twin spray heads with covers and chains, compact, stainless steel eye wash bowl, face spray ring, universal ID sign, integral flow control, chrome plated brass yoke assembly, Hand operated by a large visible safety yellow PVC push handle. Provide DW & CW mixing valve with spring check valves and shut off valves. 1/2" IPS, 1/2" stay open valve. Mixing valve fail to DCW.

2.04 WASTE DRAIN BOX: WDB

Provide wash machine waste drain box with 1-1/2" drain outlet and 1-1/2" vent. Fixture recess type with combination 1/2" MIPS DCW & DHW connection, Symmons #W602 or approved equal.

2.05 FLOOR DRAINS: FD

FD :Zurn Series Z-450 or approved equal, body with integral trap and 1/2 primer tap, pipe size 2". Provide 5" satin finish bronze top strainer with vandal proof screws. Provide 1/2" automatic trap primer to be installed on cold water lines serving lavatories. Primer valves shall be concealed under vanities, ceiling cavities, accessible or be provided access door.

2.06 EDHW HEATER (Owner Provided)

Re-use existing and install 80 gallon capacity electric type domestic hot water heater as shown. . All water connections; 3/4 NPT, dimensions: 18" diameter, overall height 60". Refer to domestic piping detail for piping arrangement.

2.07 HOT WATER CIRCULATING PUMPS: CP-DHW

CP-DHW1; Provide and install one Domestic HW Re-circulating pump.1/10 HP 3450 RPM, 3.0 GPM, 8' Head, bronze body and impeller, 115v - volts, 60 HZ 1 phase, Taco # 006-BC-1, 1" or approved equal. Pump shall be manufactured by B & G, Taco, or Amtrol as acceptable pump manufactures and suitable for portable water.

2.08 DHW MIXING STATIONS:

DHW Mixing Valve: 1", 3 way, self regulating, adjustable temperature range 100 to 140 F, bronze body, stainless steel stem and trim, 125 psi, control temperature performance; +/- 3 F. Symmons #7-400A-ASBVW. Fail safe to DCW. 3/4" inlets, 1" outlet.

2.09 COMPRESSION TANK:

A. DHW Heating System (ET-DHW)

Compression tank shall be installed per manufacturer's instructions complete with all necessary shut off cocks and sundries. Tank shall be manufactured by Extrol, Taco, Amtrol, series, model #ST-12 or approved equal. Tank shall have a total volume capacity of 4.4 gallons, 11" dia. x 15"h.

2.10 HOSE BIBB WALL HYDRANTS: HB

Exterior Wall hydrants shall be exposed type, fully recessed, Watts series #HY-725 or approved equal, automatic draining freezeless with vacuum breaker, backflow preventer, 3/4" hose thread nozzle, chrome finish, with protective cover. Provide loose key with unit.

Interior Wall hydrants shall be exposed type, fully recessed, Watts series #HY-330 or approved equal, with vacuum breaker, backflow preventer, 3/4" hose thread nozzle, chrome finish, with protective cover. Provide loose key with unit.

2.11 DOMESTIC SPRINKLER PIPING

- A. Provide and install sprinkler system, from domestic cold water, piping and heads for Mechanical Room.
- B. Sprinkler piping shall be type K copper and fittings shall be cast-brass or wrought copper suitable for sweat connections for use with harddrawn tubing.

- C. Sprinkler shall be recessed pendant type, chrome plated, and located as shown on plans. Contractor shall furnish two spare heads with sprinkler head wrench. Heads shall be Reliable Automatic Sprinkler model "G" or equal. Head rating for Mechanical Room: 210 degrees and 165 degrees for Janitor Rooms.
- D. Check valves shall be bronze swing check regrinding type. Jenkins #352 with #294 disc. Shut off valve shall be ball type, Apollo 70-100 series or equal. Valve shall be piped near door Mechanical Room and tagged "Normally Open for Sprinkler Piping".
- E. Hydrostatic tests and Certification: The Contractor shall make the proper hydrostatic tests in the presence of the architect representative and local fire department in accordance with applicable standards of the N.F.P. A. 101 and submit all necessary certification to the insurance company

2.12 FIRE EXTINGUISHERS:

Provide and install as shown on plans fire extinguishers with fully recess cabinets with glass front doors. J.L Industries Model Cosmic 10E or approved equal. Class a fires, multi-purpose dry chemical (ABC). Cabinet: Ambassador 1012F10 with ADAC option with white finish. Boiler Room; provide and install 10 lbs. extinguishers with wall bracket only, less cabinet.

2.13 MISCELLANEOUS EQUIPMENT AND FITTINGS:

A. Valves.

1. All valves shall be suitable size and type and shall be Crane, Jenkins or approved equal. Where required in copper piping, valves shall be bronze except those which are chromium plated and they shall be brass. All valves shall be for not less than 125 pound working pressure.
2. Shut-off valves shall be bronze, bodied ball valves with stainless steel ball and stem, Apollo series 70-100 or equal.
3. Drain cocks shall be 1/2 inch bronze globe valves with 3/4 inch hose end, Jenkins figure 113 with figure 658 cap and chain.
4. Stop and Waste Nibco or equal.
5. Check valves shall be bronze swing type, Jenkins figure 1222, Fairbanks figure 0681, Hammond figure IB 943 or Nibco S-413Y.
6. Locate valves for easy access and operation, where concealed, provide access doors. Do not locate valves with stem below horizontal.
7. Shock absorbers shall be Amtrol or Precision Plumbing Products, Inc. or equal. Water hammer arrestors installed at each branch manifold for hot and cold water in pipe chases and where shown on Drawings. Provide with gate valve for service. All branch lines being served with cold and hot water service shall be provided with such device. Amtrol # 536
8. Floor Clean Outs: Floor clean outs shall be Zurn series Z-1404 with satin finish bronze top recessed for tile, where applicable.

2.14 WATER PIPING AND FITTING:

- A. Copper tubing (type L) and fittings shall be used for all water inside of buildings. Fittings shall be cast-brass or wrought copper suitable for sweat connections for use with hard-drawn tubing.
- B. Branches and run-outs. Piping shall be installed as indicated on the Drawings. Pipe shall be cut accurately to measurements established at the building by the Contractor and shall be worked into place without springing or forcing. Care shall be taken not to weaken the structural portions of the building. Piping shall be run parallel with the lines of the building unless otherwise shown or noted on the Drawings. Branch pipe from service lines may be taken off top or bottom of main, using such cross-over fittings as may be required by structural or installation conditions. Service pipe, valves and fittings shall be kept a sufficient distance from other work and other services to permit not less than 2" between finished covering and other work and not less than 2" between finished covering on the different services. Changes in pipe sizes shall be made with reduced fittings.
- C. Expansion and contraction of piping: Allowance shall be made throughout for expansion and contraction. Horizontal runs over 50 feet in length shall be anchored to the wall or to the supporting construction about midway on the run to force expansion, evenly divided toward the ends.
- D. Sweated tubing joints: Tubing shall be cut square and burrs shall be removed. Both inside of fittings and outside of tubing shall be well cleaned before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Installation shall be made by competent workmen in accordance with manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints for interior soldered fittings shall be made with a non-corrosive paste flux and solid string or wire solder composed of 95 percent tin and 5 percent antimony. Cored solder or 50 percent tin and 50 percent antimony will not be permitted.
- E. Dissimilar piping materials: Where there is a junction of two different metallic piping materials, and where electrolysis may occur, provide dielectric unions or companion flanges with non conductive gaskets.

2.15 SANITARY WASTE, VENT, & STORM DRAIN PIPING:

- A. Except as otherwise noted, all sanitary waste and vent piping shall be schedule 40 cast iron piping and fittings shall be used. Schedule 40 PVC piping and fittings may be used if an approved fire stop device is used at the floor penetrations. Provide clean outs as shown, and at changes in direction and as required by local and State code.

2.16 ESCUTCHEONS:

- A. Escutcheons shall be installed around all exposed pipe passing through a finished floor, wall, or ceiling. Escutcheons shall be heavy cast brass, chromium plated, adjustable, and shall be of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe, and lock with set screw.

2.17 TRAPS:

- A. All traps connected to the sanitary system shall be vented as shown on the Drawings and as required by the local and state plumbing codes.
- B. Type of fixture traps shall be cast brass, for concealed, and cast brass chrome plated for accessible, water-seal, self-cleaning "P" trap. Each trap shall have an accessible cleanout of ample size, protected by the water seal.

2.18 EXPANSION PROVISION:

- A. Where branches are taken off hot and cold water risers, the tee in the riser shall be located with adequate clearance from the structure or other piping to allow for expansion of the riser without strain on the branch piping.
- B. Branches shall be taken off the risers with at least three fittings to form an adequate swing joint.
- C. For each hot water riser suitable swing shall be provided at top and bottom connections from mains to risers to allow for expansion in both main and riser.
- D. Where soldered or brazed joints are used for the piping systems, proper swing joints as described above for branches from risers shall be provided, or adequate length loops shall be installed to prevent undue strain on the tubing or joints to expansion and contraction.
- E. Main domestic hot water and return pipe lines that run more than fifty shall be provide with means of expansion by either pipe expansion loop or U type flex connector made of bronze braided corrugated high tensile material by KeFlex or approved manufacture.

2.19 HANGERS AND SUPPORTS:

- A. Provide all pipe hangers and fixture supports, and be responsible for proper and permanent location.
- B. All piping shall be rigidly supported from the building structure by means of approved hangers and supports. Horizontal piping shall be hung with adjustable wrought iron or malleable iron pipe hangers, unless otherwise specified, spaced as follows:
 - 1. Cast Iron or PVC pipe: 6 feet at joints.
 - 2. Copper tubing: 6 feet on center.
 - 3. Steel Piping, sch. 40: $\frac{3}{4}$ " and less 8 ft. on center, 1" and larger 12 ft. on center
- C. Vertical stacks of soil, waste, vent and conductor piping shall have friction clamps on each floor. Vertical supply risers shall be supported at each floor by friction clamps or inserting around the supply pipe, a coupling which shall rest on pipe sleeve. Soil, waste and conductor stacks shall be firmly supported at their base, either by a suitable hanger placed on the horizontal line near the riser, or by a base fitting set on a pedestal or foundation carried down to a firm bearing.
- D. Hangers for piping, sizes 4 inches and smaller, shall be Carpenter-Patterson No. 1A Bank Type, Grinnell Co., Calco Steel Products Co., or equal, black steel with hanger rods with machine threads. For un-insulated, copper tubing, the hangers shall be copperized. Hanger for use on insulated service lines shall be sized to allow for insulation thickness, except that

branch runouts to individual fixtures and water piping within concealed pipe chases shall be supported with split ring hangers attached directly to tubing.

- E. Chain, strap, perforated bar, or wire hangers will not be approved. Approved gang hangers may be used in lieu of separate hangers on pipes running parallel to each other and close together. Where used for copper tubing, the gang hangers shall have copper saddles or shall be sheet-lead coated.
- F. All fixtures and equipment shall be supported and fastened in a satisfactory manner. Where wall-hung fixtures are secured to partitions, they shall be fastened with 1/4 inch through bolts provided with nuts, washers and plates at back, except where chair carriers are specified. Bolt heads and nuts shall be hexagon and exposed bolts, nuts, washers and screws shall be chromium-plated brass. Where secured to concrete or masonry walls, they shall be fastened with brass bolts or machine screws in lead sleeve type expansion shields and shall extend at least 3 inches into solid concrete or masonry work. Water closets shall be installed with double gasket seals between floor and closet.

