

"Schools that are the Pride of our Community"

Thomas Anderson, Superintendent of Schools

James Rovezzi, Director of Facilities

Invitation to Bid # 1847-24

Exterior Door and Window Replacement and HVAC Upgrades at Goodwin and Pitkin Elementary Schools

East Hartford Public Schools (EHPS) seeks bids from qualified and experienced contractors to provide a "**Turn Key**" project for the removal and replacement of existing exterior windows and exterior doors including installation of new ductless split systems to provide air conditioning at designated locations at two schools in East Hartford; 1.) Goodwin Elementary School, 1235 Forbes Street, East Hartford, CT and 2.) Pitkin Elementary School, 330 Hill Street, East Hartford, CT.

Bids should be addressed as follows:

East Hartford Public Schools, Dept. of Facilities Jim Rovezzi, Director of Facilities 734 Tolland St. East Hartford, CT 06108

Bids must be plainly marked in the lower left-hand corner of the envelope as follows:

BID NUMBER: 1847-24

BID NAME: Door and Window Replacement and HVAC Upgrades at

Goodwin & Pitkin Elementary Schools

OPENING DATE: January 18, 2024

OPENING TIME: 12:00 PM

A mandatory pre-bid conference will be held meeting outside in the front of the school on Thursday, December 28, 2023 at 10:00 AM beginning at Goodwin Elementary School, 1235 Forbes Street, East Hartford, CT 06118, then will meet at 11:00 AM over at Pitkin Elementary School, 330 Hill Street, East Hartford, CT 06108. Contractors interested in bidding are required to participate in the site visit to view existing conditions. This will be the only opportunity to view the jobsite prior to bid opening.

Questions related to this ITB must be submitted via e-mail to rovezzi.jl@easthartford.org no later than 4:00 PM
January 4, 2024.

Any addendums, if necessary, will be published on the East Hartford Public Schools website and State of CT/DAS site by <u>January 9</u>, <u>2024</u>.

Bids must be received in the East Hartford Public Schools Department of Facilities office at 734 Tolland St, East Hartford, CT 06108 no later than **12:00 PM on January 18, 2024.**



INVITATION TO BID INSTRUCTIONS AND REQUIREMENTS

These instructions and requirements are standard for all Invitation to Bids issued by East Hartford Public Schools. East Hartford Public Schools may delete, supersede or modify any of these standard instructions for a particular Invitation to Bid. The Invitation to Bid package will describe additional or modified instructions if needed.

- 1. Bid must be signed by an authorized representative of the respondent with the authority to bind the respondent to the terms of the bid and with the acknowledgment that the bid is made with full knowledge of and agreement with the general specifications, conditions and requirements of this Invitation to Bid.
- 2. Submit Bid package in a sealed envelope marked with the vendor's name and address in the upper left-hand corner. Bid number, name, opening date and opening time must be marked in the lower left-hand corner.
- 3. Bids received later than date and time specified will not be considered. Amendments to, or withdrawals of, Bids received later than the date and time set for Bid opening will not be considered.
- 4. After the opening of the Bid, no Bid can be withdrawn for a period of ninety (90) days.
- 5. The right is reserved to purchase either by option or the total of options indicated, split awards and act as it seems in the best interest of the East Hartford Public Schools.
- 6. It is the vendor's responsibility to check the East Hartford Public School website AND the State DAS website for changes to the Invitation to Bid prior to the bid opening. The bidder will be held to the bid and all addenda.
- 7. East Hartford Public Schools does not illegally discriminate on the basis of sex, sexual orientation, race, religion, national origin, color, creed, ancestry, age, gender (including pregnancy, childbirth and related medical conditions), gender identity or gender expression (including transgender status), marital status, familial status, military service and veteran status, physical or mental disability, protected medical condition as defined by applicable state or local law, genetic information, or any other characteristic protected by applicable federal, state, or local laws and ordinances.
- 8. East Hartford Public Schools reserves the right to waive any formalities in Bids received; to reject any and all Bids, to waive technical defects and to make such award, including accepting a Bid, although not the low bid, as it deems to be in the best interest of the East Hartford Public Schools.
- 9. East Hartford Public Schools may withhold acceptances of work and payment thereof when it is determined that said work or materials do not meet the specified requirements. Payment will

- not be made until corrections are made which are acceptable to the East Hartford Public Schools officials and/or their authorized age
- East Hartford Public Schools may make such investigation as deemed necessary to determine the ability of the bidder to discharge his contract. The bidder shall furnish the East Hartford Public Schools with all such information and data including references of similar projects conducted for other school systems as may be required for that purpose. East Hartford Public Schools reserves the right to reject any Bid if the bidder fails to satisfactorily convince the East Hartford Public Schools that he/she is properly qualified by experience and has the facilities to carry out the obligations of the contract and to satisfactorily complete the work called for herein. Conditional Bids will not be accepted.
- 11. Specifications cannot be relieved by anyone other than an assigned agent for East Hartford Public Schools. All changes must be in writing, signed by agent.
- 12. The successful Bidder will be required to provide proof of insurance as outlined in the "Indemnification and Insurance Requirements for Construction, Professional, or Labor Services" form included with the Invitation to Bid and submit a signed and notarized copy of the Indemnification section on of the form. No modifications may be made to the Indemnification form.
- 13. All prices must be F.O.B. delivered unless otherwise specified.
- 14. The East Hartford Board of Education will not award a bid to any bidder who owes delinquent tax to the Town of East Hartford. Bidders certify by virtue of their signature on the bid sheet that neither the bidder nor any business or corporation which the Bidder owns an interest in is delinquent in tax obligations to the Town. Verification will be made prior to award.
- 15. Any contract or agreement entered into as a result of this ITB process that spans multiple fiscal years shall contain the following "funding out" or "non-appropriation" clause:

 East Hartford Public Schools/East Hartford Board of Education (EHPS) reserves the right to terminate this agreement/contract, without penalty, at the end of each fiscal year in the event a funding source relied upon to pay the cost of the agreement/contract does not contain an allocation for the services and/or products contained in this agreement/contract. EHPS will provide notice of termination at least sixty (60) days prior to the end of the fiscal year.





INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR CONSTRUCTION, PROFESSIONAL OR LABOR SERVICES

A. INDEMNIFICATION

BIDDERS AND PROPOSERS ARE REQUIRED TO AGREE TO THE FOLLOWING INDEMNIFICATION LANGUAGE BY NOTARIZING BELOW

To the fullest extent permitted by law, THE AWARDED BIDDER/PROPOSER agrees on behalf of itself and its successors and assigns, covenants and agrees at its sole cost and expense, to protect, defend, indemnify, release and hold the East Hartford Board of Education, Town of East Hartford, its agents, servants, officials, employees, volunteers and members of its boards and commissions (Collectively the "Board and Town of East Hartford"), harmless from and against any and all Losses (defined below) imposed upon or incurred by or asserted against the Board and Town of East Hartford by reason of bodily injury, personal injury, death, or property damage of whatsoever kind or nature, to any individuals or parties (including, but not limited to the Board and Town of East Hartford, the Awarded Bidder/Proposer, or any other third party) arising out of or resulting from, or alleged to arise out of or arise from Awarded Bidder's/Proposer's performance of its work under the contract, but only to the extent such Losses are attributable to the negligent or intentional act, error or omission of the Awarded Bidder/Proposer or any person or organization employed or engaged by Awarded Bidder/Proposer to perform all or any part of the contract. The term "Losses" includes any losses, damages, costs, fees, expenses, claims, suits, judgments, awards, liabilities (including, but not limited to, strict liabilities), obligations, debts, fines, penalties, charges, amounts paid in settlement, foreseeable and unforeseeable consequential damages, litigation costs, attorneys' fees, expert's fees, and investigation costs, of whatever kind or nature, and whether or not incurred in connection with any judicial or administrative proceedings, actions, claims, suits, judgments or awards.

Upon written request by the Board and Town of East Hartford, the Awarded Bidder/Proposer shall defend and provide legal representation to the Board and Town of East Hartford with respect to any of the matters referenced above. Notwithstanding the foregoing, the Board and Town of East Hartford may, in its sole and absolute discretion, engage its own attorneys and other professionals to defend or assist it with respect to such matters and, at the option of the Board and Town of East Hartford, its attorneys shall control the resolution of such matters. Upon demand, the Awarded Bidder/Proposer shall pay or, in the sole and absolute discretion of the Board and Town of East Hartford, reimburse, the Board and Town of East Hartford for the payment of reasonable fees and disbursements of attorneys and other professionals in connection with this contract.

THE BOARD and TOWN OF EAST HARTFORD WILL NOT AGREE TO INDEMNIFY THE AWARDED BIDDER/PROPOSER; SUBCONTRACTOR(S); OR INDEPENDENT CONTRACTOR(S)

Signature		
Name:		
Company Name:		
Address:		
Date:		
_ day of, 202		
_		

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR CONSTRUCTION, PROFESSIONAL OR LABOR SERVICES (cont'd)

B. INSURANCE

NOTE: CERTIFICATE OF INSURANCE WILL BE REQUIRED UPON AWARD AND PRIOR TO START OF WORK OR ISSUANCE OF PURCHASE ORDER

1. GENERAL REQUIREMENTS

The AWARDED BIDDER/PROPOSER shall be responsible for maintaining insurance coverage in force for the life of this contract of the kinds and adequate amounts to secure all of the AWARDED BIDDER/PROPOSER'S obligations under this contract with an insurance company(ies) with an AM Best Rating of A-VII or better licensed to write such insurance in the State of Connecticut and acceptable to the Board and Town of East Hartford Additional Insured: The East Hartford Board of Education and the Town of East Hartford, its officials, employees, volunteers, boards and commissions must be included as an Additional Insured on the AWARDED BIDDER/PROPOSER'S Insurance Policies (except Workers' Compensation and Professional Errors & Omissions). Evidence of this must be provided upon inception of this contract and upon renewal of insurance by the AWARDED BIDDER/PROPOSER to the Board and Town of East Hartford in the form of language on a Certificate of Insurance as well as a policy endorsement.

The AWARDED BIDDER/PROPOSER shall provide the Board and Town of East Hartford with a Certificate(s) of Insurance signed by an authorized representative of the insurance company(ies) prior to the performance of this contract describing the coverage and providing that the insurer shall give the Board and Town of East Hartford written notice at least thirty (30) days in advance of any termination, expiration, or any and all changes in coverage. Such insurance or renewals or replacements thereof shall remain in force during the AWARDED BIDDER/PROPOSER'S responsibility under this contract. Failure to provide or maintain any of the insurance coverage required herein shall constitute a breach of the Contract.

2. SPECIFIC REQUIREMENTS:

a) Commercial General Liability Insurance

The AWARDED BIDDER/PROPOSER shall carry Commercial General Liability Insurance (broad form coverage) insuring against claims for bodily injury, property damage, personal injury and advertising injury that shall be no less comprehensive and no more restrictive than the coverage provided by Insurance Services Office (ISO) form for Commercial General (CG 0001 04/2013). By its terms or appropriate endorsements such insurance shall include the following coverage, to wit: Bodily Injury, Property Damage, Fire Legal Liability (not less than the replacement value of the portion of the premises occupied), Personal & Advertising Injury, Blanket Contractual, Independent Contractor's, Premises Operations, Products and Completed Operations (for a minimum of two (2) years following Final Completion of the Project). Any deviations from the standard unendorsed form will be noted on the Certificate of Insurance.

Type of Coverage: Occurrence Basis

Minimum Amount of Coverage: \$1,000,000 per occurrence

\$2,000,000 aggregate

Policy Period: Annual Policy

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR CONSTRUCTION, PROFESSIONAL OR LABOR SERVICES (cont'd)

b) Workers' Compensation and Employer's Liability Insurance

The AWARDED BIDDER/PROPOSER shall provide Statutory Workers' Compensation Insurance as required by the State of Connecticut, including Employer's Liability.

Amount of Coverage: Coverage A: Statutory

Coverage B (Employer Liability):

\$500,000 Each Accident

\$500,000 Disease, Policy Limit \$500,000 Disease, Each Employee

c) Commercial Automobile Liability Insurance

The AWARDED BIDDER/PROPOSER shall carry Commercial Automobile Liability Insurance insuring against claims for bodily injury and property damage and covering the ownership, maintenance or use of any auto or all owned/leased and non-owned and hired vehicles used in the performance of the Work, both on and off the Project Site, including loading and unloading. The coverage should be provided by Insurance Services Office form for Commercial Auto Coverage (CA CA0001 10/2013) or equivalent. "Auto" (symbol 1 or equivalent) is required. Any deviations from the standard unendorsed form will be noted on the Certificate of Insurance.

Type of Coverage: Occurrence Basis

Minimum Amount of Coverage: \$1,000,000 combined single limit

Policy Period: Annual Policy

d) Umbrella Liability Insurance

The AWARDED BIDDER shall carry an umbrella liability insurance policy of \$5,000,000.

3. PROFESSIONAL SERVICE CONTRACTOR REQUIRMENTS

(e.g., Architects, Engineers, et al.)

The AWARDED BIDDER/PROPOSER shall carry Errors & Omissions coverage in the **minimum** amount \$1,000,000 per claim/\$1,000,000 annual aggregate for all professional services contracts. If the insurance coverage is written on a Claims-Made basis, an extended reporting period of at least 3 years after substantial completion of the project is required. Increased coverage limits may be required based on the scope, price and duration of the work to be performed. The East Hartford Board of Education or Town of East Hartford will inform the **AWARDED BIDDER/PROPOSER** as to the required limits for this insurance as soon as practicable, and has sole discretion of the limits to be required.

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR CONSTRUCTION, PROFESSIONAL OR LABOR SERVICES (cont'd)

4. <u>SUBCONTRACTOR REQUIREMENTS</u>:

The AWARDED BIDDER/PROPOSER shall require all subcontractors and independent contractors to carry the coverages set forth in section B. INSURANCE and will obtain appropriate Certificates of Insurance before the subcontractors and independent contractors are permitted to begin work.

The AWARDED BIDDER/PROPOSER shall require that East Hartford Board of Education and The Town of East Hartford, its officials, employees, volunteers, boards and commissions be included as an Additional Insured on all subcontractors and independent contractors' insurance (except Workers' Compensation and Professional Errors & Omissions) before permitted to begin work.

The AWARDED BIDDER/PROPOSER and all subcontractors and independent contractors and their insurers shall waive all rights of subrogation against the East Hartford Board of Education and Town of East Hartford, and its officers, agents, servants and employees for losses arising from work performed by each on this contract.

THE EAST HARTFORD BOARD OF EDUCATION OR TOWN OF EAST HARTFORD RESERVES THE RIGHT TO AMEND THE AMOUNTS OF COVERAGE REQUIRED AND TYPE OF COVERAGE PROVIDED BASED ON THE FINAL AGREED UPON SCOPE OF SERVICES



AFFIRMATIVE ACTION / EQUAL OPPORTUNITY POLICY STATEMENT

East Hartford Public Schools is an Equal Opportunity Employer and will not transact business with firms that are not in compliance with all Federal and State Statutes and Executive Orders pertaining to non-discrimination.

This form is required to be filled in (enter company name above lines below), signed and returned with any Invitation to Bid, Request for Proposal, or other public solicitation document in order to transact any business with East Hartford Public Schools. will not make employment decisions (including decisions related to hiring, assignment, compensation, promotion, demotion, disciplinary action and termination) on the basis of race, color, religion, age, sex, marital status, sexual orientation, national origin, alienage, ancestry, disability (including pregnancy), genetic information, veteran status or gender identity or expression, except in the case of a bona fide occupational qualification. It is the policy of that any form of discrimination or harassment on the basis of race, religion, color, national origin, alienage, sex, sexual orientation, marital status, age, disability (including pregnancy), genetic information, veteran status or gender identity or expression, or any other basis prohibited by state or federal law is prohibited. will also take affirmative action as called for by applicable laws and Executive Orders to ensure that minority group individuals, females, disabled veterans, recently separated veterans, other protected veterans, Armed Forces service medal veterans, and qualified disabled persons are introduced into our workforce and considered for promotional opportunities. will remain in full compliance with the above while under contract with or performing work for East Hartford Public Schools. Signed **Business Address** Name/Title of Company Officer

Phone

Date



Department of Facilities

Invitation to Bid # 1847-24

Exterior Door and Window Replacement and HVAC Upgrades at Goodwin and Pitkin Elementary Schools

Background

East Hartford Public Schools (EHPS) seeks bids from qualified and experienced contractors to provide a "**Turn Key**" project for the removal and replacement of existing exterior windows and exterior doors including installation of new ductless split systems to provide air conditioning at designated locations at two schools in East Hartford; 1.) Goodwin Elementary School, 1235 Forbes Street, East Hartford, CT and 2.) Pitkin Elementary School, 330 Hill Street, East Hartford, CT.

- Project Specifications dated <u>November 29, 2023</u> for both Goodwin and Pitkin Elementary Schools Exterior Door and Window Replacement and HVAC Upgrades projects developed by Antinozzi Associates
- Construction Drawings dated <u>November 29, 2023</u> for both Goodwin and Pitkin Schools Exterior Door and Window Replacement and HVAC Upgrades projects developed by Antinozzi Associates
- AIA Document A104- 2017 "Standard Abbreviated form of Agreement Between Owner and Contractor" **SAMPLE**
- Connecticut Department of Labor Prevailing Wage Rates (If not in bid, provided in Addendum #1)

Fixed price bids will be for a "Turn-Key" project consisting of replacing the exterior windows, doors and installation of new ductless split systems per the Project Specifications and Construction Drawings.