2.20 SLEEVES:

- A. All sleeves shall be one-piece Schedule 40 steel pipe. The sleeves shall be fitted securely to prevent slipping or moving.
- B. All piping through masonry walls, beams and partitions shall be sleeved. All sleeves shall finish flush with the finish line.
- C. Space between sleeves and piping shall be sealed watertight and/or gastight as described below:
 - 1. Uninsulated metal piping shall be sealed watertight and/or gastight by packing space between pipe and sleeve with approved packing. Special care shall be taken not to drive lead below top of sleeve. Mechanical seals may be used.
 - 2. Insulated piping and plastic piping shall be sealed watertight and/or gastight by packing space between pipe sleeve and insulation with an approved packing. Fill the remaining space with approved waterproof resilient adhesive sealant.
- D. Sleeves shall be of size to allow for continuous full thickness of pipe insulation through sleeve.
- E. Provide waterproof sleeve or casting on each pipe entering or leaving building through foundation walls and tank pits, or wet wells. Seal space between each pipe and its waterproof sleeve. Each end of sleeve shall be sealed as described above. Each pipe shall be concentric with sleeve. Sleeves shall be waterproof type with welded or cast flange and of size and length to suit pipe and wall thickness. Sleeves shall be all galvanized after welding.

2.21 INSULATION:

- A. Provide thermal insulation on cold, hot, and return water. Insulation shall be continuous through supports.
- B. Insulation shall be omitted on branch runouts designated as chromeplated, except as otherwise specified.
- C. Pipe covering shall be Armaflex #AP-2000 or equal, 1/2" thickness for all hot and cold pipe sizes 3/4" and less. 3/4" thick for 1" to 1-1/4", and 1" thick for 1-1/2" and larger.

- D. Fittings for hot water and hot water recirculating piping shall be covered with Armaflex fitted of same thickness and finish as adjacent pipe covering.
- E. Valves, flanges and fittings for cold water and hot water piping shall be covered with mitered sections of Armaflex. Insulation shall be of same thickness and finish as adjacent pipe covering.
- F. The insulation lap shall be sealed with an externally applied sealer.
- G. Storm Drain; provide ½” thick Armaflex # AP-2000 closed cell insulation for all storm drain piping, fittings, and roof drains. Install per manufacture’s recommended procedures.

2.22 PIPE IDENTIFICATION:

- A. Provide color coded pipe identification markers on all piping in the building installed under this Section. Pipe markers shall be semi-rigid plastic identification markers equal to "Set Mark" Type "SNA" by Seton Nameplate Corporation or equal.
- B. Provide an arrow marker with each pipe content marker to indicate the direction of flow. If flow can be in either direction, use a double headed arrow marker.
- C. Piping shall be labeled at 20 foot intervals, adjacent to each valve, on each riser. This work shall be done after architectural finish painting where such is required on the pipes.
- D. The following color coding shall be used with names in black letters on backgrounds indicated:

<u>Service</u>	<u>Legend</u>	<u>Background Color</u>
Domestic CW	Domestic C.W.	Green
Domestic HW	Domestic H.W.	Green
Domestic HWR	Domestic H.W.R.	Green
Storm Drain	Storm Drain	Green

- E. In general, 3/4 inch high legend shall be used for pipe lines.
- F. All markers to be OSHA approved.

2.23 VALVE TAGS AND CHARTS:

- A. All valves on pipes of every description have neat circular 1 1/2 inch brass valve tag attached with brass chain to each valve stem. Stamp on these valve tags in white letters as large as practical the number of the valve and its service, such as "H.W.", "C.W." for hot water and cold water respectively. The number of each service shall be consecutive.
- B. Valve numbers shall correspond to numbers indicated for valves on the record Drawings and on two printed detailed lists. These printed lists shall state the numbers and location, including the painted door room number, the location in the room (with location dimensions if concealed), of each valve and the fixture or group of fixtures which it controls, and other necessary information, such as requiring the opening or closing of another valve or valves, when any one valve is to be opened or closed.
- C. The printed lists shall be prepared in a form to meet the approval of the Architect and Owners. Record lists shall be includes as part of O & M manuals.

Part III - EXECUTION

3.01 GENERAL:

- A. The work shall be executed in compliance with the latest edition of the Maine State Plumbing and other applicable Building Codes and all local regulations, etc., applicable to work in this section.
- Permits: Obtain and pay for all required permits, licenses, etc.. In case of conflict between the Contract Documents and a governing code or ordinance, the more stringent standard shall apply.
- B. Unless otherwise specified or indicated, materials and workmanship shall conform with the latest edition of the following standards and specifications:
1. American National Standards Institute (ANSI).
 2. Underwriters Laboratories, Inc. (U.L.).
 3. American Society for Testing and Materials (ASTM).
 4. National Fire Protection Association (NFPA).
- C. All work shown on Drawings is diagrammatic. It is not intended to specify or to show every offset, fitting, and component. However, it is the intent of these Specifications and Drawings accompanying same that all required components and materials shall be furnished and installed under this Section, whether or not indicated or specified, in such a manner as to make the entire installation fully complete, operable and maintainable in all respects to satisfaction of Owner.
- D. Refer to appropriate sections for specifications on cutting and sealing openings for piping and other equipment penetrating walls, floors, and roofs. Building Structure Penetrations; General Contractor to provide cutting & finish patching of all building structure penetrations involving removals and new installations of system items, devices, etc. associated with this trade. This contractor shall provide necessary and proper fire stop(s), water seal or weather stop(s), etc. associated with system device penetration. This trade shall coordinate all system component penetrations through building structure(s) with General Contractor and Owner.
- E. Visit the existing site and carefully examine the existing conditions for construction, mechanical equipment and piping tie-ins which maybe involved, as to become fully informed as to the facilities, difficulties, and restrictions attending the execution of the work to be performed. Obtain definite dimensions and levels directly from the premises. Verify all governing dimensions and scale of work on Drawings at the site and carefully examine all adjoining work on which the new work is in any way dependent for its perfect efficiency according to the intent of this specification. No waiver of responsibility for defective adjoining work will be considered unless notice of same has been filed in writing with the Architect before any part of the work to be performed is undertaken.
- F. Refer to Section 02072 and the General Conditions for provisions governing work in existing buildings, including removal of existing equipment and advance notice of service interruption.

3.02 TESTING – ADJUSTING & COMMISSIONING:

- A. Due to the extent of the work, testing shall be done in sections before any work is covered in and in order that the various parts of the work can go ahead without delay.
- B. Sanitary & Storm drain piping: Before the installation of fixtures, close all openings of the system and fill all lines with water to roof and allow to stand until a thorough inspection has been made. No appreciable drop should be noticed within a 60 minute period, as witnessed by Architect or Owner.
- C. Water piping shall be tested to a hydrostatic pressure test of 125 pounds per square inch and it shall hold tight for a period of 2 hours.
- D. All piping shall then be blown out and made clean and free from scale, water or sludge.
- E. If inspection or test show defects, such defective work or materials shall be replaced and inspection and test repeated.
- F. The Inspector or Plumbers shall be notified sufficiently in advance of all tests in order that he may observe them.
- G. All tests to be witnessed by Architect or his authorized agent, or Owner. Contractor shall provide an allowance for Commissioning each Construction Phase of the project. An allowance of 2 hours minimum of onsite time for commissioning shall be allotted.
- H. All operating equipment installed under this Section shall be placed in operation and shall function continuously in an operating test for a period of two weeks.
- I. Carry out operating test prior to scheduling the project final inspection and after completion of all installation and running adjustments, balancing and any other work required to place the equipment in complete operating condition to meet all requirements under this specification. During this running test period the Contractor shall deliver to the Architect two complete sets of operating, service and replacement data for all equipment which will require operating maintenance or replacement, and one copy of this literature shall be available during the instruction of operating personnel. During all working hours of the operating test Contractor instruction personnel shall be available for and provide thorough and detailed training to operating and maintenance personnel in operation, maintenance, and adjustment of all equipment installed.

3.03 COMPLETION:

- A. Valve tags and charts: All valves shall have tags noting service and number which shall be noted on record Drawings and Charts.
- B. Provide properly executed certificate of inspection from authorities having jurisdiction.
- C. Instruct such persons as the Owner designates in the proper operation and maintenance of the systems and their parts. Submit to the Architect a letter naming the person or persons so instructed and the dates of such instruction.
- D. Prepare and deliver four sets of complete literature showing operating, service and replacement data for all equipment which will require periodic maintenance or replacement.

- F. Documentation : Proper and adequate documentation must be provided, this will include:
- a. Accurate as-built drawings and sequences submitted in hardcopy and CD disk form updated via a standard 2013 Computer Aided Drafting (CAD) program)
 - b. Owner's manuals including technical spec sheets
 - c. Operator manuals

END OF SECTION

DIVISION 23 00 00

HEATING, VENTILATING, AND AIR CONDITIONING

PART ONE: GENERAL

1.01 Scope

- A. The work covered by this section of the specification shall include all equipment, materials, labor, transportation, permits, inspections and incidentals required to complete all operations in connections with the installation of an heating and ventilation system as shown on the drawings and/or as herein specified. The Contractor shall assume complete responsibility for receiving, storing, handling, and installing all equipment. All work shall be executed to conform to all required local, state, and federal laws, regulations, etc., applicable to work in this section.
- B. The general provisions of the contract, including the General Conditions, Contract Conditions, and Drawings apply to work specified in this section.
- C. Construction Phasing: This project shall be constructed in one continuous phase.
- D. Commissioning: Time shall be allotted for project for commissioning of systems, equipment, devices, etc.,. Mechanical Contractor, as well as all involved Sub-Contractors, shall collaborate and coordinate with Owner's Commissioning Agency.

1.02 WORK SPECIFIED IN THIS SECTION

- A. Heat Air Recovery Unit
- B. Exhaust Fans
- C. Automatic Temperature Controls
- D. HW Boilers
- E. Ductwork and RG&D's
- F. HW Circulating Pumps
- G. Insulation
- H. Demolition

1.03 WORK SPECIFIED ELSEWHERE

- A. Section 06 00 00: Rough Carpentry
- B. Section 07 31 00: Roofing and Flashing
- C. Section 07 90 00: Sealants
- D. Section 09 90 00: Painting.
- E. Section 22 00 00: Plumbing
- F. Section 26 00 00: Electrical Systems

1.04 REFERENCE:

American Society for Testing and Materials (ASTM)
Underwriters' Laboratories, Inc. (UL)
Air Moving and Conditioning Assoc. (AMCA)
American Society of Heating, Refrigerating, and Air
Conditioning Engineers (ASHRAE)

American Society of Mechanical Engineers (ASME)
National Electrical Manufacturers Association Institute of Electrical and Electronics Engineers (IEEE)
American National Standards Institute (AWWA)
Local and State Fire Code
The Board of Fire Underwriters
Local and State Plumbing Codes
American Welding Society
Building Officials Code Administration (BOCA)
Office of Safety and Health Administration (OSHA)

1.05 SUBMITTALS

- A. All items shall be submitted for approval to the Owner as mentioned in the General Conditions, apply are as follows:
1. All equipment, including fan curves data.
 2. Piping specialties (thermometers, gauges, valves, flexible connections, strainers, etc.)
 3. Hot water specialties
 4. Pipe, fittings and hangers
 5. Grills, diffusers and registers
 6. Duct accessories, (volume damper, turning vanes, access doors, etc.)
 7. Thermal insulation for all systems
 8. Piping, valve and equipment identification
 9. Schematic control diagrams and control schemes
 10. Contractor's duct fabrication and piping standards
 11. Shop drawings for ductwork and piping

PART TWO: PRODUCTS

2.01 HEAT RECOVERY UNITS: HRU – 1

A. Product Specification

Energy Recovery Ventilator (HRU-1) shall be a packaged unit as manufactured by RenewAire and shall transfer both heat and humidity using static plate core technology.

B. Quality Assurance

The energy recovery cores used in these products shall be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications shall confirm manufacture's published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and exhaust air leakage (EATR). Products that are not currently AHRI Certified will not be accepted.

Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.

Unit shall be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. Some exceptions to UL Listing may apply.

The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two years from the date of purchase.

C. Energy Transfer Performance

The HRU shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

D. Passive Frost Control

The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

E. Continuous Ventilation

Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.

F. Positive Airstream Separation

Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by "porous plate" mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.

Product

A. Construction

The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts. No condensate drain pans or drains shall be allowed and unit shall be capable of operating in both winter and summer conditions without generating condensate.