A mandatory pre-bid conference will be held meeting outside in the front of the school on Thursday, December 28, 2023 at 10:00 AM beginning at Goodwin Elementary School, 1235 Forbes Street, East Hartford, CT 06118, then will meet at 11:00 AM over at Pitkin Elementary School, 330 Hill Street, East Hartford, CT 06108. Contractors interested in bidding are required to participate in the site visit to view existing conditions. This will be the only opportunity to view the jobsite prior to bid opening.

Questions related to this ITB must be submitted via e-mail to rovezzi.jl@easthartford.org no later than 4:00 PM on January 4, -2024

Any addendums, if necessary, will be published on the East Hartford Public Schools website and State of CT/DAS site by <u>January 9, 2024.</u>

Bids must be received in the East Hartford Public Schools Department of Facilities office at 734 Tolland St, East Hartford, CT 06108 no later than <u>12:00 PM on January 18, 2024</u>

Scope of Work

- Contractor will reference the following construction documents;
 - Construction Drawings for "Exterior Door and Window Replacement and HVAC Upgrades at Goodwin Elementary School" and "Exterior Door and Window Replacement and HVAC Upgrades at Pitkin Elementary School", dated November 29, 2023 developed by Antinozzi Associates.
 - Project specifications for both "Exterior Door and Window Replacement and HVAC Upgrades at Goodwin Elementary School" and "Exterior Door and Window Replacement and HVAC Upgrades at Pitkin Elementary School dated November 29, 2023 developed by Antinozzi Associates.
- Areas within schools may be occupied by school staff during construction for up to the entire duration of construction. Contractors will be responsible to use safe and appropriate work practices and behavior at all times while in and around the building. Keep all building entrances and egresses clear and available at all times. Contractors personnel shall adhere to parking requirements as established at each location.
 Schools will be off-limits to students and anyone under the age of 18 during construction.
- Contractor will provide their own waste dumpsters for all materials needing disposal. East Hartford Facilities will designate a space for the containers to be located on the property.

Bid Proposals

Contractors must provide the following in their bid package

- 1. General information and company history
- 2. Describe at least (3) examples of completed projects of a similar size and scope to this project, and provide a reference (Name, Organization, Phone Number) for each
- Pricing submitted using "Appendix A- Pricing"
- 4. Completed required submittal forms as outlined in this Invitation to Bid
- 5. 2 sets of ITB Package- (1) original and (1) unbound for scanning purposes

Other Considerations

- Project start date is June 10, 2023, (unless last day of school is pushed back due to weather or
 other events that would cause a delay), and must be substantially completed by August 26, 2023
 for both schools.
- Work authorized under any contract executed as a result of this Invitation to Bid is expected to reach the thresholds requiring prevailing wages, so contractors should bid using prevailing wage rates supplied in Addendum #1 to this Invitation to Bid.
- This project is being funded through a Federal Grant and is subject to Federal Procurement regulations which includes compliance with affirmative action. Contractors are required to comply with CRF 200.321; "Contracting with Small and Minority Businesses, Women Business Enterprises, and Labor Surplus Firms". Prime contractors are required, if subcontractors are to used, take the affirmative action steps listed in CFR 200.321 paragraphs (b) (1) through (5) of this section. Contractors will be responsible for adhering to these regulations and be subject to producing documentation upon request to show compliance.

Other Considerations (cont'd)

- AIA Document A104- 2017 "Standard Abbreviated form of Agreement Between Owner and Contractor" will form the basis of the contract between EHPS and the contractor.
- Payment Procedure- Certified payment applications received by the **15**th of the month will be paid by the **15**th of the following month. If received on the above schedule, payment will be made within 30 days of receipt. Retainage will be **5%**. These figures will be added to sections 4.1.3 and 4.1.4 of the resulting AIA A104 contract.
- Contractors and all subcontractors must be properly licensed by the State of Connecticut.
- A Bid Bond in the amount of 10% of the contract value must be supplied with all bids in order to be considered.
- Payment (Labor and Materials) and Performance Bonds will be required for the full contract amount.
- East Hartford Public Schools are exempt from Connecticut Sales Tax. Do not include sales tax in any pricing submitted.

Selection Process

The lowest cost qualified, responsive and responsible contractor will be selected.

East Hartford Public Schools reserves the right to reject any or all bids.

Invitation to Bid #1847-24

Exterior Door and Window Replacement and HVAC Upgrades at Goodwin and Pitkin Elementary Schools

PROJECT REFERENCES

In the interest of securing competent contractors, we are requiring the following information be provided with your Bid Proposal. Failure to provide this information may jeopardize your firm being awarded this project.

Please provide three references for projects of similar size and scope to this project:

1 3	
Project #1	
Project Name:Customer Name/Organization/Email/Phone#:Date Project Completed:	
Description of Project:	
Project #2	
Project Name: Customer Name/Organization/Email/Phone #: Date Project Completed: #:	
Description of Project:	
Project #3	
Project Name: Customer Name/Organization/Email/Phone#: Date Project Completed:	
Description of Project:	

Appendix A- Pricing (pg. 1 of 2)

Invitation to Bid # 1847-24

Exterior Door and Window Replacement and HVAC Upgrades at Goodwin and Pitkin Elementary Schools

	BASE BID = \$
	1a. (DEDUCT) ALTERNATE# 1b. : Delete all labor and material associated with replacement of doors at Goodwin School.
	DEDUCT THE SUM OF =\$
2.	<u>Pitkin School</u> - Lump sum cost for all project activities as specified in the Specifications and Construction Drawings prepared by Antinozzi Associates Dated <u>November 29, 2023</u> .
	BASE BID = \$
	2a. (DEDUCT) ALTERNATE# 2a. : Delete all labor and material associated with replacement of doors at Pitkin School.
	DEDUCT THE SUM OF= \$
3.	Change Order Overhead and Profit Stipulation:
	3a. The maximum allowable Overhead and Profit markup on any change order for work directly performed by the prime contractor is 10% over direct labor/material costs . If bidder is offering a lower OH&P markup,
	List here:%
	3b. The maximum allowable Overhead and Profit markup on any change order for work perform by a SUB CONTRACTOR of prime contractor is 10% over direct labor/material costs of the SUBCONTRACTOR, plus 5% of the total cost for the prime contractor (pass-thru). If bidder is offering a lower OH&P markup, list here:
	Subcontractor% + Prime Contractor (pass-thru)%.

(No delinquent taxes owed by the awarded bidder to the Town of East Hartford)

Appendix A- Pricing (cont'd) (pg. 2 of 2)

Invitation to Bid # 1847-24

Exterior Door and Window Replacement and HVAC Upgrades Goodwin and Pitkin Elementary Schools

SUBMITTED BY:		
Vendor	Contact Person	
Written signature	Title	
Address		
Telephone#		
 Email	 Date	

Project: Goodwin And Pitkin School: Door & Window Replacment and HVAC Improvements

Minimum Rates and Classifications for Building Construction

ID#: 23-55980

Connecticut Department of Labor Wage and Workplace Standards

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: 1847-24 Project Town: East Hartford

State#: FAP#:

Project: Goodwin And Pitkin School: Door & Window Replacment and HVAC Improvements

CLASSIFICATION	Hourly Rate	Benefits
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
1c) Asbestos Worker/Heat and Frost Insulator	45.56	32.65
2) Boilermaker	45.21	29.05
3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	39.4	34.62 + a
3b) Tile Setter	37.1	30.52
3c) Tile and Stone Finishers	30.0	25.30
3d) Marble & Terrazzo Finishers	31.07	24.23
3e) Plasterer	42.77	29.63

As of: December 14, 2023

4) Group 1: General laborers, carpenter tenders, concrete specialists, wrecking laborers and fire watchers.	33.5	25.59
4) Group 1a: Acetylene Burners (Hours worked with a torch)	34.5	25.59
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman (Person running mixer and spraying fireproof only).	33.75	25.59
4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	34.0	25.59
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80.	34.5	25.59
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	34.25	25.59
4e) Group 6: Blasters, nuclear and toxic waste removal.	36.5	25.59
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	36.5	25.59
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	31.78	25.59
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	31.24	25.59
4i) Group 10: Traffic Control Signalman	20.1	25.59

4j) Group 11: Toxic Waste Removers A or B With PPE	36.5	25.59
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	37.61	27.61
5a) Millwrights	38.02	28.41
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	43.75	32.47+3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	61.42	37.335+a+b
LINE CONSTRUCTION		
Groundman	26.5	6.5% + 9.00
Linemen/Cable Splicer	48.19	6.5% + 22.00
8) Glazier (Trade License required: FG-1,2)	41.18	24.55 + a
9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	42.37	40.02 + a
OPERATORS		
Group 1: Crane Handling or Erecting Structural Steel or Stone; Hoisting Engineer (2 drums or over). (Trade License Required)	52.78	27.80 + a
Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and Over	48.37	27.80 + a

Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	52.41	27.80 + a
Group 2a: Cranes (under 100 ton rated capacity).	51.51	27.80 + a
Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer)	48.0	27.80 + a
Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Finegrade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	47.1	27.80 + a
Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper); Goldhofer.	46.64	27.80 + a
Group 5: Specialty Railroad Equipment; Asphalt Spreader, Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24 mandrel).	45.92	27.80 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	45.92	27.80 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	45.55	27.80 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under mandrel).	45.14	27.80 + a
Group 8: Mechanic; Grease Truck Operator; Hydroblaster; Barrier Mover; Power Stone Spreader; Welding; Work Boat Under 26 ft.; Transfer Machine; Rigger Foreman.	44.67	27.80 + a
Group 9: Front End Loader (under 3 cubic yards); Skid Steer Loader regardless of attachments; (Bobcat or Similar); Forklift, Power Chipper; Landscape Equipment (including Hydroseeder); Vacuum Excavation	44.14	27.80 + a
As of: December 14, 2023		

As of: December 14, 2023

Truck	and Hydrovac	Fycavation	Truck (27	7 HG nrassi	ure or greater).
HUCK	and mydrovad	LACAVACION	II UCK (Z/	ינכטוק טווי	are or greater .

Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	41.69	27.80 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	41.69	27.80 + a
Group 12: Wellpoint Operator.	41.61	27.80 + a
Group 13: Compressor Battery Operator.	40.92	27.80 + a
Group 14: Elevator Operator; Tow Motor Operator (solid tire no rough terrain).	39.54	27.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	39.06	27.80 + a
Group 16: Maintenance Engineer.	38.28	27.80 + a
Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator; Portable Grout Plant Operator; Portable Water Filtration Plant Operator.	43.46	27.80 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (Minimum for any job requiring a CDL license); Rigger; Signalman.	40.54	27.80 + a
PAINTERS (Including Drywall Finishing)		
10a) Brush and Roller	37.62	24.55
10b) Taping Only/Drywall Finishing	38.37	24.55

10c) Paperhanger and Red Label	38.12	24.55
10e) Blast and Spray	40.62	24.55
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	48.28	35.50
12) Well Digger, Pile Testing Machine	37.26	24.05 + a
13) Roofer (composition)	41.2	22.35
14) Roofer (slate & tile)	41.7	22.35
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	41.89	43.22
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	48.28	35.50
TRUCK DRIVERS		
17a) 2 Axle, Helpers	32.16	30.51 + a
17b) 3 Axle, 2 Axle Ready Mix	32.27	30.51 + a
17c) 3 Axle Ready Mix	32.33	30.51 + a
17d) 4 Axle	32.39	30.51 + a
17e) 4 Axle Ready Mix	32.44	30.51 + a

17f) Heavy Duty Trailer (40 Tons and Over)	34.66	30.51 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	32.44	30.51 + a
17h) Heavy Duty Trailer up to 40 tons	33.39	30.51 + a
17i) Snorkle Truck	32.54	30.51 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	47.55	32.27 + a
19) Theatrical Stage Journeyman	25.76	7.34

Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

Crane with 150 ft. boom (including jib) - \$1.50 extra Crane with 200 ft. boom (including jib) - \$2.50 extra Crane with 250 ft. boom (including jib) - \$5.00 extra Crane with 300 ft. boom (including jib) - \$7.00 extra Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

^{**}Note: Hazardous waste premium \$3.00 per hour over classified rate

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page:

www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: December 14, 2023

Standard Abbreviated Form of Agreement Between Owner and Contractor

AGREEMENT made as of the day of (In words, indicate day, month and year.)	_ in the year
BETWEEN the Owner: (Name, legal status, address and other information)	This document has important lega consequences. Consultation with an attorney is encouraged with respect to its completion or modification.
and the Contractor: (Name, legal status, address and other information)	
for the following Project: (Name, location and detailed description)	
The Architect: (Name, legal status, address and other information)	

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

THE WORK OF THIS CONTRACT DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION 2 3 **CONTRACT SUM PAYMENT** 5 **DISPUTE RESOLUTION ENUMERATION OF CONTRACT DOCUMENTS** 6 7 **GENERAL PROVISIONS** 8 **OWNER** 9 **CONTRACTOR** 10 **ARCHITECT** 11 **SUBCONTRACTORS** 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS **CHANGES IN THE WORK** 13 TIME 14 **PAYMENTS AND COMPLETION** 15 PROTECTION OF PERSONS AND PROPERTY 16 17 **INSURANCE & BONDS** 18 CORRECTION OF WORK 19 MISCELLANEOUS PROVISIONS TERMINATION OF THE CONTRACT 20 21 **CLAIMS AND DISPUTES EXHIBIT A DETERMINATION OF THE COST OF THE WORK** ARTICLE 1 THE WORK OF THIS CONTRACT The Contractor shall execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

The date of this Agreement.
A date set forth in a notice to proceed issued by the Owner

	Established as follows (Insert a date or a med		to determine the date of commencement of the Work.)	
If a date of comi Agreement.	mencement of the Work	is no	ot selected, then the date of commencement shall be the date of this	
§ 2.2 The Contra	ect Time shall be measur	red fro	rom the date of commencement.	
Substantial Com	o adjustments of the Con apletion of the entire Wo	ork:	t Time as provided in the Contract Documents, the Contractor shall achieve necessary information.)	/e
	Not later than	() calendar days from the date of commencement of the Work.	
	By the following date	:		
to be completed			t Time as provided in the Contract Documents, if portions of the Work are tion of the entire Work, the Contractor shall achieve Substantial Completi	
Portion	of Work		Substantial Completion Date	
	ntractor fails to achieve essed as set forth in Sec		stantial Completion as provided in this Section 2.3, liquidated damages, if 3.5.	
Contract. The Co	shall pay the Contractor ontract Sum shall be on		e Contract Sum in current funds for the Contractor's performance of the the following:	
(Check the appro				
	Stipulated Sum, in acc	cordar	ance with Section 3.2 below	
	Cost of the Work plus	the C	Contractor's Fee, in accordance with Section 3.3 below	
	Cost of the Work plus Section 3.4 below	the C	Contractor's Fee with a Guaranteed Maximum Price, in accordance with	
(Based on the se	election above, complete	Secti	tion 3.2, 3.3 or 3.4 below.)	
§ 3.2 The Stipula Documents.	nted Sum shall be	(\$), subject to additions and deductions as provided in the Contract	
Documents and (State the number Owner to accept	are hereby accepted by ers or other identification tother alternates subseq	the O on of a quent	e following alternates, if any, which are described in the Contract Owner: Caccepted alternates. If the bidding or proposal documents permit the to the execution of this Agreement, attach a schedule of such other the date when that amount expires.)	

§ 3.2.2 Unit prices, if any:

(Identify the item and state the unit price and the quantity limitations, if any, to which the unit price will be applicable.)

Item Units and Limitations Price per Unit (\$0.00)

§ 3.2.3 Allowances, if any, included in the stipulated sum: *(Identify each allowance.)*

Item Price

§ 3.3 Cost of the Work Plus Contractor's Fee

§ 3.3.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.3.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

§ 3.4 Cost of the Work Plus Contractor's Fee With a Guaranteed Maximum Price

§ 3.4.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.4.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

§ 3.4.3 Guaranteed Maximum Price

§ 3.4.3.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed (\$), subject to additions and deductions by changes in the Work as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

(Insert specific provisions if the Contractor is to participate in any savings.)

§ 3.4.3.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 3.4.3.3 Unit Prices, if any:

(Identify the item and state the unit price and the quantity limitations, if any, to which the it pric all be a, cable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 3.4.3.4 Allowances, if any, included in the Guaranteed Maximum. (Identify each allowance.)

Item

Price

§ 3.4.3.5 Assumptions, if any, on which the teed Maximum rice is based:

§ 3.4.3.6 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.

§ 3.4.3.7 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 3.4.3.5. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 3.4.3.5 and the revised Contract Documents.

§ 3.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

ARTICLE 4 PAYMENT

§ 4.1 Progress Payments

§ 4.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 4.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 4.1.3 Provided that	an Application for Payment is received by tl	he Architect	not later tha	le	day of
a month, the Owner s	shall make payment of the certified amount	to the Cc	tor not late.	n/	
day of the	month. If an Application for Payme	ent is receive	ed by the Archit	ect after the date	fixed
above, payment shall	be made by the Owner not later than	()	days after the A	Architect receives	the
Application for Payn	nent.				
(Federal, state or loc	al laws may require payment within a certa	in period of	time.)		
§ 4.1.4 For each prog	ress payment made prior to Substantial Com	pletion of th	ne Work, the Ov	vner may withhol	.d
retainage from the pa	yment otherwise due as follows:				

(Insert a percentage or amount to be withheld as retainage from each Application for Payment and any terms for reduction of retainage during the course of the Work. The amount of retainage may be limited by governing law.)

§ 4.1.5 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. (Insert rate of interest agreed upon, if any.)

%

§ 4.2 Final Payment

§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- the Contractor has fully performed the Contract except for the Contractor's responsibility to correct .1 Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;
- the Contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a Guaranteed Maximum Price; and
- a final Certificate for Payment has been issued by the Architect in accordance with Section 15.7.1.