The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners.

Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.

Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr·ft²·°F/BTU).

The ERV cores shall be protected by a MERV-8 rated, 2" nominal, pleated, disposable filter in both airstreams. Unit shall have single-point power connection and a single-point 24 VAC contactor control connection.

Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters.

Blowers shall be quiet running, forward curve type and be belt drive. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning.

The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package. The ERV shall be provided "inverter-ready" allowing for applications of inverters supplied and installed by others.

B. Required Optional Equipment: N/A

C. Filter Section: Provide filters for both outside and return air. Air filters shall be two-inch pleated 30/30 disposable, MERV 8 type and are to be installed upstream of the energy recovery section. The filter section air velocity will be 450 fpm at unit nominal airflow rating.

D. The HRU energy recovery units shall be Renewaire series HE model HE2XINH as manufactured by Renewaire Industries of Madison, Wisconsin and shall be ETL listed.

E. Unit Schedules:

Unit #	SA cfm	EA cfm	HP	Voltage	Press. Drop
HRU-1	1500	1500	1.5(2)	230/1/60	"

2.02 EXHAUST FANS:

A. Inline Exhaust Fans: EF 1

Fan shall be cabinet in-line, direct driven type with housing constructed of galvanized steel. Motor(s) shall be open drip proof, high efficiency type. Fan wheels shall be constructed of aluminum. Units shall have the capacity as scheduled. Fan shall have hinged access doors on both sides. L. Cook model as listed or approved equal.

Unit#	Model #	CFM	ESP	Voltage	HP	Notes	Throat Area
EF-1	GN-182	218	.25	120/1	189w	1,2,3	6" DIA./ 14"x 4"
EF-2	GN-720	669	.25	120/1	320w	1,2,3	17"x12/ 11"x 5"

Notes: (1) Provide vibration isolators, 2) Motor Speed control, 3) Provide back draft damper.

2.03 AIR CONDITIONING UNIT: ACU-1 / AC-1, 2, & 3

- A. Air conditioning system shall consist of multi circuit drop in ceiling mounted fan/evaporator units and outdoor matching condenser.

ACU-1: Condenser Unit capacity: 30,341 btu/hr cooling / 18,632 btu/hr heating. Mitsubishi Heat Pump Unit series: model #PUMY-P36NHMUR4,. Unit specifications: SEER 14.5, COP 3.26.0, 230 v, 1 ph., refrigeration R 410A. RLA; 15.7, max fuse size; 25 amps, refrigeration piping flare type, 3/8" liquid, 5/8" suction. Provide accessories, remote handheld controller, optional low ambient control, and pre-charged liquid, and suction lines.

- B. AC 1,2, & 3: Ceiling mounted fan evaporators indoor unit model #PLFY- series, 230V - 1φ, remote wireless controller. Provide refrigerant manifold model #CMY-Y64-G-E, SMART ME controller, pre-charge refrigerant 1/4" liquid and 1/2" suction lines.

- C. Unit Schedules.

Unit #	Model #	cfm	Watts	Voltage	Cool/Heat	Note
AC-1	PO8NCMU-E	350HI	50	230/1/60	7585 / 4658	1, 2
AC-2	PO8NCMU-E	350HI	50	230/1/60	7585 / 4658	1, 2
AC-3	PO8NCMU-E	350HI	50	230/1/60	7585 / 4658	1, 2

Note 1) Ceiling T-Bar drop in mounted with grille 2) Wireless Remote Controller

2.04 CABINET UNIT HEATERS: CUH

- A. HW cabinet unit heaters shall be manufactured by Sterling, or Modine, Trane or approved equal. Units shall be as follows:
- B. HW-heating coil; copper coil with aluminum fins, 180 degree F EWT, EAT=60 db/ 52 wb, LWT=160 degree F HWR, at scheduled gpm. Supply and return water manifolds header shall be provided, and coil shall be pitched for proper air venting.
- C. Wiring: Supply fan power wiring shall be brought to motor by others along with necessary disconnect. Control wiring and associated controls shall also be by others.
- D. Unit Schedules. (Based upon Sterling)

CUH #1 shall be Sterling , Model #02, RWI-1130, semi recessed type, inverted flow type with bottom supply air and top return, hinged access grille 25.8 MBH with 180 degree F EWT, 230 CFM, 2.5 GPM, .067 HP motor.

All CUH enclosures shall have primer coat and standard baked enameled finished approved color by Owner. Unit power: 120volt / 60hz / 1 phase. Provide motor speed control switches, heavy duty architectural aluminum anodized front inlet and discharge grilles, unit filters, MERV 8. Unit thermostat and associated controls by A.T.C.

2.05 UNIT HEATERS: UH

- A. HW unit heaters shall be manufactured by Sterling, or Modine, Trane or approved equal. Units shall be as follows:
- B. HW-heating coil; copper coil with aluminum fins, 180 degree F EWT, EAT=60 db/ 52 wb, LWT=160 degree F HWR, at scheduled gpm. Supply and return water manifolds header shall be provided, and coil shall be pitched for proper air venting.
- C. Wiring: Supply fan power wiring shall be brought to motor by others along with necessary disconnect. Control wiring and associated controls shall also be by others.
- D. Unit Schedules.

Unit #	Model #	scfm	HP	Voltage	Coil MBH	GPM	Note
UH-1	HS-48	750	1/20	120/1/60	34.8	3.5	1, 3
UH-2	HS-36	450	1/25	120/1/60	26.1	2.6	1, 3
UH-3	HS-18	400	1/40	120/1/60	13.0	1.3	1, 3
UH-4	VS-104	1528	1/8	120/1/60	68.0	7.0	1, 3

- Note:
- 1) Ceiling Suspended - provide vibration isolators
 - 2) Wall mounted - provide vibration isolators
 - 3) Unit thermostat and associated controls by A.T.C.

2.06 FIN PIPE RADIATION

FR-1: Fin pipe radiation shall be Sterling Radiator Manufacturer, LCS-Line Series Style R04, slope top profile, #LCS 10, .75" – 2-3/4" x 3-3/4" 50 fins per foot or equal, 810 btu/LF at 180 degree HWS.

FR-2: Fin pipe radiation shall be Sterling Radiator Manufacturer, LCS-Line Series Style R03, slope top profile, #LCS 10, 1" – 2-3/4" x 2-1/2" 55 fins per foot or equal, 1105 btu/LF at 180 degree HWS.

Enclosure shall be LCS series with return pipe hangers and slide type damper. Enclosure shall have primer coat and standard baked enameled finished approved color by Owner. Provide all necessary enclosure accessories.

2.07 REHEAT COILS: RHC

Provide reheat coils as shown on plans per schedule manufactures as US Coil, Sterling, Trane or approved equal units as follows; EWT= 180 F, EAT= 50 F. Coils shall be housed inside metal cabinet enclosure with side removable service panels, drip pan with drain.

RHC units shall be provided with factory mounted two row. Coils to be constructed of copper tubes, aluminum fin, and galvanized steel frame. Coils shall have full fin collars for accurate fin spacing and tube fin contact. Tubes shall be 5/8" O.D. seamless copper with female sweat type water connections. Coils shall be leak tested at 300 psig.

Units shall be provided with slip and drive or straight flange rectangular discharge duct connection. Refer to mechanical drawings for HW coil/ductwork detail.

RHC#	SIZE cfm	MBH min.	GPM	DESIGN cfm	COIL SIZE Face Area	Enclosure Size
1	1500	60.0	6.0	1350	28"w x 14"h	32"w x 16"h

HWS & R connections 1" sweat.

2.08 COMPRESSION & THERMAL TANKS:

A. HW Glycol Heating System (ET-1)

Compression tank shall be installed per manufacturer's instructions complete with all necessary traps, air charging and draining valves and shut off cocks. Tank shall be manufactured by Taco CBX-84-125 or approved equal. Storage tank shall be vertically floor mounted, ASME rated with total storage capacity of 22.0 gallons, max. working pressure 125 psig, and maximum working temperature 375 F. One bottom mounted, threaded 1/2" top connection, 3/4" bottom connections. Tank dimensions 16" diameter x 38" high.

B. HW Thermal Storage Tank (TS-1)

Storage tank shall be vertical, floor mounted, ASME rated with storage capacity of 100 gallons, max. working pressure 125 psig, and maximum working temperature 375 F. Taco model MPT0100F02-100NX or approved equal. Threaded connections: 2 – 2.0", one on bottom and on top, (4) 2.5 side connections with 3/4" ports. Optional 1" silicon insulation.

2.09 HW & CW CIRCULATING PUMPS:

A. CP #1 & 2 HW & HW Systems

Provide HW circulating pump in-line centrifugal type as shown on plans. Pumps shall be manufactured by Taco as acceptable pump manufactures. Taco Series Viridan 15 - 30.

Pump #	GPM	HEAD	HP	RPM	VOLTS	PHASE	IMPEL	Flange	TYPE
CP-1	37.0	28'	.68	3450	230	1	-	1-1/2"	VR15
CP-1	37.0	28'	.68	3450	230	1	-	1-1/2"	VR15

Provide multi – purpose valves, isolation valves, wye strainer, and stainless steel flex connector for each pump as detailed. Motors Hi Eff +3 TEFC type. Provide factory start-up during commissioning.

2.10 AIR SEPARATOR: HW & CW

- A. AS-1: HW System: 2.0" air purge separator with strainer and 1/2" auto air eliminator, Taco Model #49020--125A series or approved equal. Air vent, Amtrol #706 or approved equal.

2.11 FUME HOOD

Provide one paint fume hood. Hood shall be 72"L x 28"W x 24"H, made of 304 SS, welded construction, 10" x 10" top centered outlet. Provide optional accessories vapor tight lights, unit mounted light switch, filter racks, 2" MERV 8 filters, S style edge, and internal baffles. Unit shall be ceiling supported by carbon steel threaded rods. 120v hard wired power. Kees Incorporated, industrial exhaust hood series, KA.

2.12 BOILER / BURNER PACKAGE: BLR #1(Owner Provided)

A. Provide installation of one pellet boiler with auger system / silo as shown on plans. Kedel series, wood pellet fired type; Gross input 54 MBH, Net output n/a MBH. Boiler packaged assembly maybe viewed at NMCC campus per request. Package will consist of HW boiler, circulator pump, pellet auger assembly, pellet silo, and pellet fill piping. Contractor shall be responsible of all installation of components per manufactures recommendations.

B. BOILER / BURNER PACKAGE: BLR #2

Provide HW boiler with burner as shown on plans. Pensotti Model #BL7R-185. or approved equal. Gross input 257 MBH, Gross output 220 MBH. Boiler/burner package shall be started up by approved factory representative.

Standard Equipment:

- *Insulated metal jacket
- *Burner Field mounted
- *Steel angle floor stand
- * ASME relief valve, 30 psi, TheraHimeter
- * Manual reset, Hi-Limit control, low water cutoff
- *ASME and National Certified, UL Listed

BURNER: Manufactured by Riello 40, model F10, forced draft, electric ignition, with maximum firing rate of 2.95 gph #2 fuel oil. Burner shall be set up to fire 1.75 gph firing rate. Burner control circuit power by 120 volt, 60hz, 1 phase, 1/3 hp burner motor. Burner shall be started by approved factory representative.

2.13 FUEL OIL TANK

Provide and install one 275 gallon Fuel Oil Tank: Double wall containment type. Granby Steel Tank, Dehoust, PE multipurpose, #961304, 275 gallon capacity, optional leakage indicator. Dimensions: 28"w x 63"h x 44"L.

All fill and vent piping shall be 1-1/2" black iron, A-120, pipe with malleable iron fittings. Cast iron fittings will not be permitted. Provide necessary accessories as fill cap, vent cap/whistle, and float type fill gauge.

Supply and return oil piping to burner shall be 3/8" black iron, A-120, pipe with malleable iron fittings. Cast iron fittings will not be permitted. Type L soft copper with brass flared fitting connections may be uses within two feet of the burner. Protect piping as deemed necessary with PVC or light gauge piping. All work shall comply with state, federal, and local codes.

Provide new oil tank fill gauge with ultrasonic type unit, manufactured by Tekelek, model TankAlert, tank transmitter and remote receiver.

2.14 HW & CW WATER PIPING SYSTEMS

- A. PIPING: All HWS & HWR piping 2 1/2" to 4" shall be steel schedule 40-ASME 120 pipe with either screwed type Malleable iron fittings, or welded pipe and fittings. Victualic fittings will be acceptable for HW and CW systems. HWS & HWR, and CWS & CWR piping 2" and smaller shall be steel schedule 40 ASME 120 pipe with screwed type fittings or type L copper with sweat copper fittings, acceptable.

Underground/slab HWS & R water Piping: Carrier pipe; PEX pipe with 2" diameter, schedule 40, PVC protective jacket. Provide 1/2" Armaflex close cell insulation over PVC.

All piping shall be installed so as to provide allowances for expansion and contraction and shall be thoroughly cleaned and reamed before installation.

- B. VALVES: Gate valves shall be all bronze body, non-rising stem, renewable composite disk, union bonnet, 125 Lb. W.S.P.. Valve body shall be designed such that repacking valve under pressure is possible. With the exception of steam, Shut off valves 2" and smaller may be ball type, inline service (3-piece), bronze, full port, with fiberglass reinforced teflon seats. Acceptable valves shall be : Apollo-3, Watts Series B-6800, Fairbanks No. 0851 "Sphero", Hammond Series BV-811. Shut off valves 2-1/2" and larger shall be cast iron body OS & Y type with rising stem. ITT Grinnell, Fairbanks, Jenkins manufactures are acceptable.

Shut off valves shall be installed on all main and sub main branches and as shown on the Drawings, details and where specified: Provide shut off valves on branch lines and as detailed.

- C. BALANCING VALVES: Balancing valves shall be provided for all terminal heating and cooling unit, and branch mains as indicated. The flow measuring device shall have a calibrated orifice, disconnects, chain metal tag-ball valve shutoff with memory locking device. Balancing valves shall be Gerand, or Taco.
- D. CHECK VALVES: Check valves shall be 300 lbs non shock type, capable of changing disc without removing valve body. Jenkins, Mueller Muesco 101AP or approved equal.
- E. AIR VENTS: Float type air vents shall be automatic and installed at all high points in the system and at the top of each coil and drain valve at all low points. Vents shall be Bell and Gossett Company, Amtrol #706 or equal.
- F. DRAIN VALVES: Drain valves shall be installed in all low points in the system and on supply and return connections for chemical cleaning. Drain valves shall be ball type with hose connector and cap and chain.
- G. STRAINERS: Provide wye strainers for all hot and chill water coil equipment. Wye strainer shall be 125 lb. iron body, with 20 mesh stainless steel screen, threaded ends or sweat ends.

- H. PRESSURE GAUGES: Provide pressure gauges (commercial Grade B) in supply and return connections to each pump. Gauges shall have a scale with a mid-point of approximately 50 psig. Pressure gauges shall be of the 4-1/2" size cast aluminum cases, phosphor bronze bourbon tubes, brass movements, white dial faces with black lettering and adjustable black pointer and brass sockets. Pressure gauges shall be Trerice #6001 or approved equal. All gauges shall be provided with Trerice #872 pressure snubber or approved equal. All pressure gauges shall be equipped with Trerice #865T handle gauge cocks or approved equal. All gauges shall be provided with vibration dampener and shall be as manufactured by March, U.S. Gauge, Weiss and Trerice.
- I. THERMOMETERS: Thermometers shall be stainless steel, bi-metal, 5" diameter face adjustable angle, with separable brass sockets, 4" stem length; the range shall be -40 degrees F to 60 degrees F for chill water piping. Thermometers shall be manufactured by Marsh, Weiss, Tel-Tru, Trerice (B85600) or approved equal.
- J. VIBRATION FLEX JOINTS; Vibration joints for pumps, AHU coils shall be bronze or stainlell steel braid hose type, rated for 125 psi minimum, manufactured by Flexonics PCB series or equal.
- K. DRAIN VALVES: Drain valves shall be installed in all low points in the system and on supply and return connections for chemical cleaning. Drain valves shall be ball type with hose connector and cap and chain.
- L. DIELECTRIC UNIONS: Dissimilar piping materials: Where there is a junction of two different metallic piping materials, and where electrolysis may occur, provide dielectric unions or companion flanges with non conductive gaskets.

2.15 HANGERS AND SUPPORTS:

- A. Provide all pipe hangers and equipment supports, and be responsible for proper and permanent location. All piping and equipment shall be supported and fastened in a satisfactory manner.
- B. All piping shall be rigidly supported from the building structure by means of approved hangers and supports. Horizontal piping shall be hung with adjustable wrought iron or malleable iron pipe hangers, clevis or roller type unless otherwise specified, spaced as follows:

Pipe Size	Rod Diameter	Maximum Spacing	Hanger Type
3 / 4"	3 / 8"	5'-0"	Clevis
1"	3 / 8"	6'-0"	Clevis
1-1 / 4"	3 / 8"	8'-0"	Clevis
1-1 / 2" & 2"	1 / 2"	12'-0"	Clevis
2-1 / 2" & 3"	1 / 2"	12'-0"	Clevis w/ roller
4" & 5"	5 / 8"	15'-0"	Roller w/ spring

- C. Vertical piping shall have friction clamps on each floor. Vertical pipe risers shall be supported at each floor by friction clamps or inserting around the supply pipe, a coupling which shall rest on pipe sleeve. shall be firmly supported at their base, either by a suitable hanger placed on the horizontal line near the riser, or by a base fitting set on a pedestal or foundation carried down to a firm bearing.

- D. Hangers for piping shall be Carpenter-Patterson No. 1A Bank Type, Grinnell Co., Calco Steel Products Co., or equal, black steel with hanger rods with machine threads. For un-insulated, copper tubing, the hangers shall be copperized. Hanger for use on insulated service lines shall be sized to allow for insulation thickness, except that branch runouts to individual fixtures and water piping within concealed pipe chases shall be supported with split ring hangers attached directly to tubing.
- E. Chain, strap, perforated bar, or wire hangers will not be approved. Approved gang hangers may be used in lieu of separate hangers on pipes running parallel to each other and close together. Where used for copper tubing, the gang hangers shall have copper saddles or shall be sheet-lead coated.
- F. All insulated piping hanger supports shall be provide with hanger insulation protection saddles thickness of the associated pipe insulation. Carpenter & Paterson 350 series.
- G. Pipe and pipe support hanger shall be constructed of the same material such that electrolysis may not occur between hanger, protection saddle, etc. and piping.

2.16 PIPE INSULATION

- A. Unless otherwise noted or specified, insulate all piping conveying heating fluids with pre-molded fiberglass pipe insulation with all service jacket. Insulation average thermal conductivity shall not exceed 0.24 Btu per inch of thickness per square foot per degree F per hour at a mean temperature of 75 degrees F. Fire and smoke hazard for composity insulation (, jacket or facing and adhesive) shall not exceed a flame spread of 25 and smoke developed of 50 per ASTM E84, NFPA 255 and UL 723. Insulation shall be Johns- Manville, FLAME SAFE, AP, Owens-Corning Fiberglass 25ASJ, KNAUF or approved equal.
- B. Insulation thickness for pipe sizes 1 1/2" and smaller shall be 1" thick with white removable protective jack. Insulated Pipe fittings shall match pipe insulation. HW piping 2" and larger shall be insulated with 1-1/2" thick pipe insulation with white removable protective jack.
- C. Condensate waste piping: Insulate with 1/2" thick pre-molded glass fiber insulation or Armaflex and fittings, flanges, valves, etc.
- D. Chilled water piping: provide 3/4" thick Armaflex # AP-2000 closed cell insulation or 1-1/2" high density fiberglass with white removable protective jack. All CWS & R piping, pumps, tanks, fittings, and system cold competent devices shall be insulated. Install per manufacture's recommended procedures.
- E. Steam and condensate: piping 1-1/2" and larger shall be insulated with 1-1/2" thick pipe insulation with white removable protective jack for all pi[ping fittings, flanges, valves,
- F. Exterior Piping: Exterior Piping: Insulation shall be 2" high density, mineral wool pipe insulation with all aluminum, Stocco & Boss 020 removable service jacket. All joints shall have stainless steel wing seals and bands. Insulation average thermal conductivity shall not exceed 0.24 Btu per inch of thickness per square foot per degree F per hour at a mean temperature of 75 degrees F.

2.17 ESCUTCHEONS

- A. Escutcheons shall be installed around all exposed pipe passing through a finished floor, wall, or ceiling. Escutcheons shall be heavy cast brass, chromium plated, adjustable, and shall be of sufficient outside diameter to cover sleeve opening and shall fit snugly around pipe, and lock with set screw.

2.18 SLEEVES:

- A. All sleeves shall be one-piece Schedule 40 steel pipe. The sleeves shall be fitted securely to prevent slipping or moving.
- B. All piping through masonry walls, floors, beams and partitions shall be sleeved. All sleeves shall finish flush with the finish line. All sleeves shall be chalked with an approved water repellent and fire retardant sealant.
- C. Space between sleeves and piping shall be sealed watertight and/or gastight as described below:
 - 1. Uninsulated metal piping shall be sealed watertight and/or gastight by packing space between pipe and sleeve with approved packing. Special care shall be taken not to drive lead below top of sleeve. Mechanical seals may be used.
 - 2. Insulated piping and plastic piping shall be sealed watertight and/or gastight by packing space between pipe sleeve and insulation with an approved packing. Fill the remaining space with approved waterproof resilient adhesive sealant.
- D. Sleeves shall be of size to allow for continuous full thickness of pipe insulation through sleeve.
- E. Provide waterproof sleeve or casting on each pipe entering or leaving building through foundation walls and tank pits, or wet wells. Seal space between each pipe and its waterproof sleeve. Each end of sleeve shall be sealed as described above. Each pipe shall be concentric with sleeve. Sleeves shall be waterproof type with welded or cast flange and of size and length to suit pipe and wall thickness. Sleeves shall be all galvanized after welding.

2.19 PIPE IDENTIFICATION:

- A. Provide color coded pipe identification markers on all piping in the building installed under this Section. Pipe markers shall be semi-rigid plastic identification markers equal to "Set Mark" Type "SNA" by Seton Nameplate Corporation or equal.
- B. Provide an arrow marker with each pipe content marker to indicate the direction of flow. If flow can be in either direction, use a double headed arrow marker.
- C. Piping shall be labeled at 20 foot intervals, adjacent to each valve, on each riser. This work shall be done after architectural finish painting where such is required on the pipes.

- D. The following color coding shall be used with names in black letters on backgrounds indicated:

<u>Service</u>	<u>Legend</u>	<u>Background Color</u>
Heating HWS	Heating HWS	Yellow
Heating HWR	Heating HWR	Yellow
Chilled Water Supply	CWS	Yellow
Chilled Water Return	CWR	Yellow

- E. In general, 3/4 inch high legend shall be used for pipe lines.

- F. All markers to be OSHA approved.

2.20 VALVE TAGS AND CHARTS:

- A. All valves on pipes of every description have neat circular 1 1/2 inch brass valve tag attached with brass chain to each valve stem. Stamp on these valve tags in white letters as large as practical the number of the valve and its service, such as "H.W.", "C.W." for hot water and cold water respectively. The number of each service shall be consecutive.
- B. Valve numbers shall correspond to numbers indicated for valves on the record Drawings and on two printed detailed lists. These printed lists shall state the numbers and location, including the painted door room number, the location in the room (with location dimensions if concealed), of each valve and the fixture or group of fixtures which it controls, and other necessary information, such as requiring the opening or closing of another valve or valves, when any one valve is to be opened or closed.
- C. The printed lists shall be prepared in a form to meet the approval of the Architect and Owners. Record lists shall be included as part of O & M manuals.