§ 4.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 5 DISPUTE RESOLUTION

§ 5.1 Binding Dispute Resolution

For any claim subject to, but not resolved by, mediation pursuant to Section 21.5, the method of binding dispute resolution shall be as follows:

(Check th

ne appro	priate box.)
	Arbitration pursuant to Section 21.6 of this Agreement
	Litigation in a court of competent jurisdiction

☐ Other (Spec	cify)			
			ion, or do not subsequently agree in l be resolved in a court of competent	
ARTICLE 6 ENUMERATION O § 6.1 The Contract Document Agreement, are enumerated in	s are defined in Article 7		ations issued after execution of this	
§ 6.1.1 The Agreement is this Between Owner and Contract		A104 TM –2017, Standar	rd Abbreviated Form of Agreement	
=	M_2013, Building Informa	ation Modeling and Dig	gital Data Exhibit, dated as indicated	
below: (Insert the date of the E203–2	2013 incorporated into the	is Agreement.)		
	1			
0.04.0 771 0 4				
§ 6.1.3 The Supplementary an	d other Conditions of the	Contract:		
Document	Title	Date	Pages	
§ 6.1.4 The Specifications:		is return to all to all in Annual		
(Either list the Specifications	nere or rejer to an exhibi	i allachea lo inis Agree	meni.)	
		7		
Section	Title	Date	Pages	
§ 6.1.5 The Drawings: (Either list the Drawings here or refer to an exhibit attached to this Agreement.)				
Number	ī	itle .	Date	

§ 6.1.6 The A	ddenda	, if any:			
Nun	nber		Date	Pages	
		relating to bidding or proposa requirements are enumerated i		are not part of the Contract D	ocuments unless the
§ 6.1.7 Addit		ocuments, if any, forming part Exhibits:	of the Contract I	Documents:	
.1		ek all boxes that apply.)			
		Exhibit A, Determination of	of the Cost of the	Work.	
		AIA Document E204 TM _20 (Insert the date of the E20-		Projects Exhibit, dated as incated into this Agreement.)	licated below:
		The Sustainability Plan:			
	Title		Date	Pages	
		Supplementary and other C	Conditions of the	Contract:	
	Docur	ment	Title	Date	Pages

.2 Other documents, if any, listed below: (List here any additional documents that are intended to form part of the Contract Documents.)

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 The Contract Documents

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

§ 7.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 7.4 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 7.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 7.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Subsubcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 7.5.2 The Contractor, Subcontractors, Sub-subcontractors and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to the protocols established pursuant to Sections 7.6 and 7.7, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 7.6 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203TM_2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 7.7 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203TM—2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202TM—2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 7.8 Severability

The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 7.9 Notice

§ 7.9.1 Except as otherwise provided in Section 7.9.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission in accordance with AIA Document E203TM_2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering Notice in electronic format such as name, title and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 7.9.2 Notice of Claims shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 7.10 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

ARTICLE 8 OWNER

§ 8.1 Information and Services Required of the Owner

§ 8.1.1 Prior to commencement of the Work, at the written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 8.1.1, the Contract Time shall be extended appropriately.

- § 8.1.2 The Owner shall furnish all necessary surveys and a legal description of the site.
- § 8.1.3 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.
- § 8.1.4 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments, and charges required for the construction, use, or occupancy of permanent structures or for permanent changes in existing facilities.

§ 8.2 Owner's Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or repeatedly fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 8.3 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 15.4.3, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 21.

ARTICLE 9 CONTRACTOR

§ 9.1 Review of Contract Documents and Field Conditions by Contractor

- § 9.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.
- § 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.2, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.
- § 9.1.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 9.2 Supervision and Construction Procedures

- § 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.
- § 9.2.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

§ 9.3 Labor and Materials

- § 9.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.
- § 9.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.
- § 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.

§ 9.4 Warranty

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants

that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage. All other warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 15.6.3.

§ 9.5 Taxes

The Contractor shall pay sales, consumer, use, and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 9.6 Permits, Fees, Notices, and Compliance with Laws

§ 9.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 9.6.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 Allowances

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor's costs for unloading and handling at the site, labor, installation, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowance.

§ 9.8 Contractor's Construction Schedules

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§ 9.8.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 9.8.2 The Contractor shall perform the Work in general accordance with the most recent schedule submitted to the Owner and Architect.

§ 9.9 Submittals

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.9.3 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents or unless the Contractor needs to provide such services in order to carry out the Contractor's own responsibilities. If professional design services or certifications by a design professional are specifically required, the Owner and the Architect will specify the performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional. If no criteria are specified, the design

shall comply with applicable codes and ordinances. Each Party shall be entitled to rely upon the information provided by the other Party. The Architect will review and approve or take other appropriate action on submittals for the limited purpose of checking for conformance with information provided and the design concept expressed in the Contract Documents. The Architect's review of Shop Drawings, Product Data, Samples, and similar submittals shall be for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. In performing such review, the Architect will approve, or take other appropriate action upon, the Contractor's Shop Drawings, Product Data, Samples, and similar submittals.

§ 9.10 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 9.11 Cutting and Patching

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

§ 9.12 Cleaning Up

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus material from and about the Project.

§ 9.13 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 9.14 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 9.15 Indemnification

§ 9.15.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 9.15.1.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 10 ARCHITECT

§ 10.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

- § 10.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.
- § 10.3 The Architect will visit the site at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.
- § 10.4 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.
- § 10.5 Based on the Architect's evaluations of the Work and of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.
- § 10.6 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.
- § 10.7 The Architect will review and approve or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
- § 10.8 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect will make initial decisions on all claims, disputes, and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions rendered in good faith.
- § 10.9 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

ARTICLE 11 SUBCONTRACTORS

- § 11.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.
- § 11.2 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the Subcontractors or suppliers proposed for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.
- § 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 12.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 12.2 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a Separate Contractor because of delays, improperly timed activities, or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work, or defective construction of a Separate Contractor.

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor, and Architect, or by written Construction Change Directive signed by the Owner and Architect. Upon issuance of the Change Order or Construction Change Directive, the Contractor shall proceed promptly with such changes in the Work, unless otherwise provided in the Change Order or Construction Change Directive.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor's cost of labor, material, equipment, and reasonable overhead and profit, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for Payment. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order.

§ 13.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

ARTICLE 14 TIME

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§ 14.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing this Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 14.2 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 14.3 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 14.4 The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.6.3.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) changes ordered in the Work; (2) by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably

anticipatable, unavoidable casualties, or any causes beyond the Contractor's control; or (3) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine, subject to the provisions of Article 21.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 Schedule of Values

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price pursuant to Section 3.2 or 3.4, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Stipulated Sum or Guaranteed Maximum Price to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy required by the Architect. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 15.1.2 The allocation of the Stipulated Sum or Guaranteed Maximum Price under this Section 15.1 shall not constitute a separate stipulated sum or guaranteed maximum price for each individual line item in the schedule of values.

§ 15.2 Control Estimate

§ 15.2.1 Where the Contract Sum is the Cost of the Work, plus the Contractor's Fee without a Guaranteed Maximum Price pursuant to Section 3.3, the Contractor shall prepare and submit to the Owner a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the estimated Cost of the Work plus the Contractor's Fee.

§ 15.2.2 The Control Estimate shall include:

- .1 the documents enumerated in Article 6, including all Modifications thereto;
- a list of the assumptions made by the Contractor in the preparation of the Control Estimate to supplement the information provided by the Owner and contained in the Contract Documents;
- .3 a statement of the estimated Cost of the Work organized by trade categories or systems and the Contractor's Fee;
- .4 a project schedule upon which the Control Estimate is based, indicating proposed Subcontractors, activity sequences and durations, milestone dates for receipt and approval of pertinent information, schedule of shop drawings and samples, procurement and delivery of materials or equipment the Owner's occupancy requirements, and the date of Substantial Completion; and
- .5 a list of any contingency amounts included in the Control Estimate for further development of design and construction.

§ 15.2.3 When the Control Estimate is acceptable to the Owner and Architect, the Owner shall acknowledge it in writing. The Owner's acceptance of the Control Estimate does not imply that the Control Estimate constitutes a Guaranteed Maximum Price.

§ 15.2.4 The Contractor shall develop and implement a detailed system of cost control that will provide the Owner and Architect with timely information as to the anticipated total Cost of the Work. The cost control system shall compare the Control Estimate with the actual cost for activities in progress and estimates for uncompleted tasks and proposed changes. This information shall be reported to the Owner, in writing, no later than the Contractor's first Application for Payment and shall be revised and submitted with each Application for Payment.

§ 15.2.5 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in the Control Estimate. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the Control Estimate and the revised Contract Documents.

§ 15.3 Applications for Payment

§ 15.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 15.1, for completed portions of the Work. The application shall be notarized, if required; be supported by all data substantiating the Contractor's right to payment that the Owner or Architect require; shall reflect retainage if provided for in the Contract Documents; and include any revised cost control information required by Section 15.2.4. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 15.3.2 With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 15.3.3 Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

§ 15.3.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.4 Certificates for Payment

§ 15.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.4.3.

§ 15.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluations of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 15.4.3 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of

- .1 defective Work not remedied;
- .2 third-party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment:
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 15.4.4 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 15.4.3, in whole or in part, that party may submit a Claim in accordance with Article 21.

§ 15.5 Progress Payments

§ 15.5.1 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in a similar manner.

§ 15.5.2 Neither the Owner nor Architect shall have an obligation to pay or see to the payment of money to a Subcontractor or supplier except as may otherwise be required by law.

§ 15.5.3 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 15.5.4 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 15.6 Substantial Completion

§ 15.6.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 15.6.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 15.6.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 15.6.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 15.7 Final Completion and Final Payment

§ 15.7.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.7.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 15.7.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.7.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from

- .1 liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- 4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 15.7.4 Acceptance of final payment by the Contractor, a Subcontractor or supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of the final Application for Payment.

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY § 16.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall comply with, and give notices required by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3. The Contractor may make a claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

§ 16.2 Hazardous Materials and Substances

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 16.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 16.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 Contractor's Insurance

) in the aggregate.

§ 17.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in this Section 17.1 or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the insurance required by this Agreement from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 18.4, unless a different duration is stated below:

than	nmercial General Liability insurance for the Project written on an occurrence form with policy limits of not less (\$) each occurrence, (\$) general aggregate, and (\$) aggregate for impleted operations hazard, providing coverage for claims including damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person; personal and advertising injury; damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4	bodily injury or property damage arising out of completed operations; and
.5	the Contractor's indemnity obligations under Section 9.15.
Contractor, v property dar statutorily re § 17.1.4 The Liability thro or umbrella and in no ev	comobile Liability covering vehicles owned by the Contractor and non-owned vehicles used by the with policy limits of not less than (\$) per accident, for bodily injury, death of any person, and mage arising out of the ownership, maintenance, and use of those motor vehicles along with any other equired automobile coverage. **Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile rough a combination of primary and excess or umbrella liability insurance, provided such primary and excess insurance policies result in the same or greater coverage as those required under Section 17.1.2 and 17.1.3, yent shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The regular the exhaustion of the underlying limits only through the actual payment by the insurers.
, ,	
9 17.1.5 Wor	rkers' Compensation at statutory limits.
§ 17.1.6 Empemployee, as	ployers' Liability with policy limits not less than (\$) each accident (\$) each and (\$) policy limit.
	ne Contractor is required to furnish professional services as part of the Work, the Contractor shall procure l Liability insurance covering performance of the professional services, with policy limits of not less than) per claim and (\$) in the aggregate.
	ne Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure liability insurance, with policy limits of not less than (\$) per claim and (\$) in the
	verage under Sections 17.1.7 and 17.1.8 may be procured through a Combined Professional Liability and ability insurance policy, with combined policy limits of not less than (\$) per claim and

§ 17.1.10 The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Section 17.1 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the period required by Section 17.1.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy.

§ 17.1.11 The Contractor shall disclose to the Owner any deductible or self- insured retentions applicable to any insurance required to be provided by the Contractor.

§ 17.1.12 To the fullest extent permitted by law, the Contractor shall cause the commercial liability coverage required by this Section 17.1 to include (1) the Owner, the Architect, and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's Consultants, CG 20 32 07 04.

§ 17.1.13 Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.1, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 17.1.14 Other Insurance Provided by the Contractor

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage Limits

§ 17.2 Owner's Insurance

§ 17.2.1 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 17.2.2 Property Insurance

§ 17.2.2.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed or materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section 17.2.2.2, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ 17.2.2.2 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section 17.2.2.1 or, if necessary, replace the insurance policy required under Section 17.2.2.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 18.4.

§ 17.2.2.3 If the insurance required by this Section 17.2.2 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ 17.2.2.4 If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 18.4, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ 17.2.2.5 Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Section 17.2.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by this Section 17.2.2. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ 17.2.2.6 Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.2.2, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 17.2.2.7 Waiver of Subrogation

§ 17.2.2.7.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, subsubcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by this Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and subsubcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 17.2.2.7 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 17.2.2.7.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 17.2.2.7.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 17.2.2.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements, written where legally required for validity, the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 17.2.3 Other Insurance Provided by the Owner

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	4	Limits

§ 17.3 Performance Bond and Payment Bond

§ 17.3.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Contract Documents on the date of execution of the Contract.

§ 17.3.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed, or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense, unless compensable under Section A.1.7.3 in Exhibit A, Determination of the Cost of the Work.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.6.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

§ 18.4 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 18.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 Assignment of Contract

Neither party to the Contract shall assign the Contract without written consent of the other, except that the Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 19.2 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 21.6.

§ 19.3 Tests and Inspections

Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 19.4 The Owner's representative:

(Name, address, email address and other information)

§ 19.5 The Contractor's representative:

(Name, address, email address and other information)

§ 19.6 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 Termination by the Contractor

If the Architect fails to certify payment as provided in Section 15.4.1 for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 days, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 20.2 Termination by the Owner for Cause

§ 20.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 20.2.2 When any of the reasons described in Section 20.2.1 exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 20.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 20.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Owner shall pay the Contractor for Work executed; and costs incurred by reason of such termination, including costs attributable to termination of Subcontracts; and a termination fee, if any, as follows:

(Insert the amount of or method for determining the fee payable to the Contractor by the Owner following a termination for the Owner's convenience, if any.)

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1 Claims, disputes, and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the Architect but excluding those arising under Section 16.2, shall be referred initially to the Architect for decision. Such matters, except those waived as provided for in Section 21.11 and Sections 15.7.3 and 15.7.4, shall, after initial decision by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to binding dispute resolution.

§ 21.2 Notice of Claims

§ 21.2.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 18.2, shall be initiated by notice to the Architect within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 21.2.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 18.2, shall be initiated by notice to the other party.

§ 21.3 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action against the other and arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in this Agreement, whether in contract, tort, breach of warranty, or otherwise, within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 21.3.

- § 21.4 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.
- § 21.5 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with their Construction Industry Mediation Procedures in effect on the date of this Agreement. A request for mediation shall be made in writing, delivered to the other party to this Agreement, and filed with the person or entity administering the mediation. The request may be made concurrently with the binding dispute resolution but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.
- § 21.6 If the parties have selected arbitration as the method for binding dispute resolution in this Agreement, any claim, subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association, in accordance with the Construction Industry Arbitration Rules in effect on the date of this Agreement. Demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.
- § 21.7 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation; (2) the

arbitrations to be consolidated substantially involve common questions of law or fact; and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 21.8 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, any party to an arbitration may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described in the written Consent.

§ 21.9 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to this Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 21.10 Continuing Contract Performance

Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 21.11 Waiver of Claims for Consequential Damages

The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 20. Nothing contained in this Section 21.11 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

This Agreement entered into as of the day and year	first written above.	
OWNER (Signature)	CONTRACTOR (Signature)	
(Printed name and title)	(Printed name and title)	

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
- В.
- 1. Work covered by Contract Documents.
- 2. Contractor use of premises.
- 3. Coordination with occupants.
- 4. Work restrictions.
- 5. Specification and drawing conventions.

C. Related Section:

1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Joseph O. Goodwin Elementary School Exterior Door & Window Replacement and HVAC Upgrades
 - 1. Project Location: 1235 Forbes Street, East Hartford, Connecticut.
- B. Owner: City of East Hartford, East Hartford Public Schools, 734 Tolland Street, East Hartford, Connecticut.
- C. Architect: Antinozzi Associates, P.C.
- D. The Work consists of the following:
 - 1. The Base Bid Work includes: the removal of existing windows and exterior doors and installation of new windows and exterior doors; including hazardous materials abatement and associated work as indicated in the drawings and technical specifications; the installation of new split system HVAC at designated locations as indicated in the drawings and technical specifications.

1.4 CONTRACTOR USE OF PREMISES

- A. General: Contractor shall have limited use of Project site for construction operations during construction period. Contractor's use of Project site is limited to the areas where work is taking place at any particular time and to common areas required for access to work areas. All other areas shall be restricted. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to work areas within elevator lobby and machine room.
 - 2. Limits: Limit site disturbance. All areas disturb by the general contractors, subcontractors, vendors, deliveries, etc. shall be repaired by the contractor.
 - 3. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, Tenants and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in an acceptable condition throughout construction period. Repair damage caused by construction operations.
- C. The Contractor shall conduct his operations under this Contract in such a manner as to allow, at all times during the performance of the work ingress and egress for the tenants and the public with the Owner's representative to coordinate his work to meet this condition.
- D. The Contractor shall provide all necessary safety equipment, material, and personnel to protect the public walks, entrance to buildings and grounds within the work areas of this Contract in order that pedestrians, tenants and the public be protected at all times.
- E. Contractor must preserve as much of existing parking as possible for owner use during construction.
- F. At all times, the occupants must have safe and full access to all parts of the facility including all the exit stairs and corridors.