2.21 DUCTWORK

Low pressure ductwork shall be defined as ductwork subjected to velocities of 2000 fpm or less, and operating pressure of 2" w.g. or less, positive or negative. Medium pressure duct is defined as ductwork subjected to velocities 2000 FPM and up and operating pressure of 6" positive static pressure.

Duct Pressure-Velocity Classification is as follows:

<u>System</u>	<u>SP Rating</u>	<u>Pressure</u>	<u>Seal Class</u>	<u>Velocity</u>
VAV Supply Ducts	6"	+ Pos.	A	2000 FPM UP
VAV Return Ducts	2"	Pos. or Neg.	B	2000 FPM DN
All other ducts	2"	Pos. or Neg.	B	2000 FPM DN

All supply air ductwork from HRU-1 shall be considered low pressure, 2" or less, class B ductwork construction. Ductwork serving all other air handling equipment shall be considered low pressure, class B ductwork construction.

2.21a DIMENSIONS

1. The size of ducts marked on the drawings are clear area and will be adhered to as closely as possible. The right is reserved to vary duct sizes to accommodate structural conditions during progress of work with-out additional cost to Owners. Duct layout is schematic to indicate size and general arrangement only. All ducts shall be arranged to adjust to "field conditions" Sheet Metal Contractor shall coordinate work with Electrical Contractor and other trades.

The duct sizes shown indicate the clear inside dimensions.

2.21b DUCT LEAKAGE

1. All ductwork shall be sealed as outlined in the HVAC Duct Construction Standards Metal and Flexible by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (Hereafter referred to as SMACNA HVACDS). All ductwork shall be sealed to a minimum of class A as outlined in the manual.
2. All medium duct systems shall be sealed as required to provide no more than 5 percent of the total system capacity and tested by an independent agency. All ductwork joints, seams, fittings, etc. shall be sealed with two coats of an asbestos-free mastic sealant. Foster - Monolar Mastic or equal. Test each medium pressure duct system as outlined in paragraph 2.26 Testing, Balancing, & Adjusting of this Section.

2.21c DUCTWORK:

1. Ducts shall be constructed of galvanized steel in accordance with high and low pressure duct construction standards specified by SMACNA "HVAC Duct Construction Standards- Metal & Flexible, 3rd Edition, 2005. All ductwork shall be constructed of quality materials. All gauges, reinforcing, longitudinal and cross joints, elbows, transitions, hangers, access panels, volume dampers, etc., shall be as shown and specified in the Sheet Metal and Air Conditioning Contractors' National Association, Inc.'s "Duct Construction Standards" under the classification of 2" w.g. (+,-). Provide access panels into ducts at all coils, automatic dampers, controls, instruments, filters, valves and equipment not easily accessible. Provide manually operated volume control dampers in all duct run-outs to ceiling diffusers. Locate all ductwork to miss all field obstructions, including all piping, conduits, beams, bar joists, etc. Elbows shall be square type with turning vanes. Support ductwork with approved strap hangers fastened to side and bottom by sheet metal screws and to building with leak expansion plugs or other approved means. All framing angles shall be provided by this contractor. All duct runs shall be coordinated with existing conditions and approved by the Engineer.
2. Fittings: Square elbows, round elbows, fittings, branch take-offs, transitions, duct volume dampers, fire dampers, flexible connections, and access doors shall conform with the SMACNA HVACDCS, Section 2.
 - a. Rectangular branches shall be 45 degree take-offs and conical or bellmouth take-offs shall be used for round branches. (Each branch line shall have a Volume damper installed.)

- b. Round Elbows: Provide 45 degree and 90 degree elbows of 2 piece die stamped construction for ducts 8 inches or less in diameter. For ducts over 8 inches in diameter, provide 5 mitered piece for 90 degrees and 3 mitered piece of 45 degrees.
- c. Round and Oval Ducts: SMACNA HVACDCS, Section 3. Rectangular Ducts: Make joints between sections of duct and between ducts and fittings with either gasketed flanged connection, welded flange joints, or other joints recommended in SMACNA HVACDCS Section 1, and reinforce at the joints and between the joints as recommended.
- d. Flexible round duct: flexible insulated duct shall be permitted for supply air devices and shall have glass fiber reinforced foil face vapor barrier facing. Flex runs shall not exceed 5 feet.

3. Dampers

Balance / Volume Dampers: unless otherwise noted, all manual Balancing dampers shall be pre-manufactured, constructed of formed steel a minimum of #16 gauge and stiffened as required for pressure class, OBD type. Acceptable manufacture Ruskin series MD 25 and MD 35. Do not use splitter dampers. Shop manufactured dampers will not be excepted.

Control / Mixing Dampers: unless otherwise noted, all control and air mixing dampers shall be pre-manufactured, constructed of formed steel a minimum of #16 gauge and stiffened as required for pressure class, opposed blade type, and neoprene edge seal. Acceptable manufacture Ruskin series CD60 for rectangular and CDR25 for round damper configurations.

Exterior OA / EA Dampers: unless otherwise noted, all outside and exhaust dampers that is associated with ductwork penetrating to the exterior shall be pre-manufactured, insulated, damper, constructed of formed aluminum a minimum of #12 gauge and stiffened as required for pressure class, opposed blade type, and EDPM edge seal. Compete blade shall have an insulating factor of R-2.29 with temperature index of 55. Acceptable manufacture TAMCO, series 9000 for rectangular and CDR25 for round damper configurations.

4. Flexible Connectors

- a. Furnish and install flexible connections on all air handling unit and exhaust fans equipment. Connections shall be made from Ventglas neoprene coated glass fabric, as furnished by Ventfabrics, Inc., or equal.
- b. Materials: Interlocking spiral or helically corrugated type constructed of zinc-coated steel, corrosion-resistant steel, aluminum, or noncollapsible fire-retardant, woven mineral fabric.
- c. Joints: Make airtight slip-joints, seal with pressure-sensitive vapor-seal adhesive tape or duct-sealer, and secure with sheet metal screws. To prevent insulation compression place 2-inch wide by one-inch thick closed cell foam plastic spacers over the joints under vapor barriers. To provide a vapor tight joint, use a corrosion-resistant steel or aluminum clamp over such spacers.

2.21d DUCT INSULATION

- A. Unless noted otherwise or indicated on plan, all low and medium pressure supply ductwork shall be insulated with 2" of fiber glass wrap insulation with aluminum vapor barrier. All low pressure return and exhaust ductwork shall be insulated with 1-1/2" of fiber glass wrap insulation with aluminum vapor barrier.
- B. All low and medium pressure supply and return ductwork, located in unheated areas, (unless noted otherwise or indicated on plan), shall be insulated with one layer of 1.5" high density fiberglass duct board with aluminum vapor barrier and thermal conductivity R-value of not less than $R = 7.0/\text{inch}$. All seams taped properly.
- C. All exhaust and fresh OA air ductwork from its associated air handling device to its respective exterior louver shall have one layer of 1" high density fiberglass duct board with thermal conductivity R-value of not less than $R = 7.0/\text{inch}$. All seams taped properly.
- D. All insulated duct fiberglass wrap insulation with foil faced vapor barrier, Owen-Corning type 150 insulation. Flexible insulation shall have glass fiber reinforced foil face vapor barrier facing, Owens- Corning Fiberglass EK FRK-25, or approved equal. Insulation maximum thermal conductivity shall be 0.24 Btu/in/hr/SF degrees F at 75 Degrees F mean temperature. Fire hazard classification shall not exceed a flame spread of 25 and smoke developed of 50 per ASTM E-84, NFPA 255 and UL 723. Insulation shall be Johns-Manville, Flame Safe, AP, Owens- Corning, Knauf, or approved equal.
- E. All ductwork which is indicated on plan or scheduled for acoustical liner shall be environmental approved and have the following characteristics: Liner to exceed ASTM C 1071 for surface burning, temperature resistance, moisture absorption, erosion resistance, corrosiveness, and bacteria and fungi resistance. Liner shall be flexible polyimide foam coated with an acrylic polymer. Thermal Conductivity (k); .30(btu-in)/(hr-sq. ft-F), R-value / inch; 3.3 (hr-sq ft-F)/(btu), Surface burning; flame spread<25, Temperature resistance; ASTM C 411 Pass, Water vapor sorption; < 2% by weight, Fungi / bacteria resistance; no growth, Density; .80 lb/sq. ft. Solcoustic Duct Liner or approved equal. 1" thick. Ph. 972-516-0702
- F. Exterior Duct Insulation: All exterior ductwork shall be insulated with two layers of 2.0" high density fiberglass duct board with EPDM rubber membrane weather barrier, white in color, and thermal conductivity R-value of not less than $R = 7.0/\text{inch}$. All seams taped properly.

2.21e. Duct Access Doors

Hinged insulated access doors with seals shall be provided in ducts where indicated on drawings, or as required. Provide access panels for all equipment installed in ductwork such as motorized dampers, reheat coils, turning vanes (up stream) Units shall be provided at each fire damper unless accessible through grilles and as shown on drawings. Doors equal Ruskin ADH series. Size: duct size or 12"w x 12"h min.

2.21f MOTOR OPERATED DAMPERS & LOUVERS

Motor operated control dampers mounted in duct shall be provided by Temperature Control Contractor, but installed by Sheetmetal Contractor.

2.21g DUCT SLEEVES

Provide galvanized duct sleeves through outside wall at all locations as shown on drawings. 20 gage minimum. Where sleeves are installed in bearing walls, provide structural steel sleeves.

2.22 DIFFUSERS, GRILLES, REGISTERS

Diffusers/Grilles/Registers type: Shall be Price series or approved equal. RG & D's shall have square inlet and be T-bar and surface mounted where applicable.

- A. Supply Diffusers and Grilles: Diffusers shall have a full face pattern controller, two, three and four way pattern as indicated: Provide adjustable air pattern cones.

S-1 Type: 6" inlet, 24"x24", Series SCDA, T-bar, Price # SCDA, 4 cone
S-2 Type: 8" inlet, 24"x24", Series SCDA, T-bar, Price # SCDA, 4 cone
S-3 Type: 10" inlet, 24"x24", Series SCDA, T-bar, Price # SCDA, 4 cone

- B. Supply Grilles: Grilles shall be architectural linear bar type, aluminum constructed and anodized white finish. Provide the following options; linear straighten grid, hinged access doors, OB damper Price #LBMH 26B, 1/2" bar spacing, and 3/4" border frames.

SG-1 Type 18" w x 18" h inlet grille, horizontal bars, 15 degrees, OBD

- C. Return air grilles and registers: Price 600 series with aluminum fixed louvers, 45 degrees 1/2" blade spacing with opposed blade damper or approved equal, standard white finish. Grilles and registers shall be surface mount where applicable.

R1 Type: 12" w x 12" h grille, surface

- D. Exhaust air grilles and registers: Price 80 series with aluminum 1/2 x 1/2 x 1/2 squares with opposed blade damper or approved equal, standard white finish. Grilles and registers shall be surface mount where applicable.

E-1 Type: 12" w x 10" h grille, surface

2.23 FIRE DAMPERS:

Install as indicated on drawings fire dampers with fusible link. The damper shall be curtain type which will allow clear free area to be the same as duct size and have a minimum fire rating of 2 hour, UL listed. Rectangular Greenheck model #FD 203 type A or approved equal.

2.24 OUTSIDE AIR LOUVRES

Provide outside intake and exhaust louvres as shown on drawings. General Contractor shall install louvres. Frame shall be constructed of aluminum, 6" deep with fixed aluminum blades, blades set at 37 deg. angle. Blade style shall be drainable type. Louvre shall have 1/2" mesh bird screen and be licensed by AMCA. Ruskin or approved equal. Finish shall be anodized color approved by architect.

LV-1: 12"w x 18"h, fixed blade,
LV-2: 32"w x 20"h, fixed blade,

2.25 ROOF FRESH AIR & EXHAUST HOODS : RV

Provide fresh air and exhaust roof hoods, with 18" high roof curbs as shown on plans. Greenheck Model #WRH , 18" high pitched curb with tiered louvered hood.