1.5 COORDINATION WITH OCCUPANTS

A. Full Occupancy: Owner will occupy site and portions of the existing building during entire construction period. Cooperate with Owner and occupants during construction operations to minimize conflicts and facilitate Owner and occupant's usage. Perform the Work so as not to interfere with Owner's and occupant's day-to-day operations. Maintain existing exits unless otherwise indicated.

- 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
- 2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's and occupant's operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 3:00 p.m., Monday through Friday, except as otherwise indicated. No Off Hour, Holiday, or Weekend work allowed unless authorized in advance, given 3 business days' notice of request to the Assistant Facilities Director. All payroll costs, associated with staffing a Facilities worker at the site, will be charged to the contractor.
 - 1. Hours for Utility Shutdowns: 48 hours notice and approval from owner.
- C. Excessive Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to the occupants with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances within the existing building or on the Project site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements regarding screening of Contractor personnel working on the Project site.
 - 1. Maintain list of approved screened personnel with Owner's Representative.
 - I. Security: The Owner will not provide security guard service, watchman or escorts for this project. The employment of a security guard service to guard the contractor's employees, equipment or materials shall be at the discretion of the Contractor. However, the Contractor shall be solely responsible for theft, vandalism or similar acts at no extra cost to the Owner.

1.7 SCHEDULING OF WORK

- A. The window replacement work will be carried on while the existing facility is partially occupied.
- B. The Contractor shall be given reasonable latitude in scheduling of the work. The East Hartford School District officials will cooperate mutually with the general contractor in adjusting to situations, which may arise during the construction. The East Hartford School District Officials will make every effort to allow access to areas requested by the Contractor in advance. In no case will the existing building be entirely vacated.
- C. The Contractor shall include in his base bid any overtime work that may be required to perform work that can not be completed during regular working hours. If overtime work is required the contractor must pay for all payroll costs associated with staffing a Facilities worker at the building when overtime is in force. No overtime work can take place without the permission of the East Hartford School District Assistant Director of Facilities or designee.
- D. It is the intent of the Contractor to prosecute the work as rapidly as possible. The final construction schedule will be subject to the approval of the Owner and Architect.

1.8 SPECIFICATIONS AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary A. Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 **SUMMARY**

This Section includes administrative and procedural requirements for alternates. A.

1.3 **DEFINITIONS**

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - The cost or credit for each alternate is the net addition to or deduction from the Contract 1. Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 **PROCEDURES**

- Coordination: Modify or adjust affected adjacent work as necessary to completely integrate A. work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- В. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

ALTERNATES

012300 - 1

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Refer to Bid Form for complete list of Alternates.

END OF SECTION 012300

ALTERNATES 012300 - 2

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

- 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
- 2. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. Certificates and qualification data, where applicable or requested.
- g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - i. If a comparable product or substitution is proposed, the Contractor shall be solely responsible for verifying that the substitution does not impact the structural design, HVAC, electrical, plumbing or utility requirements, clearances, dimensions or layouts, building or fire code requirements or any other change in the original design. If the substitution does require a change in any of the items noted above or similar design change or physical changes, the contractor shall be responsible for the cost of any redesign and for the additional construction costs associated with the changes due to the substitution.

- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - k. If a comparable product or substitution is proposed, the Contractor shall be solely responsible for verifying that the substitution does not impact the structural design, HVAC, electrical, plumbing or utility requirements, clearances, dimensions or layouts, building or fire code requirements or any other change in the original design. If the substitution does require a change in any of the items noted above or similar design change or physical changes, the contractor shall be responsible for the cost of any redesign and for the additional construction costs associated with the changes due to the substitution.
 - 1. If a Contractor does propose a substitution for convenience within 60 days of notice to proceed, the Architect shall be compensated directly by the Contractor for the Architect's time reviewing such a request.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, within this specification.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 5 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Recommended form is AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 (or similar format).

1.6 ALLOWANCE FOR OVERHEAD AND PROFIT ON CHANGE ORDERS

- A. The allowance for overhead and profit is compensation for administration, superintendence, materials for temporary structures, additional premiums on bonds and the use of small tools.
- B. For additions, deletions or other approved changes in the Work performed by the prime contractor, the maximum allowable Overhead & profit markup is 10% over the direct labor/material costs, unless the contractor is offering a lower Overhead & Profit markup.
- C. The maximum allowable Overhead & Profit markup on any change order for work performed by a Sub-Contractor of Prime Contractor is 10% over direct labor/material costs of the Sub-Contractor, plus 5% of the total costs for the Prime Contractor (pass thru). Unless the contractor is offering a lower Overhead & Profit markup.

- D. The General Contractor's allowance of up to 5 percent on changes involving more than one subcontractor shall be applied only to the combined net of cost additions and deductions of all subcontractors.
- E. There shall be no allowance for overhead and profit for the Contractor or any subcontractor on changes resulting in a net deduction.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 (or similar format). Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
- b. Name of Architect.
- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.
- 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
- 6. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- C. Retainage: Owner shall retain 10% of each progress payment until proof of the project's substantial completion. Upon substantial completion, Owner shall retain 5% of the remaining project completion cost. Upon final project completion and closeout, the Owner will then proceed to release the remaining retainage amount and make final payment to the Contractor.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. When an application shows completion of an item, submit final or full waivers.
 - 2. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 3. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of Values.
 - 3. Contractor's Construction Schedule (preliminary if not final).
 - 4. Products list.
 - 5. Schedule of unit prices.
 - 6. Submittals Schedule (preliminary if not final).
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of building permits.
 - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 11. Înitial progress report.
 - 12. Report of preconstruction conference.

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- 13. Certificates of insurance and insurance policies.
- 14. Performance and payment bonds.
- 15. Data needed to acquire Owner's insurance.
- 16. Initial settlement survey and damage report if required.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
 - 4. Requests for Interpretation (RFIs).
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

- 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
- 3. Make adequate provisions to accommodate items scheduled for later installation.
- 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.5 SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
- B. Coordination Drawings: Prepare Coordination Drawings where space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Indicate relationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Minutes: Architect will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Contractor, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.
 - 1. Use of the premises.
 - m. Work restrictions.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.
 - w. Working hours.
 - 3. Minutes: Architect will record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at regular intervals not exceeding every 2 weeks. Coordinate dates of meetings with preparation of payment requests.

- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) RFIs.
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
- 3. Minutes: Architect will record and distribute the meeting minutes to the Project team.
- 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Architect.
 - 5. RFI number, numbered sequentially.
 - 6. Specification Section number and title and related paragraphs, as appropriate.
 - 7. Drawing number and detail references, as appropriate.
 - 8. Field dimensions and conditions, as appropriate.
 - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 10. Contractor's signature.
 - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
 - 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
 - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow five working days for Architect's response for each RFI. RFIs received after 3:00 p.m. will be considered as received the following working day.
 - 1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

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- c. Requests for coordination information already indicated in the Contract Documents.
- d. Requests for adjustments in the Contract Time or the Contract Sum.
- e. Requests for interpretation of Architect's actions on submittals.
- f. Incomplete RFIs or RFIs with numerous errors.
- 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
- 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each progress meeting. Include the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- C. Special Reports: Submit two copies at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for completion and startup procedures.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. Review submittal requirements and procedures.
 - 11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than **20** days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Use of premises restrictions.
 - b. Work Sequence.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action. Submittals may be rejected for not complying with requirements.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect for Contractor or sub-contractor use in preparing submittals. Fees and disclaimers will be requested.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's and Architect's Consultants receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 10 working days for review of each resubmittal.
 - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 working days for initial review of each submittal.
 - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - 6. Submittals requiring color selections will be reviewed for compliance only. Colors will be released all at the same time once approved by the Client.
- D. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect or Architect's Consultant.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name and Architect's Project number.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - Submittal numbers must be coordinated with the Architect's submittal
 procedures. Standard transmittal and memorandum to Contractors regarding
 submittal procedure will be provided by Architect, if necessary, upon award
 of Contract.
 - i. Number and title of appropriate Specification Section.

- j. Drawing number and detail references, as appropriate.
- k. Location(s) where product is to be installed, as appropriate.
- 1. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - 1. Submit one original and (2) copies of submittal to Architect in addition to specified number of copies to concurrent reviewer.
 - 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect and Architect's Consultants will return submittals, without review, received from sources other than General Contractor or Construction Manager.
 - 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - 1. Remarks.
 - m. Typed name and signature of transmitter.
 - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Architect's Consultant on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect or Architect's Consultant.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. Review, approval and signing of disclaimer form regarding use of drawings.
 - 2. Fees will be requested as deemed appropriate per drawing sheet or file.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - 1. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.

- 5. Number of Copies: Submit four (4) copies of Product Data, unless otherwise indicated. Architect will return three (3) copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Construction Documents, unless submittals of Architect's CAD Drawings are otherwise permitted.
 - 1. Preparation: Fully illustrate requirements as shown in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - 1. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 - 3. Number of Copies: Submit four (4) copies of each submittal, where copies are not required for operation and maintenance manuals. Submit five (5) copies where copies are required for operation and maintenance manuals. Architect and Consultant will retain one copy each; remainder will be returned to Contractor.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. Color photos or digital images are not accepted.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.

- 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of samples: Submit two (2) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- 6. Paint samples:
 - a. General Contractor to provide one 2'x2' color sample for each color painted in finish as specified.
 - b. All colors to be submitted at once.
 - c. Five (5) day notice required prior to submitting paint samples.
 - d. Architect reserves the right to change color.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product.

- 2. Number and name of room or space.
- 3. Location within room or space.
- 4. Number of Copies: Submit three (3) copies of product schedule or list, unless otherwise indicated. Architect will return two (2) copies.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a

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product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

- 1. Preparation of substrates.
- 2. Required substrate tolerances.
- 3. Sequence of installation or erection.
- 4. Required installation tolerances.
- 5. Required adjustments.
- 6. Recommendations for cleaning and protection.
- R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND ARCHITECT'S CONSULTANT ACTION

A. General: Architect and Architect's Consultant will NOT review submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Action Submittals: Architect and Architect's Consultant will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect or Architect's Consultant will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- C. Informational Submittals: Architect and Architect's Consultant will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 – QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Mockups
- D. Manufacturers' Instructions.
- E. Manufacturers' Certificates.
- F. Testing Laboratory Services.

1.02 QUALITY CONTROL - GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Submit to the owner safety data sheets for all materials delivered to the site.

1.03 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Employ persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.04 MOCKUPS

- A. Mockups: Before installing portions of the Work, build mockups for each item listed below and for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of the following prior to proceeding with any further work:
 - a. Windows
 - 2. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.

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- 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
- 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
- 5. Demonstrate the proposed range of aesthetic effects and workmanship.
- 6. Obtain Architect's approval of mockups before starting work, fabrication, or final construction.
 - a. Allow two days for initial review and each re-review of each mockup.
- 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 8. Mockups can become part of the completed work.

1.05 MANUFACTURERS' INSTRUCTIONS

- A. When required by individual specification sections, submit manufacturer's printed instructions in the number of copies the Contractor requires plus three (3) which will be retained by Architect.
- B. Comply with instructions in full detail and include each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.06 MANUFACTURERS' CERTIFICATES

A. When required by individual Specification Sections, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

1.07 TESTING LABORATORY SERVICES

- A. Employ and pay for services of an independent testing laboratory to perform inspections and tests, when so specified in individual Specification Sections.
- B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports shall be submitted to Architect giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.
- D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.
 - 1. Notify Architect and testing laboratory 24 hours prior to expected time for operations requiring testing services.
 - 2. Make arrangements with testing laboratory and pay for additional samples and tests ordered for Contractor's convenience.

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E. When reports indicate non-compliance, take appropriate corrective measures and request for inspection or retesting. The costs of corrective work, reinspections, and retesting shall be paid by the Contractor at no extra cost to the Owner.

PART 2 - PRODUCTS Not used

PART 3 - EXECUTION Not used

END OF SECTION 01 40 00

QUALITY CONTROL 014000-3

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Electric power service.
 - 2. Lighting.
 - 3. Telephone service.
 - 4. Water Service
 - 5. Sanitary Facilities.
 - 6. Protection Facilities.

1.3 USE CHARGES

A. Temporary Utilities Service: With the exception of toilet facilities and telephone service, the owner will pay for service use charges for usage of temporary utilities, by all parties engaged in construction, at Project site for construction operations for this project.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Provide materials suitable for use intended.
- B. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- B. Sanitary Facilities: Contractor shall provide temporary toilets, wash facilities and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- C. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Lighting: If required, provide temporary lighting that provides adequate illumination to allow for safe working conditions during normal working hours.

3.2 TEMPORARY FACILITIES INSTALLATION

- A. Lighting: If required, provide temporary lighting that provides adequate illumination for construction operations and traffic conditions.
- B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with procedures approved by the architect.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas as required.
 - b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 3. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

- i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
- i. Cost information, including a proposal of change, if any, in the Contract Sum.
- k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- 1. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Coordinate delivery with Owner.
- 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

- 1. Store products to allow for inspection and measurement of quantity or counting of units.
- 2. Store materials in a manner that will not endanger Project structure.
- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Store cementitious products and materials on elevated platforms.
- 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 7. Protect stored products from damage and liquids from freezing.
- 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

- 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 - 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

- 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
- 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

- 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
- 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
- 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
- 8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
- 9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
- 10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2. Requested substitution does not require extensive revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. General installation of products.
 - 3. Progress cleaning.
 - 4. Protection of installed construction.
 - 5. Correction of the Work.

B. Related Sections include the following:

- 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
- 2. Division 1 Section "Submittal Procedures" for submitting surveys.
- 3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
- 4. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

- 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- 2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

- A. General: Project work area is located in an occupied functioning building. Contractor shall use the utmost care to eliminate, when possible, or diminish all noise, water, dust, odors, etc. from the Project work area. Clean Project work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- C. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Washing waste materials down drains will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Primary operational systems and equipment.
 - 2. Mechanical systems piping and ducts.
 - 3. Control systems.
 - 4. Communication systems.
 - 5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 - 1. Equipment supports.
 - 2. Piping, ductwork, vessels, and equipment.

- 3. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut. Provide temporary dams to contain water and moisture.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Protect fixtures and personal property on other occupied floors in building from moisture, dust and impact damage.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

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- 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete / Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 013100 "Project Management and Coordination."

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 REQUIREMENTS FOR CONSTRUCTION WASTE MANAGEMENT

- A. Overview: Prepare and submit a Construction Waste Management Plan (CWM) to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project. The end-of-project recycling rate shall equal, at minimum, 75% (by weight) of the total waste from construction, demolition, and land clearing activities.
- B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Specification. Further Construction Waste Management requirements are as follows.
- C. Construction Waste Management Plan: The Construction Waste Management Plan shall include, but not be limited to, the following components:
 - 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging
 - b. Clean dimensional wood, palette wood
 - c. Beverage containers
 - d. Concrete
 - e. Bricks
 - f. Concrete Masonry Units (CMU)
 - g. Asphalt
 - h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Drywall
 - i. Carpet and pad
 - k. Paint
 - 1. Asphalt roofing shingles if applicable for any existing building demolition
 - m. Rigid Foam
 - n. Glass
 - o. Plastics
 - 2. Landfill Information: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).
 - 3. Sorting Method: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
 - 4. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
 - 5. Field Conditions: Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

- 6. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
- 7. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.
- D. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

1.6 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.
- B. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:
 - 1. The number of dumpsters or other containers of recycled or salvaged materials for that month;
 - 2. The volume (in cubic yards) of each dumpster or container of recycled or salvaged materials for that month;
 - 3. The type of recycled or salvaged material contained in each dumpster or container; and
 - 4. The weight of the recycled or salvaged material in each dumpster or container. If the weight of the material is not directly measured for each dumpster or container, the Solid Waste Conversion Factors listed for landfill waste (see above) shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above (e.g. glass), propose a conversion factor for review by the Owner and Architect.
- C. In addition, provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.
- D. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Owner's and Architect's review and approval.
- E. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and landfilled waste also in tons), and multiplying by 100.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.8 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Refrigerant Recovery Technician Qualifications: Universal certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.9 WASTE MANAGEMENT PLAN

- A. General: Prepare and submit a Construction Waste Management Plan (CWM) to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project. The end-of-project recycling rate shall equal, at minimum, 75% (by weight) of the total waste from construction, demolition, and land clearing activities.
- B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Specification. Further Construction Waste Management requirements are as follows.
- C. Construction Waste Management Plan: The Construction Waste Management Plan shall include, but not be limited to, the following components:

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- 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging
 - b. Clean dimensional wood, palette wood
 - c. Beverage containers
 - d. Concrete
 - e. Bricks
 - f. Concrete Masonry Units (CMU)
 - g. Asphalt
 - h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Drywall
 - j. Carpet and pad
 - k. Paint
 - 1. Asphalt roofing shingles if applicable for any existing building demolition
 - m. Rigid Foam
 - n. Glass
 - o. Plastics
- D. Landfill Information: Provide the name of the landfill(s) where trash will be dis-posed of and the applicable landfill tipping fee(s).
- F. Sorting Method: Provide a description of the proposed means of sorting and trans-porting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
- G. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
- H. Field Conditions: Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, in-cluding provisions to implement a stop work order, or to rectify non-compliant con-ditions.
- I. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
- J. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.
- K. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Construction Manager's requirements for controlling dust and dirt, environmental protection, and noise control.

3.2 WASTE MANAGEMENT MEETINGS

- A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.