Hood shall have bird screen and colored aluminum anodized finish. Color shall be approved by architect. Provide manufacture's prefabricated insulated roof mounted curb to match manufacture's hood. Penn or Acme acceptable manufactures, equivalent equipment subject to approval.

RV-1: 18"w x 18"d, fixed throat, free area 2.25 sq. ft.

2.26 PRE-FAB METAL CHIMNEY STACK

- A. Metal chimney stack and breeching components, supports and terminations shall be factory prefabricated, and shall be tested and listed by the Underwriters Laboratory, Inc., for use with building heating equipment burning gas, liquid or solid fuels as described in NFPA 211, Chapter 2. The system shall have clearances to combustibles of 2" and insulation thickness of 2" temperatures not exceeding 1400 degrees F continuous. The system is to be designed for continuous operation at temperatures not to exceed 1400 degrees F.

All stacks and breechings will have inner walls of 20 gauge Type 304 Stainless Steel. The outer jacket shall be 24 gauge aluminized steel. There shall be a 1" insulated space between the inner and outer walls.

Insulation to be 11# minimum density fiber insulation.

All connections to be made through the use of captive nuts and bolts.

The inner pipe joints shall be field sealed by use of containment bands and RTV silicone sealant temperatures up to 600 degrees F. The joints shall be sealed with high temperature joint cement (VS 600). The stack and breeching shall be AMPCO model IVSI, as manufactured by AMPCO, or Metal -Fab Company approved equal.

2.27 TESTING, BALANCING, & ADJUSTING

2.27.1 SUMMARY:

Testing, adjusting, and balancing shall include all constant and variable volume air systems and water hydronic systems, including domestic hot water returns.

2.27.2 SUBMITTALS:

Within 30 days of Contractor's Notice to Proceed, submit qualifications of TAB company. If not submitted within time frame specified, the Engineer reserves the right to choose a alternative TAB agency at the Contractor's expense.

Within 60 days of Contractor's Notice to Proceed, submit 1) Strategies and Procedure Plan, 2) System Readiness Check lists, 3) Examination Report, 4) Preliminary Project Example Report, specific to project, 5) Equipment to be used with calibration dates, and 6) Supervisor and field names.

2.27.3 QUALIFICATIONS:

- A. Qualifications: Test and balance agency shall be an independent agency specializing in the testing and balancing of HVAC systems. The agency must have a minimum of five years business, experience and be staffed with qualified personal. TAB agency shall be a State of Maine operated and owned Maine business.
- B. System testing shall be performed by NEBB or AABC certified technicians with a minimum of five years experience, or directly supervised by a qualified Heating and Ventilating Licensed Engineer fully employed by the TAB agency. All work shall be per National Environment Balance Bureau (NEBB). Agency shall be subject to approval before any testing is performed.

2.27.4 CONTRACTOR RESPONSIBILITIES:

- A. Mechanical Contractor shall provide one complete set of construction documents, addendums, approved submittals in hard copy as well as digital format.
- B. A.T.C. contractor shall provide required BMS hardware, software, personnel and field assistance for performing TAB procedures.
- C. Provide access to volume dampers, test ports, equipment, devices, etc.
- D. All HVAC systems shall be complete operational status before testing is started.

2.27.5 EXAMINATION:

- A. TAB agency shall be familiar with all project mechanical and associated electrical system equipment and components, along with the intent system design concepts. Examinations and standard pre-balance preparations shall be completed of all scheduled equipment and systems before testing.

2.27.6 GENERAL PROCEDURES FOR TAB:

- A. Perform TAB on each system according to the procedures in the latest edition of NEBB or AABC for air and hydronics.
- B. All devices that are considered field adjustable shall be field indicated or marked such that permanent identification of final setting.
- C. Air Equipment: Provide the complete balancing and adjusting of all air moving equipment and systems including, but not limited to:
 - 1. Adjusting fan speeds including re-heaving if required for all AHU's and fans.
 - 2. Test and record all motor currents and nameplate data.
 - 3. Test and adjust each diffuser, grille and register to within 5% of design requirements. Method of testing shall be to NEBB or AABC standards.
 - 4. List design and measured air velocities and quantities, fan speeds, static pressures, and motor amperage.
 - 5. All air moving equipment shall be tested at maximum operating status via motor starter or VFD.
 - 6. Provide measured temperature and quantities of return air and supply air for all AHU VAV box coil units.
- D. Hydronic Equipment: Provide the complete balancing and adjusting of all hydronic equipment and systems including, but limited:
 - 1. Set water flow for CUH's, FR base board, VAV & RH coils, etc., as scheduled.

2. Test and adjust flow at each balancing flow device unit.
3. List design and measured flows and temperatures.
4. Operate all hydronic pumps at maximum flow capacity in respect to motor horse power.

2.27.7 TOLERANCES

- | | |
|--|------------------|
| A. Air System air flow tolerances: Supply, return, exhaust | plus / minus 5%. |
| B. Outside minimum | zero to plus 5% |
| C. Pressure relationships | plus / minus 3% |
| D. Hydronics HW, CW, DHWR | plus / minus 10% |

2.27.8 COMMISSIONING:

- A. Commissioning: The TAB Agency shall be responsible to pre-commission the sequence of ATC operations and devices and all HVAC equipment. TAB agency shall schedule and arrange meetings and procedures with the ATC and Mechanical contractor. HVAC and ATC operations and sequence short falls shall be reported to Mechanical Contractor and Engineering. Deficiency reports formatted similar to commissioning protocol standards BBCC or ACG shall be received. TAB Agency shall allow time for final Commissioning of involved systems.

2.27.9 FINAL TAB REPORT

- A. Test and balance agency shall submit a final TAB Report, five copies, of a complete record of the HVAC system and equipment performance. All remaining and outstanding deficiencies shall be included. All final operating field settings shall be documented for Owner's Maintenance personnel. The Owner's Representative has the right to reject the final TAB report if independent field measurements do not agree with more than 10% of recorded final reported data. In such an event, TAB services shall be re-performed either by the same TAB agency to the Engineer's satisfaction, or the Engineer reserves the right to choose an independent third party to accomplish such re-balancing at no additional costs to the Owner.

2.28 AUTOMATIC TEMPERATURE CONTROLS

A. General:

Furnish and install a complete automatic temperature control system consisting of automated controlled devices provided and installed by Honeywell. The ATC system shall be connected to, monitor, and control all HVAC equipment to provide the sequences as described in these specifications. The system general components shall be consistent with direct digital control devices, electric, electronic solid state, or a combination of the above, and shall include required components including, low voltage (24 V) and line voltage wiring. Pneumatic will not be accepted.

B. System Guarantee:

The entire control system shall be guaranteed for parts and labor a period of one (1) year from the date of acceptance by the Owner.

C. Diagrams and Supervision:

Provide any necessary wiring or piping diagrams and supervise the installation. These diagrams shall be incorporated into the Owner and Operating Manuals.

D. Control Panels:

In general, relays, transmitters, controllers, transformers, or other control devices (not including room thermostats) shall be grouped and mounted in a factory- built cabinet enclosure located in the Mechanical Room(s) or as indicated on plans.

E. Wiring:

It is the intent that all control wiring for installation of temperature controls shall be provided and installed by the A.T.C. Contractor, unless noted otherwise. Power wiring for HVAC equipment and wiring for boiler/burner package shall be by Electrical Contractor. All wiring shall comply with requirements of Electrical Section 26000 of the specification. Mechanical Contractor shall furnish temperature control devices with wiring diagram.

F. Automatic Control Valves:

Automatic control valves shall be full line size and 2- way or 3 - way valves, as indicated on plans or details, and shall be two position or modulating, normally closed or open type, determined by sequence, capable of being manually opened or closed through controller. Ratings: 250 degree F, 125 psi, Material: bronze or brass body, threaded or flanged ends.

G. Thermostats

Each thermostat shall be located as shown or where it will respond to the average space temperature if not indicated on prints. Thermostats shall be mounted approximately 48" above finished floor on interior walls or surfaces, not on outside walls. It is the intent that each zoned terminal heating device, in all areas, be independently controlled by its respective wall controller. All thermostats shall be protected with a clear locking cover guard.

Boiler Room UH shall be controlled by analog type T-stat and will not require cover guard. Thermostats in all areas shall be DDC programmable type, equivalent to Viconics series VT7200, network ready, 24vac zone terminal equipment controller.

H. SEQUENCE OF CONTROLS:

2.21.H.01 PUMP CONTROL:

CP- 1 & CP-2 H.W. circulating pumps shall be controlled on/off based upon outside temperature . A "hand- off-auto" switch shall be provided for each pump. In the "hand" position, the pump shall operate continuously. In the "auto" position, the pump shall be under control of the BMS controller and shall run continuously when the outside air temperature is below 65 degrees F (adj.) and on system heating demand. Pumps shall alternate from active to standby once every week. If lead pump does not prove flow, lag pump shall be started. Each pump motor RPM speed shall be self controlled. ATC shall activated/de-activated based upon OA temperature. Minimum and maximum pump RPM shall be field determined by TAB Agency.

CP- DHWR 1 Circulator: Pump shall be controlled on/off based upon occupied schedule, 120 F, adjustable via mixing valve. ATC to control & monitor DHWS temperature with Hi alarm. If DWHS is detected more than 125`F adjustable, pump shall disabled.

CP-BLR-1 & 2 Boiler H.W. circulating pump shall be controlled on/off based upon manual switch. A "hand- off-auto" switch shall be provided for each pump. In the "hand" position, the pump shall operate continuously. In the "auto" position, the pump shall be under control of Independent boiler controllers and shall run continuously when the HW boiler/burner is enabled.

2.21.H.02 H.W. BOILER/BURNER:

A complete set of factory installed operating and safety controls shall be properly installed, checked, and calibrated to protect each boiler unit from abnormal operating conditions. All safety controls shall be manual reset type.

Upon activation of CP-1 or 2, Pellet Boiler BLR-1 shall energize. If Boiler BLR-1 cannot maintain Thermal Tank setpoint. 180`F, adj., Boiler BLR-2 shall energize.

2.21.H.03 HWS RESET

The A.T.C. control system shall sense the zone HW supply hot water temperature and shall control to maintain required mixed reset hot water set point by means of 3 way mixing valve control. Reset water temperature schedule shall be determined by O.A. temperature. Minimum HWS temperature setpoint shall not be less than 140 F, maximum 200`F.

2.21.H.04 CABINET / UNIT HEATERS (CUH) / UH / FR

UH & CUH's fans shall be energized after wall stat calls for heat, 2 way, NO, valve shall open 100%, and associated HWS pipe mounted aquastat confirms water temperature above 120 When space temperature is satisfied, valve 100% close, fan shall be turned off. UH & CUH's will be on occupied/unoccupied schedule and motion detection uncc. override.

FR-1 & 2: fin radiation heat shall be controlled by associated DDC T-stat. 2 way, NO, valve shall open 100%. When space temperature is satisfied, valve 100% close. FR's will be on occupied/unoccupied schedule and motion detection uncc. override.

2.21.H.05 COMBUSTION MAKE UP AIR:

Provide one spring return, modulating actuator for a 16"h x 32"l OB damper for the intake air. Damper shall be interlocked with ATC panel to modulate open to maintain room pressure between - .001" to -.003"wc.

2.21.H.06 BOILER ROOM VENTILATION:

Provide one spring return, two position actuator for a 32"w x 16"h ventilation EA damper interlocked with ATC panel. When room temperature raises above 80F, adjustable, both combustion air and ventilation air dampers shall be energized 100% open.

2.21.H.07 HEAT RECOVERY UNIT: (HRU –1

During occupied periods (determined by clock schedule or motion override), the HRU's fans shall run continuously. Upon unit start up: Both SA and RA fans shall start up. Associated OA & EA shut off dampers shall open, spring return type.