3.3 MONTLY WASTE MANAGEMENT REPORTING FORMS

A. Monthly Waste Management Reporting Forms shall be submitted to the Owner and Architect for review throughout the duration of the project.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases
 - 3. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 4. Advise Owner of changeover in heat and other utilities.
 - 5. Complete final cleaning requirements, including touchup painting.
 - 6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

- 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 - 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. Expenses incurred by the Architect for more than one reinspection will be the responsibility of the Contractor and will be invoiced directly.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding into the building in order of the room numbers indicated on the Drawings.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - b. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
 - c. Sweep concrete floors broom clean in unoccupied spaces.
 - d. Remove labels that are not permanent.
 - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
- C. Comply with safety standards for cleaning. Do not dump debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for systems, subsystems, and equipment.
 - 2. Maintenance manuals for the care and maintenance of systems and equipment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 8 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Final Submittal: Submit one of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-

- reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
- 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
- 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
- 4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
- 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Operating standards.
 - 3. Operating procedures.
 - 4. Operating logs.
 - 5. Wiring diagrams.
 - 6. Control diagrams.
 - 7. Piped system diagrams.
 - 8. Precautions against improper use.
 - 9. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.

- C. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Instructions on stopping.
 - 6. Normal shutdown instructions.
 - 7. Seasonal and weekend operating instructions.
 - 8. Required sequences for electric or electronic systems.
 - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.

- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and

flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

- 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
- 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- D. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.

B. Related Sections:

- 1. Division 01 Section "Execution" for final property survey.
- 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
- 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 4. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit three (3) sets of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal: Submit one paper copy set, and one PDF electronic files of marked-up record prints and one sets of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal: Submit three paper copies sets, and one PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit three paper copies and one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

- C. Record Product Data: Submit one paper copy and one annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Work Change Directive.
 - k. Changes made following Architect's written orders.

- 1. Details not on the original Contract Drawings.
- m. Field records for variable and concealed conditions.
- n. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - 1. Upon issuance of a Notice to Proceed or similar authorization by the Owner, the Architect will transfer a copy of the current version of the digital model of the project to the Construction Manager's website for use by all trade contractors in preparing submittals, coordination drawings and record drawings. The model was prepared using Revit 2013 software.
 - 2. All contractors using or accessing the digital Model shall first be required to execute a data licensing agreement in the form of AIA Document C106 Agreement form acceptable to the Owner and Architect. A fee of \$5,000 will be requested to gain access to the digital model.
 - 3. Over the course of the multi-year construction project, all contractors using or accessing the model shall be required to update their version of Revit to the latest available version of the software in general use at that time.
 - 4. File Preparation Format: RVT operating in Microsoft Windows operating system.
 - 5. File Submittal Format: Submit or post coordination drawing files using the same format as the file preparation or PDF format.
 - 6. The Architect or his consultants make no representation as to the accuracy or completeness of the digital model as it relates to the drawings.
 - 7. The Architect and his consultants shall be granted access to the coordination model on the Construction Manager's website for their use in conducting their construction administration responsibilities.

- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.
 - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file.
 - 1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of a building or structure.
 - 2. Repair procedures for selective demolition operations.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 2. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.5 SUBMITTALS

- A. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Stamped shoring layout drawings (if required) prepared by the General Contractor's Professional Engineer, indicating location, method and design loads for the temporary shoring system utilized.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Predemolition Conference: Conduct conference a project site to review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.7 PROJECT CONDITIONS

- A. All areas of the building will be fully occupied immediately adjacent to selective demolition areas. Conduct selective demolition so Owner's and occupant's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's or occupant's operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

- C. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: Hazardous materials are present in portions of the building to be selectively demolished. A report on the presence of hazardous materials is included with the bid package. Examine report to become aware of locations where hazardous materials are present.
 - 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified in Sections 020800, 020850, 020860 and 022220.
 - 2. The contractor shall provide the owner within 30 days of removal a copy of the hazardous waste disposal manifest in accordance with State of Connecticut Department of Environment Protection Regulations.
- E. Storage or sale of removed items or materials on-site will not be permitted.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Architect.
- D. If required, engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations. Professional Engineer shall develop shoring layout plan for all temporary shoring and supervise the General Contractor's implementation of that plan.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- B. Temporary Facilities: Provide temporary barricades and other protection if required to prevent injury to people and damage to adjacent areas to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furnishings and equipment that have not been removed.
- C. Temporary Partitions: If required, erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- D. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.3 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

- 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding and pollution.
- 2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows.
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
 - 10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

- B. Existing Facilities: Protect existing stairs, walkways, building entries, and other building facilities during selective demolition operations.
- C. Removed and Reinstalled Items: Comply with the following:
 - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- E. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- F. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

3.5 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Scope of Selective Demolition is indicated on the Drawings.

END OF SECTION 024119

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- B. Fuss & O'Neill, Inc. (Fuss & O'Neill) Limited Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Lead Paint Awareness Section 02 83 19.
- E. Presumed Polychlorinated Biphenyl Removal & Disposal Section 02 84 34.
- F. Abatement Plan HM-01.
 - 1. Abatement areas represented on the Plans are to better aid in identification of areas requiring abatement. The Contractor shall refer to the architectural drawings for demolition and Site work information.
 - Shading, hatching, and/or numbering represented on the Plans are to better aid in the identification of areas requiring abatement. The Contractor shall verify all existing conditions, locations and/or quantities prior to finalizing the bid. Both these specifications and Plans are to be used to help identify material and may not both address all items but are to both be considered.

1.02 CONSULTANT

- A. The Owner and/or Architect shall retain a Consultant for the purposes of project management and monitoring during Asbestos Removal activities. At the discretion of the Owner, the Consultant will represent the Owner during the abatement project. The Asbestos Abatement Contractor (the "Contractor") will regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
 - 1. Approval of work areas
 - 2. Review of monitoring results
 - 3. Completion of the various segments of work
 - 4. Final completion of the abatement
 - 5. Submission of data
 - 6. Daily field punch list items
- B. The State of Connecticut-licensed Asbestos Consultant Project Designer for this project is Eric W. Cooley (License No.000305).

1.03 SCOPE OF WORK

A. Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of asbestos-containing materials (ACM) and asbestos impacted materials during

the renovations (the "Work") at Joseph O. Goodwin School located at 1235 Forbes Street, East Hartford, Connecticut (the "Site"). This Work under this Contract includes but is not limited to asbestos abatement in the areas of window/door removal, demolition, and replacement throughout the school.

B. This scope of work includes necessary selective demolition to remove windows scheduled for replacement and access/remove all ACM that would potentially be disturbed during the course of the project.

1.04 USE OF THE CONTRACT DOCUMENTS

- A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.
- B. All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.
- C. It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all material and labor necessary for the completion of the Work in accordance with the intent of these Specifications.
- D. In case of ambiguity among the Contract documents, the more stringent requirement as determined by the Consultant shall prevail.
- E. The Work of this Contract includes making modifications as necessary, subject to approval by the Owner in consultation with the Consultant to correct any conflicts.
- F. All items not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

1.05 SITE EXAMINATION

- A. It is understood that the Contractor has examined the Site and made their own estimates of the facilities and difficulties attending the execution of the Work and has based their price thereon.
- B. Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional cost due to the existing conditions at the Site.

1.06 CONTRACTOR QUALIFICATIONS

- A. All bidders shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year, with all projects of similar size and scope. The Contractor shall list the experience and training of the project foremen and all on-site personnel. The information that should be included is as follows:
 - 1. Project Name and Address
 - 2. Owner's Name and Address
 - 3. Architect/Consultant

- 4. Contract Amount
- 5. Date of Completion
- 6. Extras and Changes
- B. The Contractor selected must appear on the approved list of Asbestos Abatement Contractors on file at the State of Connecticut Department of Public Health (CTDPH) and hold a valid license for asbestos abatement within the State of Connecticut.
- C. Submit a written statement regarding whether the Contractor has ever been cited for non-compliance with federal, state, or local asbestos and/or lead and/or polychlorinated biphenyl (PCB) regulations pertaining to worker protection, removal, transport, or disposal.

1.07 TESTING LABORATORY SERVICES

A. The Contractor shall submit to the Consultant the name; address and qualifications of proposed laboratories intended to be utilized for sample analysis as required by this Section.

1.08 ADDITIONAL GENERAL REQUIREMENTS

- A. The Contractor shall employ a competent CTDPH-licensed Asbestos Abatement Supervisor with at least three years of experience on projects of similar scope and magnitude who shall be responsible for all work involving asbestos abatement as described in the specifications and defined in applicable regulations and have full-time daily supervision of the same. The Supervisor shall be the competent person as defined by Occupational Safety and Health Administration (OSHA) regulations.
- B. If required by federal, state, local, and any other authorities having jurisdiction over such work, the Contractor shall allow the work of this contract to be inspected. The Contractor shall immediately notify the Owner and Consultant and shall maintain written evidence of such inspection for review by the Owner and Consultant.
- C. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.
- D. The Contractor shall immediately notify the Owner and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the Owner and Consultant for verification and recording.

1.09 PROJECT DESCRIPTION

- A. The base bid includes the removal, packaging, transporting, and disposing of all asbestos-containing materials (ACM) as identified herein conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class 1 and 2 work. This shall include all necessary demolition to access the identified and assumed ACM for abatement.
- B. Materials discovered outside of those listed (either above or below) will be measured and paid or credited by unit prices. The quantities are estimates only and should be verified by the Contractor.

C. The base bid includes the following ACM:

BASE BID - ACM

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
All Window Systems/Lovers/Window Openings Throughout School	All Caulks, Adhesives, Sealants, Flashings, Damp Proofing & Glazing Compounds Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 84 34 Polychlorinated Biphenyl Bulk Product Abatement	Window Frame Caulk: 35 Units @ 24 LF EA 80 Units @ 18 LF EA 7 Units @ 20 LF EA 2 Units @ 18 LF EA 4 Units @ 24 LF EA Window Glazing: 28 @ 30 LF EA 54 Units @ 24 LF EA 7 Units @ 19 LF EA 2 Units @ 17 LF EA 4 Units @ 20 LF EA	1,2,3
Exterior Door Windows & Door Frame/Sills/ Window Wall Systems & Door/Window Wall Openings Throughout Building	All Caulks, Adhesives, Sealants, Flashings, Damp Proofing & Glazing Compounds Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 84 34 Polychlorinated Biphenyl Bulk Product Abatement	Door/Window Wall Frame Caulk: 13 Door Frames @ 20 LF EA 5 Door Frames @ 17 LF EA 2 Doors Frames @ 24 LF EA 3 Door Frames @ 26 LF EA 24 Sections @ 20 LF Each Window Glazing: 25 Doors @ 16 LF EA 7 Doors @ 4 LF EA Door Sidelight/Window Walls: 2 Sections @ 16 LF EA 3 Sections @ 18 LF EA 24 Sections @ 30 LF Each	1,2,3

ADD ALTERNATES - ACM - REMOVAL/PENETRATIONS

7,557,E1ERRYRIES 7,6111 REMOVAEN ERETTORISTS					
LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES		
Within Masonry Wall Cavities on CMU behind Brick Facade	Flashing/Vapor Barrier/Damp proofing (Assumed to be Present & ACM) Inspect/Sample Before Disturbing	< 3 SF	1,2,4		
Building perimeter soffits over windows and door entryways and wall panels above windows in gymnasium	Asbestos Cement Soffits and/or wall paneling	< 3 SF	1,2,4		

SF=Square Feet, LF=Linear Feet

Notes:

- 1. All Material Quantities shall be verified by the Contractor during the time of the walk-through. Discrepancies of amounts and/or locations of asbestos-containing materials shall be addressed prior to bidding the work to the Owner and Consultant.
- 2. Please also refer to all related specification documents for additional requirements:
 - a. Unit Prices Section 01 22 00.
 - b. Asbestos Abatement Section 02 82 13
 - c. Lead-Based Paint Awareness Section 02 83 19
 - d. Presumed Polychlorinated Biphenyl Bulk Product Abatement Section 02 84 34
 - e. Hazardous Materials Abatement Drawing HM-01
 - f. Architectural Elevation Drawings

3. Windows/window walls and doors/door systems openings shall be sealed on the inside with critical barriers and window/door components removed from the exterior within an asbestos and PCB regulated work area. Any work that will disturb the lead painted components as identified in the Hazardous Building Materials Inspection Report and Lead-Based Paint Awareness Section 02 83 19 shall also be conducted within a lead RRP regulated work area complying with the EPA's RRP Rule (40 CFR 745.80 through 92). Work includes removing of the window\door frames and window sash\door windows for disposal as ACM & PCB Bulk Product Waste. The window and door openings shall be removed of all suspected ACM to include, but not limited to caulk, adhesives, sealants vapor barrier adhesives and flashing materials to a clean undamaged substrate. The caulking and glazing compound are also presumed > 50ppm PCB Bulk Product Waste. Caulk, glazing compound, sealants, flashing and all adjacent contaminated components shall be packaged, stored, and disposed of as asbestos and > 50ppm PCB Bulk Product Waste. The waste stream from areas of lead coated window/door systems removal shall also be considered RCRA lead waste until TCLP sampling proves otherwise. Work shall be coordinated with the CM to allow proper timing between window removal and replacement. The contractor is responsible for securing and weatherproofing the openings at the completion of each shift when openings are made by window removal. Materials also contain presumed >50 ppm PCB's, refer to PCB Specification Section 028434 as well as architectural Elevation Drawings.

Add Alternate Work:

- 4. Moisture/vapor barrier damp proofing behind brick facade assumed to be Present & ACM. Before walls are penetrated for utilities / HVAC line sets or for any other reason, the abatement contractor shall open the wall to provide access for the consultant to inspect and sample any vapor barrier / damp proofing materials behind the brick facade. If ACM is identified within the wall, or if asbestos cement soffits or wall panels require coring, or other penetrations/disturbance of <3 square feet, such work shall be conducted by the asbestos abatement contractor within a regulated area from the exterior, using engineering controls to prevent making dust. All debris and waste removed shall be disposed of as ACM.</p>
- D. Some of the Work will be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).
- E. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to site delivery.
- F. Encapsulants applied to any surface that will receive a new finish that requires an adhesive must be compatible with the application of the new finish.
- G. The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site to perform the work required. All temporary electrical power and lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels installed by a State of Connecticut-licensed electrician, permitted as required, and located outside of the work areas.

1.10 DEFINITIONS

- A. The following definitions relative to asbestos abatement apply:
 - 1. <u>Abatement</u>: Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.

- 2. <u>Air Monitoring</u>: The process of measuring the total airborne fiber concentration of an area, or a person.
- 3. Amended Water: Water to which a surfactant (wetting agent) has been added.
- 4. <u>Architect</u>: a person or firm professionally engaged in the design of certain large constructions other than buildings and the like.
- 5. <u>Asbestos</u>: The name given to a number of naturally occurring fibrous silicates. This includes the serpentine forms and the amphiboles, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically altered.
- 6. <u>Asbestos-Containing Materials</u>: For the purpose of this project design, an asbestos containing material is any building material categorized by EPA as a surfacing material, thermal system insulation, or miscellaneous that contains any amount of asbestos (as defined above) based on the analytical methodology adopted by the project designer for application to subject building materials at the Site.
- 7. <u>Asbestos Felt</u>: A product made by saturating felted asbestos with asphalt, or other suitable bindery, such as a synthetic elastomer.
- 8. <u>Asbestos Fibers</u>: Those particles with a length greater than five (5) microns and a length to diameter ratio of 3:1 or greater.
- 9. <u>Asbestos Work Area</u>: A regulated area as defined by OSHA Title 29 CFR, Part 1926.1101 where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated area for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
- 10. <u>Caulking</u>: Resilient mastic compound often having a silicone bituminous or rubber base; used to seal cracks, fill joints, and prevent leakage. Typical applications: around windows, and doors. Caulking is at joints between two dissimilar materials. (i.e., masonry to wood, masonry to steel).
- 11. <u>Clean Room:</u> An uncontaminated area or room, which is a part of the worker decontamination enclosure with provisions for storage of worker street clothes and protective equipment.
- 12. <u>Clearance Sampling</u>: Final air sampling performed aggressively after the completion of the abatement project in a regulated area. Air samples collected by the air sampling professional having a total airborne fiber concentration of less than 0.010 fibers per cubic centimeter of air (fibers/cc) in each of five (5) samples collected inside the containment will denote acceptable clearance sampling by Phase Contrast Microscopy (PCM), or five air samples collected inside the containment by the air sampling professional having an average asbestos concentration of less than 70 structures per square millimeter (s/mm²) of air will denote acceptable clearance sampling for Transmission Electron Microscopy (TEM).
- 13. <u>Competent Person</u>: As defined by OSHA Title 29 CFR, Part 1926.1101, a representative of the Abatement Contractor who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. The Competent Person has authority to take prompt corrective measures, and to eliminate such hazards during asbestos removal. The Competent Person shall be properly trained in accordance with EPA's Model Accreditation Plan (MAP).
- 14. <u>Consultant</u>: Fuss & O'Neill, Inc.: A company retained by the Owner with State of Connecticut-licensed asbestos designer and asbestos project monitors to provide services enumerated in this section during asbestos abatement.
- 15. <u>Containment</u>: An enclosure within the building which establishes a contaminated area and surrounds the location where ACM and/or other toxic or hazardous substance removal is conducted and establishes a Control Work Area.
- 16. <u>Curtained Doorway</u>: A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of six feet apart can form an airlock.

- 17. <u>Damp Proofing</u>: Application of a water impervious material to surface (such as a wall) to prevent penetration of moisture, typically at foundation or below grade surface.
- 18. <u>Decontamination Enclosure System</u>: A series of connected areas, with curtained doorways between any two adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.
- 19. <u>Encapsulant</u>: A liquid material which can be applied to ACM, which controls the possible release of asbestos fibers from the materials either by creating a membrane over the surface (bridging encapsulant) or penetrating the material and binding its components together (penetrating encapsulant).
- 20. <u>Equipment Room</u>: Any contaminated area or a room that is part of the worker decontamination enclosure with provisions for storage of contaminated clothing and equipment.
- 21. <u>Fixed Object</u>: Unit of equipment or furniture in the work areas that cannot be removed from the work area.
- 22. <u>Friable Asbestos Materials</u>: Any material that contains more than 1% asbestos by weight, that can be crumbled, pulverized, or reduced to powder by hand pressure.
- 23. <u>Glazing Compound</u>: Any compound used to hold window glass in place, also referred to as putty, or glazier's putty. Is not field applied, usually installed during manufacture of windows.
- 24. <u>HEPA Filter</u>: High Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.
- 25. <u>HEPA Vacuum Equipment</u>: Vacuum equipment fitted with a HEPA filter system for filtering the effluent air from the unit.
- 26. <u>Movable Object</u>: Unit of equipment of furniture in the work area that can be removed from the work area.
- 27. <u>Negative Air Pressure Equipment</u>: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 28. <u>NESHAP</u>: National Emission Standards for Hazardous Air Pollutants regulations enforced by the EPA.
- 29. Owner: East Hartford Public Schools: An employee or executive who has the principle responsibility for a process, program, or project.
- 30. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The new limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers per cubic centimeter (fibers/cc) as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc averaged over a sampling period of 30 minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.
- 31. <u>Project Monitor</u>: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring and worker protection equipment and procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- 32. <u>RCRA</u>: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 265).
- 33. Regulated Area: An area established by the employer to demarcate where Class I, II, and III asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate, and a work area within which total airborne fiber concentrations exceed, or there is a reasonable possibility that they may exceed the PEL.
- 34. <u>Shower Room</u>: A room between the clean room and the equipment room in the work decontamination enclosure with hot and cold running water and suitably arranged for employee showering during decontamination. The shower room is located in an airlock between the contaminated area and the clean area.

- 35. <u>Totally Enclosed Manner</u>: A manner that will ensure no exposure of human beings or the environment to a concentration of asbestos.
- 36. <u>Transport Vehicle</u>: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.
- 37. <u>Waterproofing</u>: Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities); sometimes combined with felts.

1.11 SUBMITTALS

- A. The Contractor shall submit the following to the Consultant in one complete package prior to the pre-construction meeting and no later than 10 business days prior to the anticipated start of the Work:
 - 1. Submit copies of all notifications, permits, applications, licenses, and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
 - 2. Submit a schedule to the Owner and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).
 - 3. Submit the current valid State of Connecticut Asbestos Abatement Contractor license and certificate of insurance.
 - 4. Submit the name and address of the hauling contractor and landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
 - 5. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
 - 6. Submit the CTDPH license, training, medical, and respirator fit test records of each employee who may be on the Site.
 - 7. If the Contractor's CTDPH-licensed Asbestos Abatement Supervisor is not conducting OSHA required employee exposure monitoring, submit the qualifications of the air sampling professional that the Contractor proposes to use for this project for this task.
 - 8. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project. This includes Safety Data Sheets (SDS) on all products and chemicals that may be used on the project.
 - 9. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
 - 10. Submit a chain-of-command for the project.
 - 11. Submit a site-specific Emergency Action Plan for the project. The Plan may include emergency procedures to be followed by Contractor personnel to evacuate the building, hospital name, phone number, and most direct transportation route from the Site, emergency telephone numbers, etc.
 - 12. Submit a written site-specific Respiratory Protection Program for employees for the Work, including make, model and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable).
 - Proposed electrical safeguards to be implemented by a qualified Electrical Contractor, including but not limited to location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the project, including a description of electrical hazards and a safety plan for common practices in the work area. This may also include safety plan for temporary lighting, extension cord and other powered equipment used in the work area (locations, daily inspections, etc.).
 - Submit the proposed worker orientation plan that at a minimum includes a description of asbestos hazards and abatement methodologies, a review of worker protection requirements, and the outline of safety procedures.

- B. No work on the Site will be allowed to begin until the Owner/Architect and the Consultant as listed herein approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.
- C. The Contractor shall submit the following to the Consultant during the Work:
 - 1. Copies of personal air sampling results (Consultant will not review or provide any direction or advice regarding results). The Contractor shall be responsible for proper sample analytical review and personal protective equipment (PPE) selection and use. Records are retained solely for project record.
 - 2. Copies of training, CTDPH certifications, fit test records, and medical records for new employees to start work (24 hours in advance) and prior to the new employee arriving at the Site.
 - 3. Carbon copies from waste shipment record, waste manifest records, bill of lading or other waste tracking record for all specified materials.
 - 4. Copies of daily log sheets, daily sign-in sheets, and containment sign-in sheets.
- D. The Contractor shall submit the following to the Consultant at the completion of the Work. The Owner reserves right to retain payment(s) until all items are received in completion:
 - 1. Original final completed copies of the waste shipment records, signed by all transporters and the designated disposal site owner/operator.
 - 2. Original final completed copies of bill of laden, weight tickets, recycling tickets, and manifests for all specified materials.
 - 3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, CTDPH certifications, medical records, and respirator fit test records.
 - 4. Copies of all OSHA personal monitoring results.

1.12 REGULATIONS AND STANDARDS

- A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:
 - 1. EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M):
 - 2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E);
 - 3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101);
 - Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 – 180);
 - 5. Connecticut Department of Energy and Environmental Protection (CTDEEP) Regulations (Section 22a-209-8(i) and Section 22a-220 of the Connecticut General Statutes);
 - 6. CTDPH Standards for Asbestos Abatement (Sections 19a-332a-1 to 19a-332a-16);
 - 7. CTDPH Licensing and Training Requirements for Persons Engaged in Asbestos Abatement and Asbestos Consultant Services (Sections 20-440-1 to 20-440-9 and Section 20-441);
 - 8. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, 2016, and 2018 amendments;
 - 9. Life Safety Code, National Fire Protection Association (NFPA); and
 - 10. Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society of Testing

and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

1.13 EXEMPTIONS

- A. Any deviations from these specifications require written approval and authorization from the Owner and Consultant. Any deviations that may impact the bid cost shall be delineated with the bid for the Architect/Owner to review.
- B. Any modifications from the standard work practices identified in the CTDPH Standards for Asbestos Abatement, Sections 19a-332a-1 to 19a-332a-16 must be requested in writing and approved in writing by the CTDPH. The Consultant shall develop the Alternative Work Practice (AWP) application on behalf of the Owner. If the Contractor intends to request an AWP for this project, the nature of the AWP shall be disclosed in the bid documents and the cost savings associated with said AWP shall be provided for the Owner's consideration. An AWP shall not be filed without prior Owner's and Consultant's approval.

1.14 FINAL RE-OCCUPANCY AIR CLEARANCE (IF REQUIRED)

- A. Following the completion of the encapsulation phase of the work, the Consultant shall collect final re-occupancy clearance air samples inside the work area per CTDPH Standards for Asbestos Abatement (19a-332-1 to 19a-332-16).
- B. The Owner shall be responsible for payment of the sampling and analysis of the initial final air clearance samples only. The Contractor shall be responsible for payment of all costs associated with the collection and analysis of additional final clearance air samples if the first set of samples fail to satisfy the clearance criteria.
- C. Contractor shall not conduct demolition or other removal activities during final re-occupancy air clearance sampling.

1.15 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS (IF REQUIRED)

- A. The Contractor shall make the following notifications and provide the submittals to the following agency prior to the start of work. The CTDPH notification is required 10 calendar days prior to start of the abatement project and the EPA notification is required 10 business days prior to the start of the abatement project.
 - Connecticut Department of Public Health 410 Capitol Avenue MS #12 AIR P.O. Box 340308 Hartford, CT 06134-0308
 - United States Environmental Protection Agency (USEPA)
 Jordan Alves (alves.jordan@epa.gov)
 Region 1- New England (OEP05-2)
 5 Post Office Square, Suite 100
 Boston, MA 02109-3912

- B. The minimum information included in the notification to these agencies includes:
 - 1. Name and address of building Owner/Operator
 - 2. Building location
 - 3. Building size, age, and use
 - 4. Amount of asbestos to be removed
 - 5. Work schedule, including proposed start and completion date
 - 6. Asbestos removal procedures to be used
 - 7. Name and location of disposal site for generated asbestos waste, residue, and debris

1.16 WORK SITE SAFETY PLAN

- A. The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:
 - 1. Evacuation of injured workers.
 - 2. Emergency and fire exit routes from all work areas.
 - 3. Emergency first aid treatment.
 - 4. Local telephone numbers for emergency services including ambulance, fire, and police.
 - 5. A method to notify occupants of the building in the event of a fire or other emergency requiring evacuation of the building.
- B. The Contractor shall be responsible for training all workers in these procedures.

1.17 INDEPENDENT AIR SAMPLING AND ASBESTOS ABATEMENT MONITORING

- A. This Section describes independent air sampling work being performed on behalf of the Owner. This work is not in the Contract Sum. This Section describes air monitoring conducted by the Consultant to verify that the building beyond the work area and the outside environment remains uncontaminated. (Personal air monitoring required by OSHA is work to be performed by the Contractor and is within the Contract Sum). Negative exposure assessments will not be reviewed and/or approved by the Consultant. It shall be the Contractor's responsibility to determine its validity.
- B. The purpose of the Consultant's air monitoring is to verify proper engineering controls in the work area:
 - 1. Contamination of the building outside of the work area by airborne fibers.
 - 2. Failure of filtration or rupture in the differential pressure system.
 - 3. Contamination of air outside the building envelope by airborne fibers.
- C. Should any of the above occur, the Contractor shall immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the Consultant.
- D. The Consultant may monitor total airborne fiber concentrations in the work area. The purpose of this air monitoring will be to detect total airborne fiber concentrations, which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- E. To determine if the elevated total airborne fiber concentrations encountered during abatement operations have been reduced to an acceptable level, the Consultant will sample and analyze air in accordance with clearance air sampling requirements.

- F. The Consultant may perform on-site monitoring throughout the project, as follows:
 - 1. All work procedures shall be continuously monitored by the Consultant to assure that areas outside the designated work locations in the buildings will not be contaminated.
 - 2. Prior to work on any given day, the Contractor's designated "competent person" shall discuss the day's work schedule with the Consultant to evaluate job tasks with respect to safety procedures and requirements specified to prevent contamination of the building or the employees. This includes a visual work area inspection and the building or the employee decontamination.

1.18 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

- A. The Contractor shall independently retain an air sampling professional, or the CTDPH-licensed Asbestos Abatement Supervisor shall monitor total airborne fiber concentrations in the worker breathing zones, and to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- B. The Contractor's air sampling professional shall document all air sampling results and provide a report to the Consultant within 48-hours after sample collection.
- C. All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

1.19 PROPER WORKER PROTECTION

- A. This Section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.
- B. All workers are to be accredited as Abatement Workers as required by the EPA AHERA Title 40 CFR, Parts 763 Appendix C to Subpart E, February 3, 1994.
- C. The Contractor is required to be certified and accredited as required by CTDPH.
- D. In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:
 - 1. Methods of recognizing asbestos
 - 2. Health effects associated with asbestos
 - 3. Relationship between smoking and asbestos in producing lung cancer
 - 4. Nature of operations that could result in exposure to asbestos
 - 5. Importance of and instruction in the use of necessary protective controls, practices, and procedures to minimize exposure including:
 - a. Engineering controls
 - b. Work Practices
 - c. Respirators
 - d. Housekeeping procedures
 - e. Hygiene facilities
 - f. Protective clothing
 - g. Decontamination procedures
 - h. Emergency procedures

- Waste disposal procedures
- 6. Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
- 7. Appropriate work practices for the work
- 8. Requirements of medical surveillance program
- 9. Review of OSHA Title 29 CFR, Part 1926
- 10. Pressure Differential Systems
- 11. Work practices including hands on or on job training
- 12. Personal Decontamination procedures
- 13. Air monitoring, personal and area
- E. The Contractor shall provide medical examinations for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the work area for any reason. Examination shall, at a minimum, meet OSHA requirements as set forth in Title 29 CFR, Part 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.
- F. Submit the following to the Consultant for review. The Contractor shall not start work until these submittals are returned with Consultant indicating that they are approved.
 - 1. Submit copies of certificates from an EPA approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the AHERA Regulation Title 40 CFR, Part 763 Appendix C to Subpart E, February 3, 1994.
 - 2. Submit evidence that the Contractor is certified to perform asbestos abatement work by the CTDPH.
 - 3. Submit documents verifying that each worker has had a medical examination within the last 12 months as part of compliance with OSHA medical surveillance requirements. Submit, at a minimum, for each worker the following:
 - a. Name and Social Security Number (optional minimum last 4 digits)
 - b. Physician's written opinion from examining physician including at a minimum the following:
 - 1) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.
 - 2) Any recommended limitations on the worker or on the use of PPE such as respirators.
 - 3) Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
 - c. Copy of information that was provided to physician in compliance with OSHA Title 29 CFR, Part 1926.
 - 4. Statement that worker is able to wear and use the type of respiratory protection proposed for the project and is able to work safely in an environment capable of producing heat stress in the worker.
 - 5. Submit copies of certificates for the site supervisor and the workers issued by CTDPH.
- G. Submit certification signed by an officer of the abatement-contracting firm and notarized that exposure measurement, medical surveillance, and worker training records are being kept in conformance with OSHA Title 29 CFR, Part 1926.
- H. The Contractor shall maintain control of and be responsible for access to all work areas to ensure the following requirements:

- 1. Non-essential personnel are prohibited from entering the area.
- 2. All authorized personnel entering the work area shall read the "Worker Protection Procedures" that are posted at the entry points to the enclosure system and shall be equipped with properly fitted respirators and protective clothing.
- 3. All personnel who are exiting from the decontamination enclosure system shall be properly decontaminated.
- 4. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with these Specifications. The surface of the bags shall be decontaminated. Asbestos waste removed from the NPE must be immediately transported off-site or immediately placed in locked, posted temporary storage on-site, and removed within 24 hours of the project conclusion.
- 5. Any material, equipment, or supplies that are removed from the decontamination enclosure system shall be thoroughly cleaned and decontaminated by wet cleaning and/or HEPA vacuuming of all surfaces.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- B. Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as asbestos waste.
- C. Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- D. Poly disposable bags shall be 6-mil with OSHA required pre-printed label (29 CFR, Part 1926.1101(k)(8)(iii)). Tie wraps for bags shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- E. Tape or adhesive spray will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.
- F. Surfactant (wetting agent) shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of one ounce surfactant to five gallons of water or as directed by manufacturer.
- G. Removal encapsulant shall be non-flammable factory prepared penetrating chemical encapsulant deemed acceptable to Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- H. The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with asbestos.
- I. Impermeable containers are to be used to receive and retain any asbestos-containing or asbestos contaminated materials until disposal at an acceptable disposal site. The containers shall be

- labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii) [June 1, 2015, requirements]. Containers must be both air and watertight.
- J. Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used.
- K. Encapsulant shall be bridging or penetrating type which has been deemed acceptable to the Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- L. HEPA filtered local exhaust ventilation shall be utilized during the installation of enclosures and supports where ACM may be disturbed.

2.02 TOOLS AND EQUIPMENT

- A. The Contractor shall provide all clean tools and equipment necessary for asbestos removal, encapsulation, and enclosure.
- B. The Contractor's air monitoring professional or Abatement Supervisor shall have air monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly, and air samples shall be calibrated with a recently calibrated (within 6 calendar months and then annually as required) rotometer.
- C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the job including protective clothing, respirators, filter cartridges, poly sheeting of proper size and thickness, tape, and air filters.
- D. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticut-licensed electrician.
- E. The Contractor shall be responsible for coordinating electrical and water services and shall pay for these services for the duration of the project, if applicable.
- F. The Contractor shall assist the Consultant by providing necessary tools and equipment (e.g., coveralls, ladders, extension cords, lighting, etc.) for the Consultant to conduct inspections, final visual inspections, and final air clearance monitoring. The Consultant reserves the right to reject such items that are deemed unsafe and/or do not function properly and request items be replaced with adequate replacements. The work areas shall be safe to enter/occupy by the Consultant.
- G. The Contractor shall have available shower stalls and plumbing to support same to include sufficient hose length and drain system or an acceptable alternate.
- H. When applicable, exhaust air filtration system units shall contain HEPA filter(s) capable of sufficient air exhaust to create negative air pressure of at a minimum -0.02 inches of water column within enclosure with respect to outside area. Digital monometers shall be supplied for Class 1 work or Class II work if wet removal is not occurring, or removal is not intact. Equipment shall be checked for proper operation by smoke tubes or differential pressure gauge before the start of each shift and at least twice during the shift. Adequate exhaust air shall be provided for a minimum of four (4) air changes per hour within the NPE. All exhaust tubes shall be routed outside through secured openings to prevent people from access into the building. The exhaust shall be away from any air intakes or openings to the building or where people may come in contact with exhausted air. No air movement system or air filtering equipment shall discharge

- unfiltered air. The Contractor will have reserve units so that the station system will operate continuously.
- I. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- A. At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.
- B. The Contractor shall present a detailed project schedule and project submittals at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.
- C. Following the Pre-Construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORK AREA PREPARATION FOR INTERIOR OR EXTERIOR FRIABLE ABATEMENT (Not all anticipated for this exterior removal project)

- A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during the decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician, permitted as required, and located outside the work areas.
- B. Temporary power shall be continuous power. Portable generators for use during asbestos abatement are not authorized.
- C. Deactivate and/or isolate heating, ventilation, and air conditioning (HVAC) air systems or zones to prevent contamination and fiber dispersal to other areas of the building or structure. During the work, vents within the work area shall be covered with two layers of 6-mil poly, and completely sealed with duct tape.
- D. The Contractor shall be responsible for removing furniture, equipment, and any other materials to be salvaged from the work areas. Contractor shall be responsible for removing all solid waste within the work areas (if applicable). The Contractor shall pre-clean moveable objects within the proposed work areas using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate and remove such objects from work areas. Non-porous materials (i.e., metal) shall be cleaned, visually inspected by a project monitor prior to removal from the work areas and recycling/disposal as solid waste.
- E. Completely seal all openings, including, but not limited to, windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetration of the work areas, with poly sheeting

- a minimum of 6-mil thick, and sealed with duct tape. This includes doorways and corridors that will not be used for passage during work areas and occupied areas.
- F. Pre-clean fixed objects within the work areas, using HEPA vacuum equipment and/or wet cleaning methods as appropriate, and enclose with a minimum 6-mil poly sheeting completely sealed with duct tape.
- G. Clean the proposed work areas using HEPA vacuum equipment or wet cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.
- H. After HEPA vacuum cleaning, cover fixed walls and floors with polyethylene sheeting. All seams and joints of sheeting shall be sealed with tape or equivalent. Floor covering shall consist of at least two layers of 6 mil polyethylene and must cover at least the bottom 12 inches of adjoining wall. Wall covering shall consist of a minimum of two layers of 4 mil polyethylene sheet which shall overlap the floor covering to prevent leaks. There shall be no seams in the polyethylene sheet at the wall-to-floor joints. Where ceilings are not being removed, a ceiling covering shall be installed to consist of at least one layer of 4-mil polyethylene sheeting.
- I. Maintain emergency and fire exits from the work areas or establish alternate exits satisfactory to fire officials.
- J. Clean and remove ceiling mounted objects, such as lights and other items not sealed-off, which interfere with asbestos abatement. Use hand-held amended water spraying or HEPA vacuuming equipment during fixture removal to reduce settled fiber dispersal.
- K. Create pressure differential between work areas and uncontaminated areas by the use of acceptable negative air pressure equipment sufficient to provide four air changes per hour and create negative air pressure of at a minimum -0.02 inches of water column within enclosure with respect to outside area as measured on a water gauge.