HW Coil: RHC-1 A 3 way, modulating, spring return HW valve shall maintain discharge air temperature of 72`F, adj., from DDC wall T-stat located in Corridor 106.

Unoccupied Periods (HRU)

In unoccupied mode, HRU and associate equipment shall be de-energized, OA dampers shall go fully closed. Ductwork SA and EF: 100% closed. There shall be no fan operation for unoccupied cooling or heating periods.

Provide interlock with controls for a smoke detector device to be supplied by and installed by Electrical Contractor. Detectors shall be interlocked with unit. Locate detector such that when smoke is detected in supply and exhaust air ductwork, unit will shut off. When cause of smoke has been taken care of, unit shall be manually reset by proper authorities.

Provide all necessary relays, safety devices, such as freeze stats, etc., to protect the unit from component damage due to control device failure or mal-function. Low Temperature Safety Thermostat (Freeze-stat): Electric low temperature warning thermostat shall have low point sensitive elements installed to cover entire duct area. Thermostat shall be two position type with autol reset.

2.21.H.08 EXHAUST VENTILATION: EF-1 & 2

EF-1: IT Room ventilation base on temperature, provide space sensor, and (2) 12" w x 12"h OBD with SR damper actuator. Space temperature > 80 F, (adj.) EA & make up air damper shall go fully to the open position.

EF-2: Carpentry Shop Paint Hood: ventilation base on local fan on/off speed switch., 12" w x 12"h OBD with SR damper actuator. On / Off control. EA damper shall go fully to the open position when energized.

2.21.H.09 AC-1, 2, 3 (Alt. Add #1)

AC 1, 2, 3 shall be controlled by individual wall thermostats provided by AC manufacture, installed by A.T.C Contractor. Associated control wiring for ACU-1 shall also be provided by A.T.C. Contractor.

2.21.H.10 GARAGE CO & NO2 MONITORING

Provide and mount CO sensor 60" above finish floor with protective guard and NO2 sensor 60" below roof without guard. Provide remote H/O/A control switches, located in ATC Panel, to serve future fan motor. Either sensor shall energize red warning light when CO raises above 100 ppm or when NO2 raises above 5 ppm. All set points adjustable.

2.21.H.11 MANUAL OVERRIDES & SCHEDULES

There shall be the capability to manually override, in a "user friendly manner", unoccupied heating and cooling schedules from the ATC Panel / System. This shall be accomplished by individual mark timed switches, override switches, keypad display, or CRT wired to necessary controls if DDC are used. Motion detector(s) shown, shall, when activated, provide unoccupied system, heating only, override.

2.21.H.12 SYSTEM MONITORING & ANNUNCIATION

ATC Contractor shall provide system monitoring and alarm annunciation for the HW system as indicated on plans. This system shall be network ready and capability of future integration tie-in(s) into the Campus BMS.

2.21.H.13 SYSTEM TRAINING

ATC Contractor shall provide system training of all system components and DDC control programmed systems.

Provide 4 hours of training for the building operators, made up of two different sessions. The 1st session of training shall be 'hands-on' type at the Owner's place of convenience at approximately 50% completion. The intent of this training is that 2 hours will occur before the Owner has occupied the facility and the rest is to follow after the Owner has accepted beneficial use. A mutual agreement on the scheduling of this training class will be made between the Owner and the ATC contractor. The training class will use the actual operator manual that will be submitted for this project.

In addition to the above training and after the project has been finally commissioned, the ATC Contractor shall allow for 8 hours of Owner customized software programming, additional custom sequence and time at the Owner request.

2.21.H.14 COMMISSIONING:

Commissioning: A.T.C. Contractor, as well as all involved Sub-Contractors, shall collaborate and coordinate efforts with the TAB Contractor to perform commissioning of control sequences.

2.21.H.15 DOCUMENTATION:

Proper and adequate documentation must be provided, this will include:

- a. Accurate as-built drawings and sequences submitted in hardcopy and electronic form.
Provide program files, graphic information, and updated standard Computer Aided Drafting (CAD) as built record drawings and specifications.
- b. Owner's manuals including technical spec sheets
- c. Operator manuals

2.22 MOTORS AND DRIVES:

- A. Unless otherwise noted, all motors/ drives shall be furnished factory-mounted on the driven equipment and shall be provided by equipment manufacturer. Mechanical Contractor shall supply all motors to associated HVAC equipment. Electrical Contractor shall be responsible for providing motor starters, variable frequency drives, and disconnects and power wiring to all mechanical equipment including motor starters and terminating in such equipment. This Contractor and Electrical Contractor shall coordinate such installation of electrical equipment and both shall be present when motors of 1/2 hp and larger are to be first energized.
- B. Motors shall meet the latest applicable standards of the following:
 - National Electric Manufacturers' Association (NEMA)
 - American National Standards Institute (ANSI)
 - Institute of Electrical and Electronic Engineers (IEEE)
 - National Electrical Code (NEC)
 - Underwriters' Laboratories (UL)
- C. Motors shall be horizontal, induction type, for general purpose applications under usual indoor and outdoor service conditions as defined in NEMA Standard MGI-14.02 (Class B insulation, continuous 40 degrees C ambient).
- D. Unless otherwise noted, all motors 1/2 horsepower and larger shall be rated 230 volts, 1-phase, 60 hertz. All motors smaller than 1/2 horsepower shall be rated 120 volts, single-phase, 60 hertz.
- E. Motors shall develop rated horsepower at terminal voltage rating from 90 to 110 percent of rated frequency, and a combined frequency/voltage deviation of 10 percent at any frequency between 95 and 105 percent of rated.

PART THREE: EXECUTION

3.01 GENERAL

- A. The work shall be executed in strict conformance with the latest edition of the State Building Code and all local regulations that may apply. In case of conflict between the Contract Documents and a governing code or ordinance, the more stringent standard shall apply.
- B. All piping and ductwork shall be properly supported as approved by the Engineer.
- C. Follow equipment manufacturers' detailed instructions and recommendations in the installation and connection of all equipment. No equipment installation or connections shall be made in a manner that voids the manufacturer's warranty.
- D. Duct systems shall be thoroughly cleaned during erection.
- E. Refer to Section 06100 for specifications on cutting and sealing openings for piping, ductwork and other equipment penetrating walls, floors and roofs.
- F. Refer to Section 06100 and General Conditions for provisions governing work, including removal of existing equipment and advance notice of service interruption.

- G. All work shown on Drawings is diagrammatic. It is not intended to specify or to show every offset, fitting, and component. However, it is the intent of these Specifications and Drawings accompanying same that all required components and materials shall be furnished and installed under this Section, whether or not indicated or specified, in such a manner as to make the entire installation fully complete, operable and maintainable in all respects to satisfaction of Owner.
- H. Refer to appropriate sections for specifications on cutting and sealing openings for piping and other equipment penetrating walls, floors, and roofs.

Building Structure Penetrations; General Contractor to provide cutting & finish patching of all building structure penetrations involving removals and new installations of system items, devices, etc. associated with this trade. This contractor shall provide necessary and proper fire stop(s), water seal or weather stop(s), etc. associated with system device penetration. This trade shall coordinate all system component penetrations through building structure(s) with General Contractor and Owner.

3.02 GENERAL - PIPING

- A. All piping shall be installed so as to provide allowances for expansion and contraction and shall be thoroughly cleaned and reamed before installation.
- B. Shut off valves shall be installed on all main and sub main branches and as shown on the Drawings, details and where specified. Provide shut off valves on branch lines and as detailed.
- C. Piping system shall be tested at 1-1/2 times the working pressure, but not less than 50 psi. All leaks shall be repaired in a manner approved by the Engineer before applying insulation
- D. SLEEVES:

All piping through masonry walls, floors, beams and partitions shall be sleeved. All sleeves shall finish flush with the finish line. All sleeves shall be chalked with an approved water repellent and fire retardant sealant. Space between sleeves and piping shall be sealed watertight and/or gastight as described below:

1. Uninsulated metal piping shall be sealed watertight and/or gastight by packing space between pipe and sleeve with approved packing. Special care shall be taken not to drive lead below top of sleeve. Mechanical seals may be used.
2. Insulated piping and plastic piping shall be sealed watertight and/or gastight by packing space between pipe sleeve and insulation with an approved packing. Fill the remaining space with approved waterproof resilient adhesive sealant.

Sleeves shall be of size to allow for continuous full thickness of pipe insulation through sleeve.

Provide waterproof sleeve or casting on each pipe entering or leaving building through foundation walls and tank pits, or wet wells. Seal space between each pipe and its waterproof sleeve. Each end of sleeve shall be sealed as described above. Each pipe shall be concentric with sleeve. Sleeves shall be waterproof type with welded or cast flange and of size and length to suit pipe and wall thickness. Sleeves shall be all galvanized after welding.

3.03 GENERAL - DUCTWORK

- A. Assemble and install ductwork in accordance with recognized industry practices to achieve air tight (5% leakage) and noiseless (no objectionable noise) systems, and capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections, with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.

3.04 SEALING DUCT

After installation to seal class recommended in SMACNA "HVAC Duct Standards - 1st Edition 1985". Use sealant described in Paragraph 2.1 (G) of this section. All joints in sheet-metal ducts shall be made airtight, and all branches and turns shall be made with elbows and fittings. Elbows shall be provided with fixed double wall turning vanes designed to reduce resistance of the elbow to equivalent of a long radius elbow with throat radius not less than duct width.

3.05 LOCATION OF DUCT

- A. Locate ductwork runs, except as indicated otherwise, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or if not otherwise indicated, run ductwork in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold ducts close to walls overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view by locating mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions except as specifically shown. Coordinate layout with suspended ceiling, lighting layouts and similar finished work.
- B. Electrical Equipment Spaces: Do not run ductwork through electrical equipment spaces and enclosures.
- C. Where ducts pass through interior partitions and floors, conceal space between construction opening and duct or duct- plus-insulation with sheet metal flanges of same gauge as ducts. Over lap opening on 4 sides by at least 1-1/2" and seal to prevent sound transmission.
- D. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- E. Support ductwork in manner complying with SMACNA "HVAC Duct Standards - 1st Edition 2004 hangers and supports section.

- G. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- H. Clean duct system and force air at high velocity through duct to remove accumulated dust. Cheese-cloth shall be secured over each air outlet to entrain dirt and dust during this operation. Duct systems shall be thoroughly cleaned during erection.
- I. Provide adequate access into ductwork for cleaning purposes.

3.06 COORDINATION WITH ELECTRICAL WORK

- A. Available electric power shall be, in general, 230/120 volt, 1 phase, 60 hertz for motors of 1/2 hp and higher, and 120 volts, 1 phase, 60 hertz for motors smaller than 1/2 hp.
- B. Unless otherwise specifically noted, all 208v 3 phase motors furnished in this Section shall be furnished with magnetic across the line starters with H-O-A switch and reset push button in cover, and control transformer as necessary for reduced voltage, all contained in suitable general purpose enclosure. Electrical Contractor shall be responsible for providing motor starters and disconnects and power wiring to all mechanical equipment including motor starters and terminating in such equipment. This Contractor and Electrical Contractor shall coordinate such installation of electrical equipment and both shall be present when motor of 1/2 hp and larger are to be first energized. All coil control wiring shall be done under this section except as otherwise noted. Each unit shall be equipped with necessary auxiliary contacts for its application. Coil voltage shall not exceed 120 volts. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be bypassed when the switch is in the manual position; all safety control devices, such as motor overload protective devices, shall be connected in the motor control circuit in both the manual and the automatic positions of the selector switch. The starters solid state type with adjustable overcurrent relays, shall be as manufactured by Telemecanique, Westinghouse, General Electric or Cutler Hammer. Starters for outdoor equipment shall be weatherproof-type if exposed to the elements.
- C. Unless otherwise noted, and where a magnetic starter is not required, 120v single phase motors furnished in this section shall be furnished with a manual toggle type starter with overload heaters and red pilot lights in a suitable general purpose enclosure supplied and installed by the electrical contractor. The units shall be as manufactured by Westinghouse, General Electric or Cutler Hammer.
- D. Unless otherwise noted all control and interlock wiring with appurtenances necessary to make the work of this section complete shall be furnished and installed under this section. See "Automatic Temperature Controls" section.
- C. Starters for all 208v 3 phase equipment shall be provided with thermal overload solid state type, relays.