3.03 DECONTAMINATION SYSTEM

- A. The Contractor shall establish contiguous to the work area, a decontamination system consisting of equipment room, shower room, and clean room, in series. The only access between contaminated and uncontaminated areas shall be through this decontamination enclosure. If it is not feasible to erect a contiguous decontamination system, the Contractor shall establish a remote decontamination unit in as close proximity to the work area as is feasible. For exterior work, the Contractor shall establish a remote decontamination system at the perimeter of the regulated work area.
- B. Access between rooms in the decontamination system shall be through double-flap curtained openings. The clean room, shower, and equipment room within the decontamination enclosure shall be completely sealed ensuring that the sole source of airflow through this area originates from uncontaminated areas outside the work area.
- C. The Contractor shall establish contiguous with the work area an equipment decontamination enclosure consisting of two totally enclosed chambers divided by a double-flapped curtained opening. This enclosure must be constructed so as to ensure no personnel enter or exit through this unit.
- D. Occupied areas and/or building space not within the work areas shall be separated from asbestos abatement work areas by means of airtight barriers.

- E. Construct the decontamination enclosure system with wood or metal framing, cover both sides with a double layer of 6-mil poly sheeting, completely sealed with spray adhesive, and taped at the joints.
- F. If a Consultant is retained for pre-abatement services, the Contractor and the Consultant shall visually inspect the barriers several times daily to assure effective seal and the Contractor shall repair defects immediately.

3.04 ASBESTOS REMOVAL PROCEDURE - GENERAL

- A. The Contractor shall have a designated "competent person" on the Site at all times to ensure establishment of a proper enclosure system and proper work practices throughout project.
- B. Abatement work will not commence until authorized by the Consultant.
- C. The Contractor shall properly coordinate abatement work with other trades, new construction, and Site use. The Contractor shall be responsible for addressing any concerns by the Owner and/or Consultant.
- D. With a fine mist, spray ACM with amended water using airless spray equipment or apply approved removal wetting agent to reduce the release of fibers during removal operation.
- E. To maintain indoor asbestos concentrations to the minimum, the wet asbestos must be removed in manageable sections. Material drop shall not exceed eight feet. For heights up to 15 feet, provide inclined chutes or scaffolding to intercept drop.
- F. Remove ACM as appropriate by standard methods. Fill disposal containers as removal proceeds; seal filled containers and clean containers before removal to equipment decontamination enclosure system. Wet clean each container thoroughly, double bag and apply caution label. Ensure that workers do not exit the work area through the equipment decontamination enclosure.
- G. After completion of stripping work, all surfaces from which asbestos has been removed shall be wet brushed, using a nylon brush, wet wiped, and sponged or cleaned by an equivalent method to remove all visible material (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept wet.
- H. Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. During cleanup, utilize brooms, rubber dustpan, and rubber squeegees to minimize damage to floor covering.
- I. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup, and shall be removed from work areas via the equipment decontamination enclosure at an appropriate time in the cleaning sequence. All asbestos waste in 6-mil poly disposal bags shall be double bagged in the equipment decontamination enclosure before removal from the Site.
- J. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas, and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections certify decontamination.

K. After completion of the initial final cleaning procedure including removal of the inner layers of poly sheeting, but prior to encapsulation, a pre-sealant inspection shall be conducted by the Consultant. The pre-sealant inspection shall verify that ACM and residual dust has been removed from the work area.

3.05 ASBESTOS REMOVAL PROCEDURE FOR EXTERIOR NON-FRIABLE MATERIALS

- A. Exterior non-friable materials which are not RACM as defined by the EPA and CTDPH are not required to be removed within a contained negative pressure enclosed work area in the State of Connecticut. This applies as long as the proposed methods of removal will not render the non-friable materials RACM during proposed removal operations.
- B. The Contractor shall have a designated "competent person" on the job at all times to ensure proper work practices throughout the project.
- C. The Contractor shall regulate the work area as required for compliance with OSHA regulation Title 29 CFR, Part 1926.1101 to prohibit non-trained workers from entering areas where ACM are to be removed.
- D. The Contractor shall establish worker decontamination unit adjacent to the regulated work area.
- E. The Contractor shall spray ACM with amended water using airless spray equipment or apply approved removal wetting agent to ensure no visible emissions during removal of non-friable materials.
- F. After completion of stripping/removal work, all surfaces from which ACM has been removed shall be wet cleaned or cleaned by an equivalent method to remove all visible suspect ACM (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept adequately wet, without causing a safety hazard or creating puddles or runoff.
- G. Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. Waste shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5 inches long (minimum), pointed and looped to secure filled waste bags.
- H. At any time during asbestos removal should the Consultant suspect contamination of areas outside the work area(s), they shall issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections indicate acceptable decontamination.
- I. The Consultant shall conduct a final visual inspection of the work area. If residual suspect ACM debris is identified during the course of the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all residual ACM.

3.06 ASBESTOS REMOVAL PROCEDURE – GLOVE BAG

A. Removal or intentional disturbance of asbestos-containing materials should only be conducted be certified and trained employees. Personal protective equipment (PPE) is always required when removing and/or disturbing asbestos-containing materials. PPE must be in accordance with applicable OSHA regulations.

- B. The following steps should be taken when glove-bagging asbestos-containing materials. Current regulations require two employees to conduct glove-bagging. Employees should always isolate the area in case of accidental spills or bag failure:
 - 1. Isolate the area and place appropriate signs and critical barriers. Only trained and protected employees are allowed in the area during the removal process.
 - 2. Employees shall use personal protective equipment.
 - 3. HEPA vacuum all debris located beneath the area of the glove bag operation. Then place polyethylene sheeting.
 - 4. Custom cut sides of glove bag to fit pipe.
 - 5. Place tools inside bag pouch (Nylon Brush, Razor, Wire Snips, Scraper, and Bone Saw, etc.)
 - 6. Place duct tape around pipe and seal edges of glove bag with duct tape (tape bottom of glove bag for extra protection)
 - 7. Cut opening near the insulation to be removed for the HEPA Vacuum nozzle and amended water wand.
 - 8. Test the bag for leaks. (A smoke tube is recommended)
 - 9. Insert tube and fill bag with smoke and squeeze bag.
 - 10. Insert spray wand in bag and spray insulation with amended water.
 - 11. Sprays amended water onto the glove bag while conducting removal.
 - 12. Remove ACM and spray inside of bag with lockdown encapsulant.
 - 13. Rinse tools in pouch and while holding tools in gloved hands, pull hands out. Twist and tape glove arms and cut tape in the middle. (Tools can be kept in gloves or submersed in water and cleaned)
 - 14. Turn on HEPA vacuum and deflate bag totally. Tape import holes.
 - 15. Twist bag as close to the top of bag as possible, tape and cut.
 - 16. Remove glove bag and cut away remaining bag material. (Be careful to not disturb remaining ACM)
 - 17. Use proper decontamination procedures and remove personal protective equipment.
 - 18. Dispose of asbestos contaminated materials and remove signs and barriers.

3.07 CONSULTANT'S RESPONSIBILITIES

- A. Air sampling may be conducted by the Consultant to ascertain the integrity of the controls that protect the building from asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees, and to comply with OSHA regulations.
- B. The Consultant's project monitor may collect and analyze air samples during the following period:
 - 1. <u>Abatement Period</u>. If required, or retained for this service, the Consultant shall collect samples on a daily basis during the work period. A sufficient number of area samples shall be collected outside of the work area, at the exhaust of the negative pressure system, and outside of the building to evaluate the degree of cleanliness or contamination of the building during removal. At the discretion of the Consultant, additional air samples may be collected inside the work area and decontamination enclosure system.
 - a. If the Consultant determines that the building air quality has become contaminated from the abatement project, they shall immediately inform the Contractor to cease all removal operations and implement a work stoppage clean-up procedure. The Contractor shall conduct a thorough clean-up of the building areas designated by the Consultant. No further removal work may occur until the Consultant has determined through air sample collection and analysis that the airborne fiber concentrations are at or below the CTDPH re-occupancy standard.

- C. The Consultant shall collect and analyze air samples during the following period (Not anticipated for this exterior removal project):
 - Post-Abatement Period. The Consultant shall conduct air sampling following the final clean-up phase of the project, once the "no visible residue" criterion, as established by the Consultant, has been met and the work area has been encapsulated by the Contractor. Five air samples shall be collected inside the work area utilizing aggressive methods to comply with the CTDPH Standards for Asbestos Abatement Section 19a-332a-12 (if required).
 - Final re-occupancy air clearance sampling, if necessary, shall be conducted by the Consultant in accordance with the CTDPH requirements using one of the following methods:
 - 1) Transmission Electron Microscopy (TEM) method with an average limit of less than 70 s/mm² of filter surface.
 - 2) Phase Contrast Microscopy (PCM) with a total airborne fiber concentration limit of less than or equal to 0.010 fibers/cc.
- D. The Owner shall be responsible for payment for the initial final clearance air sampling performance only. If the first set of samples fail to satisfy the re-occupancy criteria, the Contractor shall be responsible for payment of all costs associated with the additional final clearance air sampling and analysis.
- E. The Consultant shall provide continual evaluation of the air quality of the building during removal, using their best professional judgment in respect to the CTDPH guideline of 0.010 fibers/cc, and the background air quality established during the pre-abatement period.
- F. Pre-abatement and abatement air samples shall be collected as required to obtain a volume of 1,200 liters. Samples shall be analyzed by PCM NIOSH 7400 Method.

3.08 CONSULTANT'S INSPECTION RESPONSIBILITIES

- A. The Consultant shall conduct inspections throughout the progress of the asbestos removal project. Inspections shall be conducted to document the abatement work progress, as well as the procedures and practices employed by the Contractor.
- B. The Consultant may perform the following inspections during the removal activities:
 - 1. <u>Pre-commencement Inspection</u>. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall make the necessary adjustments to obtain compliance.
 - Work Area Inspections. Work area inspections shall be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant shall observe the Contractor's removal procedures, verify barrier integrity, monitor negative air filtration devices, assess project progress, and if deficiencies are noted, inform the abatement Contractor of specific remedial activities.
- C. The Consultant shall perform the following inspections during the removal/abatement activities:
 - 1. <u>Pre-sealant Inspection</u>. Upon the request of the Contractor, the Consultant shall conduct a pre-sealant inspection. The Consultant shall be informed 24 hours prior the time that the inspection is needed. The pre-sealant inspection shall be conducted after completion of

- the initial cleaning procedures, but prior to encapsulation. The pre-sealant inspection shall verify that all ACM and residual debris have been removed from the work area. If the Consultant identifies residual dust or debris during the pre-sealant inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".
- 2. <u>Final Visual Inspection</u>. Upon request of the abatement Contractor, the Consultant shall conduct a final visual inspection. Following the removal of the inner layer of poly sheeting, but prior to final air clearance, the Consultant shall conduct a final visual inspection inside the work area. If residual dust or debris is identified during the final inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".

3.09 RE-OCCUPANCY AIR CLEARANCE AIR TESTING (Not anticipated for this exterior removal project)

- A. After the visual inspection is completed and all surfaces in the abatement area have dried, the Consultant shall conduct final re-occupancy air clearance sampling. Aggressive air monitoring will be used. Selection of location and of samples shall be the responsibility of the Consultant. Air monitoring volumes shall be sufficient to provide a detection limit of 0.010 fibers/cc using PCM NIOSH Method 7400, or a detection limit of 70 s/mm2 utilizing TEM analysis as required.
- B. Areas that do not comply with the Standard for Cleaning for Initial Clearance (no visible dust or debris) shall continue to be cleaned by, and at, the Contractor's expense until the specified Standard of Cleaning is achieved, as evidenced by results of air testing results, as previously specified. This shall include all Consultant-based costs.
- C. The Contractor shall properly schedule abatement work and other site activities at appropriate times and locations to prevent cross contamination and/or dust in areas where the Consultant will conduct air sampling.

3.10 ASBESTOS DISPOSAL

- A. Asbestos-containing and/or asbestos-contaminated material disposal must be in compliance with requirements of, and authorized by the EPA, CTDEEP, and the State of Connecticut.
- B. Disposal approvals shall be obtained before commencing asbestos removal.
- C. A copy of the approved disposal authorization shall be provided to the Owner and the Consultant, and any required federal, state, or local agencies.
- D. Copies of all fully executed Waste Shipment Records (WSR) will be retained by the Consultant as part of the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator will sign the WSR, and the quantity of asbestos debris leaving the Site, and arriving at the landfill is documented for the Owner.
- E. All asbestos debris shall be transported in covered, sealed vans, boxes, or dumpsters, which are physically isolated from the driver by an airtight barrier. All vehicles must be properly licensed to meet DOT requirements.
- F. Any vehicles used to store or transport ACM will either be removed from the Site at night, or securely locked and posted to prevent disturbance.

G. Any incident and/or accident that may result in spilling or exposure of asbestos waste outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

END OF SECTION 02 82 13

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- B. Fuss & O'Neill, Inc. (Fuss & O'Neill Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Presumed Polychlorinated Biphenyl Removal & Disposal Section 02 84 34.
- F. Abatement Plan HM-01.

1.02 SUMMARY OF WORK

- A. Work of this Section includes requirements for worker protection and waste disposal related to window/door removal and replacement activities involving lead-based paint (LBP)-coated building components and surfaces (the "Work) impacted during the Joseph O. Goodwin Elementary School renovation project at 1235 Forbes Street, East Hartford, Connecticut (the "Site").
- B. Required training of all workers involved in surface preparations and repair operations involving the disturbance of lead paint shall have completed a minimum of 8 hours of training (Lead Safe Renovator) training in accordance with the Environmental Protection Agency (EPA). The Contractor shall be an EPA Certified Lead Safe Renovator or shall be a licensed Lead Abatement Contractor in accordance with the Connecticut Department of Public Health (CTDPH).
- C. The EPA Renovation, Repair, and Painting (RRP) requirements apply to buildings that are target housing or child-occupied facilities with children under the age of six. The Site is currently utilized as an elementary school and is considered a child occupied facility.
- D. The removal of the painted surfaces may result in dust and debris exposing workers to levels of lead above the Occupational Safety and Health Administration (OSHA) "Action Level". Worker protection, training, and engineering controls referenced herein shall be strictly adhered to, until completion of exposure assessment with results indicating exposures below the "Action Level".

The procedures referenced herein shall be utilized during required work specified elsewhere that may impact building components coated with LBP. The following components were determined to be coated with LBP:

- Exterior Metal Doors;
- 2. Exterior Metal Vents in the Window Systems;
- 3. Exterior Metal Window Sashes in the Connector Hallway;

- 4. Exterior and Interior Wood Window Components in the Gymnasium; and
- 5. Exterior Metal Door Lintels in the Gymnasium;
- E. If disturbed and managed off-site, non-porous LBP-coated building materials (i.e., metals) may be segregated and recycled as scrap metal. Metal LBP-coated building components cannot be subject to grinding, sawing, drilling, sanding, or torch cutting.
- F. Construction activities disturbing surfaces with lead-containing paint that are likely to be employed, such as demolition, sanding, grinding, welding, cutting, and burning, have been known to expose workers to levels of lead in excess of the OSHA Permissible Exposure Limit (PEL). All work specified in the technical sections of the Contract Documents shall also be in conformance with this Technical Specification Section 02 83 19 for Lead Paint Awareness.