3.07 COMPLETION

- A. The contractor shall provide four report copies of the complete balancing and adjusting of all air, and water systems as specified as well as duct pressure test results.
- B. Submit four copies of maintenance data and operating instructions including schematic diagrams of control systems, valve tagging charts, spare parts lists, extended warranty certificates, etc.
- C. Verify that project record documents are complete such as Submittals and Record Documents. Clean and repair damage to finished surfaces resulting from work under this Section. Remove materials and equipment from areas of work and storage areas. All dirt and debris resulting from the work shall be thoroughly taken up and removed from the premises on a regular schedule acceptable by Architect/Engineer/Owner. All equipment shall be cleaned for inspection and use.
- D. All special tools required for maintenance shall be provided to owner at the completion of the project.
- E. Provide two extra sets of clean air filters for the all air handling and ventilation equipment. Install one set and leave with the owner one other set.
- D. Commissioning: Time shall be allotted for each Construction Phase of this project for commissioning of systems, equipment, devices, etc.,. Mechanical Contractor, as well as all involved Sub-Contractors, shall collaborate and coordinate efforts with Commissioning Agency for the duration of all three construction phases.
- F. Documentation : Proper and adequate documentation must be provided, this will include:
 - a. Accurate as-built drawings and sequences submitted in hardcopy and electronic form, flash drive, or CD, formatted in 2013 Autocad standard Computer Aided Drafting (CAD) program.
 - b. Owner's manuals including technical spec sheets
 - c. Operator manuals

END OF SECTION

Section 26 00 00 Electrical

16.1 Scope of Work

The Electrical Contractor shall be responsible for removal and proper disposal of deleted existing wiring and electrical equipment, and for furnishing all materials and labor necessary to provide a lighting and power system for the new Maintenance facility as indicated on the plans and in these specifications. The work shall include, but shall not be limited to the following:

- a. Remove existing overhead feeder from last pole to building and replace with new underground feeder to existing pole. Connect to existing overhead secondary feeders.
- b. Remove deleted wiring for compressor and water heater and re-wire in new location
- c. Relocate light switching in existing garage for re-located entrance door.
- d. Remove all deleted wiring for existing garage to match demolition for new construction.
- e. Re-feed existing garage power panel from new MDP and provide updated panel directory.
- f. Furnish and install new lighting fixtures as indicated on the plans
- g. Furnish and install light switching, including 2-level switching and occupancy sensors, as indicated on the plans.
- h. Furnish and install new branch circuits, feeders, and panelboards as indicated on the plans.
- i. Furnish and install receptacles, including GFCI and special purpose receptacles, as indicated on the plans.
- j. Furnish and install power wiring and disconnect switches for Mechanical equipment.
- k. Furnish and install exterior lighting, with timeclock and photocells, as indicated on the plans.
- l. Furnish and install conduits, sleeves, bushings, and boxes where indicated on the plans. Coordinate specific locations with NMCC.
- m. Provide temporary power and lighting during construction.
- n. Provide and pay for all required permits.
- o. Provide lockout/tagout procedures in compliance with all applicable codes and coordinate with established NMCC procedures.
- p. Coordinate all outages with NMCC with at least 72 hours of notification
- q. Cutting and patching of walls for electrical penetrations shall be the responsibility of the Electrical Contractor. Patching of roof penetrations shall be provided by others.
- r. Meet the requirements of all applicable local, state, and federal codes.

16.2 Power Distribution Equipment

Furnish and install new main distribution panelboard MDP, rated at 400 amperes, 120/208 volt, 3-phase, 4-wire with 400 ampere frame main breaker with interchangeable trip unit rated at 300 amperes and feeder breakers as indicated on the plans. The panelboard shall include a manufacturer-installed surge protective device rated 50 KA, minimum. All breakers shall be rated for 42 KAIC minimum. Series ratings, where applicable, must be listed as such and clearly marked by manufacturer. Panelboard shall be General Electric Spectra, or approved equal, and shall be listed for service equipment.

Furnish and install new 3-phase, 120/208 volt, 4-wire panelboards PP, LPA, and EP as indicated on the plans. Panelboards and breakers shall be rated 22 KAIC, minimum, with breakers and bus space as indicated on the plans and as required. Match the breaker sizes to specific equipment manufacturer markings, where applicable, prior to installation. Provide spares as indicated on the plans. Series ratings, where applicable, must be listed as such and clearly marked by manufacturer. Panelboards shall be General Electrical style AL, flush or surface mounted, as indicated on the plans, or approved equal.

Furnish and install all wiring and materials necessary to re-feed existing 200 ampere GE main lugs panelboard in garage. Provide additional neutral and grounding terminal bars as required, providing separation of neutrals and equipment grounding conductors. Furnish and install new fuses in the 200 ampere, 3 –phase, feeder disconnect switch. Fuses shall be rated 125 ampere, class RK-1, dual-element time delay, current limiting, 200 KAIC.

Make adjustments as necessary to provide all required clearances, including clear working space and dedicated equipment space, as required by the NEC, and clearances as required for other equipment. Arrange for furring of walls as required for flush panelboards.

All panelboards shall be labeled on the exterior cover. Marking shall include the panelboard name, voltage information, and the feeder breaker location.

16.3 Circuit Identification

Complete the directory on all panelboards, denoting specific equipment or areas served. Spares shall be labeled as “spare” on the directory. For existing panelboards, install a new directory to provide for circuits moved, deleted, or added.

Neutrals shall be identified with the ungrounded conductors of the same circuit where multiple homeruns enter the panelboards, junction boxes, pull boxes, or equipment in common raceways or cables. Nylon cable ties are acceptable.

Provide a label for the cover of each receptacle denoting the branch circuit and panel feeding the receptacle. Washable laser printed labels are acceptable if not more than ½ inch in height.

Disconnect switches shall also be clearly labeled to indicate the load served in addition to the circuit identification. Equipment identification provided on equipment must match the disconnect label. Washable laser printed labels are acceptable.

Conductors shall be identified by phase and voltage system. The identification shall be marked at the panelboards by labels. The identification shall be as follows for 120/208 volt system:

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White (stripes allowed as permitted by the NEC)
EGC	Green

16.4 Wiring Materials

All circuits shall be run in metal raceway, flexible metal conduit, or type MC cable. Equipment grounding conductors shall be included in all raceways and all cables. All feeders shall have bonding bushings installed at each end.

All boxes shall be metal, and shall be installed flush with the wall except where surface mounted. Cutting and patching for electrical boxes and equipment shall be the responsibility of the Electrical Contractor. All gaps around penetrations shall be completely sealed.

Where firewalls are penetrated, the openings shall be closed by patching with material listed for the purpose. Where exterior walls are penetrated, the openings shall be effectively closed airtight, with the vapor retardant layer restored. Boxes in exterior walls shall be rated for the application or effectively sealed. Boxes in firewalls shall be rated and listed for the rating of the wall and shall be spaced apart, where required, a minimum of 24 inches from boxes in the same wall space serving other areas. Putty used for encasement of boxes shall be listed for the fire rating of the wall.

All wire for power and lighting shall be copper, #12 AWG minimum, with minimum 90 degree C insulation rating. Aluminum conductors shall be permitted where indicated on the plans.

All grounding electrode conductors shall be copper only. Ground rods shall be copperweld and shall be listed. Connections to electrodes shall be by connectors listed for the purpose. Where raceway is used to protect and enclose grounding electrode conductors, it shall be Schedule 80 PVC.

Multiwire circuits shall not be used where there is sharing of the neutral conductor.

16.5 Wiring Devices

Devices shall be commercial rated, specification grade, and shall be side-wired. All devices shall be ivory in color.

Device plates, where flush mounted, shall be brushed stainless steel. Plates for surface-mounted boxes shall match the box style and device configuration.

Switches shall be rated 20 amperes, minimum, 120-277 volts AC only, and shall be specification grade, quiet type. Where indicated, switches shall be dual mode occupancy sensors, with adjustable time delay off, and have manual override capability. Dimmer switches shall match the lighting fixtures served.

General purpose receptacles shall be rated 20 amperes, 125 volts AC, and shall be commercial grade with heavy duty binding screws. Where GFCI receptacles are required, they shall not feed through to also protect downstream receptacles. Where receptacles are located in damp or wet locations, they shall be listed as weather-resistant and marked with WR. All covers rated for wet locations shall be weather resistant while in-use and shall be listed as extra duty.

16.6 Lighting Equipment

Fixtures shall be provided as indicated on the plans, and shall be furnished with all mounting hardware and adapters as required for a complete installation.

Type A fixtures for suspended grid ceilings shall be supported independently of the ceiling grid system. Electrical support wires shall be clearly distinguishable from the ceiling support wires. Type A fixtures shall be LED, with 3500K CCT, with driver L70 rated at 50,000 life hours, minimum, with 0-10 volt dimming capability. Efficacy shall be 93 lumens per watt, or greater. CRI shall be 80, minimum. Diffuser shall provide low glare and high angle shielding, with no greater than 21% of total fixture lumens between 60 and 90 degrees. Fixture shall be NICOR MAXCOR T3V, or approved equal.

Type YL wall packs shall have two LED engines, with 4000K CCT, 70 CRI, 4675 lumens, at 99 lumens per watt efficacy. The fixtures shall have medium type IV roadway class distribution, with no more than 25% house side light, and less than 4% light output above 80 degrees and 0% uplight.

Fixtures shall have wall bracket and integral photocell. Fixtures shall be Lithonia DSXW1 LED 20C 700 40K T3M MVOLT PE DBLXD, or approved equal.

Type C fixtures shall be wraparound LED surface mount fixtures rated for damp locations. LED life rating shall be 50,000 hrs at L70, minimum. Color temperature shall be 3500K. Output shall be 4400 lumens. LED and driver components shall be accessible after installation. Fixture shall be Columbia LAW-35-ML-E-U, or approved equal.

Exterior 6 inch recessed canopy fixtures shall be suitable for damp location, HALO 750 T or approved equal, with 600 lumen 3500K LED module, 80 CRI, and white baffle. Fixtures shall be controlled by timeclock located in Supervisor's office.

Timeclock shall be Tork 930L-E, or approved equal, with 2101 photocell. Control shall be photocell on and timeclock off.

Exit signs and emergency light units, and Exit/ELU combinations, shall be LED. Exit signs shall be stencil face style with battery emergency backup. Units shall be connected to a non-switched lighting circuit serving the area.

16.7 Mechanical Equipment

Furnish and install branch circuit power to mechanical equipment. Refer to the Mechanical Plans and specifications for specific information on the equipment.

Furnish and install disconnect switches for the equipment. Disconnects shall be general duty, and fusible where required to meet manufacturer requirements for equipment protection. Fuses shall be dual-element, time delay for all motor applications. GE CR 101 toggle style disconnect switches may be used for fractional horsepower motors.

Control wiring shall be the responsibility of the Mechanical Contractor.

16.7 Conduct of Work

All work shall be coordinated with other trades and with NMCC. Any outages shall be approved by NMCC and shall be scheduled at least 72 hours prior to the outage.

The plans show the general location and intent. Specific locations must be verified on site at the time of installation. All locations for special equipment receptacles shall be coordinated with NMCC. Adjustments to location shall be coordinated with other trades.

The contractor shall install all wiring and equipment in a neat and workmanlike manner. Work shall be performed in compliance with all applicable worker safety regulations, including OSHA and NFPA 70E.

The installation shall meet all requirements of the 2014 National Electrical Code, and any other applicable local, state, and federal codes and laws.

16.8 Submittals

Four sets of submittals must be submitted for the following:

- a. Lighting fixtures
- b. Devices
- c. Switchgear
- d. HP-rated disconnect switches

END OF SECTION