1.03 DEFINITIONS

- A. The following definitions relative to lead containing paint/materials and LBP shall apply:
 - 1. Action Level (AL) The allowable employee exposure, without regard to use of respiratory protection, to an airborne concentration of lead over an eight-hour time-weighted average (TWA) as defined by OSHA. The current action level is thirty micrograms per cubic meter of air (30 µg/m³).
 - 2. <u>Area Monitoring</u> The sampling of lead concentrations, which is representative of the airborne lead concentrations that may reach the breathing zone of personnel potentially exposed to lead.
 - 3. <u>Biological Monitoring</u> The analysis of a person's blood and/or urine, to determine the level of lead concentration in the body.
 - 4. <u>CDC</u> The Center for Disease Control.
 - 5. <u>Change Room</u> An area provided with separate facilities for clean protective work clothing and equipment and for street clothes, which prevents cross-contamination.
 - 6. <u>Component Person</u> A person employed by the Contractor who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them as defined by OSHA.
 - 7. Consultant Fuss & O'Neill, Inc.
 - 8. <u>USEPA</u> United States Environmental Protection Agency.
 - 9. <u>Exposure Assessment</u> An assessment conducted by an employer to determine if any employee may be exposed to lead at or above the action level.
 - 10. <u>High Efficiency Particulate Air (HEPA)</u> A type of filtering system capable of filtering out particles of 0.3 microns diameter from a body of air at 99.97% efficiency or greater.
 - 11. HUD United States Housing and Urban Development.
 - 12. <u>Lead</u> Refers to metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.
 - 13. <u>Lead Work Area</u> An area enclosed in a manner to prevent the spread of lead dust, paint chips, or debris resulting from lead containing paint disturbance.
 - Lead Paint Refers to paints, glazes, and other surface coverings containing a toxic level of lead.
 - 15. MSHA Mine Safety and Health Administration.
 - 16. NARI National Association of The Remodeling Industry.
 - 17. <u>NIOSH</u> National Institute of Occupational Safety and Health.
 - 18. OSHA Occupational Safety and Health Administration.
 - 19. Owner An employee or executive who has the principle responsibility for a process, program, or project.

- 20. Permissible Exposure Limit (PEL) The maximum allowable limit of exposure to an airborne concentration of lead over an eight (8)-hour TWA, as defined by OSHA. The current PEL is fifty micrograms per cubic meter of air (50 μg/m³). Extended workdays lower the PEL by the formula: PEL equals 400 divided by the number of hours of work.
- 21. Personal Monitoring Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with OSHA Title 29 CFR, Parts 1910.1025 and 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a sphere with a radius of 18-inches and centered at the nose or mouth of an employee.
- 22. Resource Conservation and Recovery Act (RCRA) RCRA establishes regulatory levels of hazardous chemicals. There are eight (8) heavy metals of concern for disposal: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Six (6) of the metals are typically in paints, excluding selenium and silver.
- 23. SDS Safety Data Sheets.
- 24. TWA Time Weighted Average.
- 25. <u>Toxic Level of Lead</u> A level of lead, when present in dried paint or plaster, contains equal to or more than 0.50% lead by dry weight as measured by atomic absorption spectrophotometry (AAS) or 1.0 milligram per square centimeter (mg/cm²) as measured by on site testing utilizing an x ray fluorescence analyzer. (Term is specific to State of CT regulations and HUD guidelines only.)
- 26. <u>Toxicity Characteristic Leaching Procedure (TCLP)</u> The United States Environmental Protection Agency (EPA) required sample preparation and analysis for determining the hazard characteristics of a waste material.

1.04 REGULATIONS AND STANDARDS

- A. The following regulations, standards, and ordinances of federal, state, and local agencies are applicable and made a part of this specification by reference:
 - 1. American National Standards Institute (ANSI)
 - a. ANSI 288.2 1980 Respiratory Protection
 - 2. Code of Federal Regulation (CFR)
 - a. Title 29 CFR, Part 1910.134 Respiratory Protection
 - b. Title 29 CFR. Part 1910.1025 Lead
 - c. Title 29 CFR, Part 1910.1200 Hazard Communication
 - d. Title 29 CFR, Part 1926.55 Gases, Vapors, Fumes, Dusts, and Mists
 - e. Title 29 CFR. Part 1926.57 Ventilation
 - f. Title 29 CFR, Part 1926.59 Hazard Communication in Construction
 - g. Title 29 CFR, Part 1926.62 Lead in Construction Interim Final Rule
 - h. Title 40 CFR, Parts 124 and 270 Hazardous Waste Permits
 - i. Title 40 CFR, Part 172 Hazardous Materials Tables and Communication Regulations
 - j. Title 40 CFR, Part 178 Shipping Container Specifications
 - k. Title 40 CFR, Part 260 Hazardous Waste Management Systems: General
 - I. Title 40 CFR, Part 261 Identification and Listing of Hazardous Waste
 - m. Title 40 CFR, Part 262 Generators of Hazardous Waste
 - n. Title 40 CFR, Part 263 Transporters of Hazardous Waste
 - o. Title 40 CFR, Part 264 Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - p. Title 40 CFR, Part 265 Interim Statutes for Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - q. Title 40 CFR, Part 268 Lead Disposal Restrictions

- r. Title 49 CFR, Parts 170 180
- 3. Underwriters Laboratories, Inc. (UL)
 - a. UL586 1990 High Efficiency Particulate Air Filter Units

1.05 QUALITY ASSURANCE

A. Hazard Communication Program

1. The Contractor shall establish and implement a Hazard Communication Program as required by OSHA Title 29 CFR, Part 1926.59.

B. Compliance Plan (Site-Specific)

- 1. The Contractor shall establish a written compliance plan, which is specific to the project site, to include the following:
 - a. A description of work activity involving lead including equipment used, material included controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices.
 - b. Methods of engineering controls to be used to control lead exposure.
 - c. The proposed technology the Contractor will implement in meeting the PEL.
 - d. Air monitoring data documenting the source of lead emissions.
 - e. A detailed schedule for implementing the program, including documentation of appropriate supply of equipment, etc.
 - f. Proposed work practice which establishes proper protective work clothing, housekeeping methods, hygiene facilities, and practices.
 - g. Worker rotation schedule, if proposed, to reduce TWA.
 - h. A description of methods for informing workers of potential lead exposure.

C. Hazardous Waste Management

- 1. The Contractor shall establish a Hazardous Waste Management Plan, which shall comply with applicable regulations and address the following:
 - a. Identification of hazardous wastes
 - b. Estimated quantity of waste to be disposed
 - c. Names and qualifications of each subcontractor who will be transporting, storing, treating, and disposing of wastes
 - d. Disposal facility location and 24-hour point of contact
 - e. Establish EPA state hazardous waste and identification numbers if applicable
 - f. Names and qualifications (experience and training) of personnel who will be working on site with hazardous wastes
 - g. List of waste handling equipment to be used in performing the work to include cleaning, volume reduction, if applicable, and transport equipment
 - h. Qualifications of laboratory to be utilized for TCLP sampling and analysis
 - i. Spill prevention, containment, and countermeasure plan (SPCC)
 - j. Work plan and schedule for waste containment, removal, treatment, and disposal

D. Medical Examinations

- 1. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by OSHA Title 29 CFR, Parts 1910.1025 and 1926.62.
- 2. The examination shall not be required if adequate records show that employees have been examined as required by OSHA Title 29 CFR, Part 1926.62 within the last year.

3. Medical examination shall include, at a minimum, approval to wear respiratory protection and biological monitoring.

E. Training

1. The Contractor shall ensure that workers are trained to perform lead paint disturbing activities and disposal operations prior to the start of work, in accordance with OSHA Title 29 CFR, Part 1926.62. The supervisor at a minimum must have EPA "Lead Safe Work Practices" RRP Training (8-hours) and have trained the crew on RRP practices for this specific project.

F. Respiratory Protection Program

- 1. The Contractor shall furnish each employee required to wear a negative pressure respirator with a respirator fit test at the time of initial fitting and at least once every six months thereafter, as required by OSHA Title 29 CFR, Part 1926.62.
- 2. The Contractor shall establish a Respiratory Protection Program in accordance with ANSI Z88.2, OSHA Title 29 CFR, Parts 1910.134 and 1926.62.

1.06 SUBMITTALS

- A. The Contractor shall submit the following to the Consultant in one complete package prior to the pre-construction meeting and at least 10 business days before the start of the Work:
 - 1. Submit a schedule to the Owner and the Consultant, which defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, and decontamination.
 - 2. Submit a current valid certificate of insurance.
 - 3. Submit the name and address of the hauling contractor and location of the landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
 - 4. Submit video documentation showing the existing building conditions prior to the start of work. The Contractor shall be responsible for all costs associated with damage to the building and its contents that are not shown on the video documentation.
 - 5. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
 - 6. Submit copies of medical records for each employee to be used on the project, including results of biological monitoring and a notarized statement by the examining physician that such an examination occurred.
 - 7. Submit workers' valid training certificates.
 - 8. Submit record of successful respirator fit testing performed by a qualified individual within the previous six months, for each employee to be used on this project with the employee's name and social security number with each record.
 - 9. Submit the name and address of Contractor's blood lead testing lab, OSHA CDC listing, and certification in the State of Connecticut.
 - 10. Submit detailed product information on all materials and equipment proposed for demolition work on this project.
 - 11. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
 - 12. Submit a chain-of-command for the project.
 - 13. Submit a site-specific Emergency Action Plan for the project.

- Submit a written site-specific written Respiratory Protection Program for employees for the Work, including make, model and NIOSH approval numbers of respirators to be used at the Site (if applicable).
- 15. No work on the Site will be allowed to begin until the Owner and the Consultant as listed herein accept the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation accurately, completely, and in a timely manner does not constitute a cause for change order or a time extension.
- B. The following shall be submitted to the Consultant during the Work:
 - 1. Results of personal air sampling
 - 2. Training and medical records for new employees to start Site work (24-hours in advance)
- C. The following shall be submitted to the Consultant at the completion of the Work:
 - 1. Copies of all air sampling results.
 - 2. Contractor logs.
 - Copies of manifests and receipts acknowledging disposal of all waste material from the project showing delivery date, quantity, and appropriate signature of landfill's authorized representative.

1.07 PERSONAL PROTECTION

A. Exposure Assessment

- The Contractor shall determine if any worker will be exposed to lead at or above the action level.
- 2. The exposure assessment shall identify the level of exposure a worker would be subjected to without respiratory protection.
- 3. The exposure assessment shall be achieved by obtaining personal air monitoring samples representative of a full shift at least (8-hour TWA).
- 4. During the period of the exposure assessment, the Contractor shall institute the following procedures for protection of workers:
 - a. Protective clothing shall be utilized
 - b. Respiratory protection
 - c. Change areas shall be provided
 - d. Hand washing facilities and shower
 - e. Biological monitoring
 - f. Training of workers

B. Respiratory Protection

- 1. The Contractor shall furnish appropriate respirators approved by the National Institute of Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) for use in atmospheres containing lead dust.
- 2. Respirators shall comply with the requirements of OSHA Title 29 CFR, Part 1926.62.
- 3. Workers shall be instructed in all aspects of respiratory protection.
- 4. The Contractor shall have an adequate supply of HEPA filter elements and spare parts onsite for all types of respirators in use.
- 5. The following minimum respirator protection for use during paint removal or demolition of components and surfaces with lead paint shall be the half-face air purifying respirator with a minimum of dual P100 filter cartridges for exposures (not in excess of 500 μg/m³ or 10 x PEL).

C. Protective Clothing

- 1. Personal protective clothing shall be provided for all workers, supervisors, and authorized visitors entering the work area.
- 2. Each worker shall be provided daily with a minimum of two complete disposable coverall suits.
- 3. Removal workers shall not be limited to two (2) coveralls, and the Contractor shall supply additional coveralls as necessary.
- 4. Under no circumstances shall anyone entering the abatement area be allowed to re-use a contaminated disposable suit.
- 5. Disposable suits (TYVEKTM or equivalent), and other personal protective equipment (PPE) shall be donned prior to entering a lead control area. A change room shall be provided for workers to don suits and other PPE with separate areas to store street clothes and personal belongings.
- 6. Eye protection for personnel engaged in lead operations shall be furnished when the use of a full-face respirator is not required.
- 7. Goggles with side shields shall be worn when working with power tools or a material that may splash or fragment, or if protective eye wear is specified on the SDS for a particular product to be used on the project.

1.08 PERSONAL MONITORING

A. General.

1. The Contractor shall be required to perform the personal air sampling activities during lead paint disturbing work. The results of such air sampling shall be posted, provided to individual workers, and submitted to the Client as described herein.

B. Air Sampling.

- Air samples shall be collected for the duration of the work shift or for 8-hours, whichever is less. Personal air samples need not be collected every day after the first day, if working conditions remain unchanged, but must be collected each time there is a change in removal operations, either in terms of the location or in the type of work. Sampling will be used to determine 8-hour TWA. The Contractor shall be responsible for personal air sampling as outlined in OSHA Title 29 CFR, Parts 1910.1025 & 1926.62.
- 2. Air sampling results shall be reported to individual workers in written form no more than 48-hours after the completion of a sampling cycle. The reporting document shall list each sample's result, sampling time and date, personnel monitored and their social security numbers, flow rate, sample duration, sample yield, cassette size, and analysts' name and company, and shall include an interpretation of the results. Air sample analysis results will be reported in μg/m³.

C. Testing Laboratory.

1. The Contractor's testing lab shall be currently participating in the American Industrial Hygiene Association's (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP). The Contractor shall submit to the Engineer for review and acceptance, the name and address of the laboratory, certification(s) of AIHA participation, a listing of relevant experience in air lead analysis, and presentation of a documented Quality Assurance and Quality Control Program.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Any substitution in materials, equipment, or methods to those specified shall be approved by the Owner and Consultant prior to use. Any requests for substitution shall be provided in writing to the Owner and Consultant. The request shall clearly state the rationale for the substitution.
- B. Submit to the Owner and Consultant product data of all materials and equipment and samples of all materials to be considered as an alternate.
- C. Product data shall consist of manufacturer; catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, SDS, and other standard descriptive data. Submittal data shall be clearly marked to identify pertinent materials, products or equipment and show performance characteristics and capacities.
- D. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product or material with integrally related parts and attachment devices.

2.02 MATERIALS AND PRODUCTS

- A. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- B. Damaged or deteriorating materials shall not be used and shall be removed from the premises.
- C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the project including protective clothing, respirators, filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, and air filters.

D. Materials

- 1. Poly sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- 2. Poly disposable bags shall be 6-mil. Tie wraps for bags shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- 3. Tape or spray adhesive will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheeting to finished or unfinished surfaces of dissimilar materials and capable of adhering onto both dry and wet conditions, including use of amended water.
- 4. Impermeable containers are to be used to receive and retain any lead-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with EPA and DOT standards.
- 5. HEPA filtered exhaust systems shall be used during powered dust-generating abatement operations. The use of powered equipment without HEPA exhausts on this Site shall be prohibited.

2.03 TOOLS AND EQUIPMENT

A. Provide suitable tools for all lead disturbing operations.

- B. The Contractor shall have available power cables or sources such as generators (where required).
- C. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- A. At least one week prior to the start of work, a Pre-Construction Meeting will be scheduled and must be attended by the Contractor and any Subcontractors. The assigned Contractor Site Supervisor must attend this meeting.
- B. The Contractor shall present a detailed project schedule and project submittal package at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and Consultant will inform the Contractor of any scheduling adjustments for this project.
- C. Following the Pre-Construction Meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORKER PROTECTION/TRAINING

- A. The Contractor shall provide appropriate training, respiratory and other PPE, and biological monitoring for each worker and ensure proper usage during potential lead exposure and the initial exposure assessment.
- B. Workers who will perform procedures must have completed one of the following training courses for LBP:
 - 1. EPA Lead Abatement Supervisor (40-hours)
 - 2. EPA Lead Abatement Worker (32-hours)
 - 3. EPA "Lead Safe Work Practices" Renovation Repair and Painting (RRP) Training (8-hours) (required for the on-site supervisor)

The following is only for lead containing paint/materials, not LBP:

 Lead Awareness training in accordance with the OSHA Lead-in-Construction Standard (29 CFR 1926.62)

3.03 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall be responsible for establishing and maintaining controls referenced herein to prevent dispersal of lead contamination from the lead work area.
- B. The Contractor shall also be responsible for conducting work with applicable federal, state, and local regulations as referenced herein.

3.04 WORKER HYGIENE PRACTICES (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

- A. Work Area Entry.
 - 1. Workers shall don PPE prior to entering work area, including respiratory protection, disposable coveralls, gloves, headgear, and footwear.
- B. Work Area Departure.
 - 1. While leaving respirators on, workers shall remove all gross contamination, debris, and dust from disposable coveralls and proceed to change room and remove coveralls and footwear and place in hazardous waste disposal container.
- C. Hand washing Facilities.
 - 1. All workers must wash their hands and faces upon leaving the work area.
- D. Equipment.
 - All equipment used by workers inside the work area shall be wet-wiped or bagged for later decontamination before removal from the work area.
- E. Prohibited Activities.
 - 1. Under no circumstances shall workers eat, drink, smoke, chew gum or tobacco, apply cosmetics, or remove their respirators in the work area.
- F. Shock Hazards.
 - 1. The Contractor shall be responsible for using safe procedures to avoid electrical hazards. All temporary electrical wiring will be protected by a ground fault circuit interrupter (GFCI).

3.05 LEAD WORK AREA (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

A. The Contractor shall place lead warning signs at all entrances and exits from the work area. Signage shall be a minimum of 20" x 14" and shall state the following:

DANGER LEAD WORK AREA MAY DAMAGE FERTILITY OR THE UNBORN CHILD CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM DO NOT EAT, DRINK OR SMOKE IN THIS AREA

- B. The Contractor shall designate a change room as specified in this Section. The change room shall consist of two layers of 6-mil thickness poly sheeting on the floor surface adjacent to the lead work area. The change room shall have separate storage facilities for street clothes to avoid cross-contamination.
- C. The Contractor shall provide potable water for hand and face washing and provide a portable shower unit.

D. The Contractor shall place 6-mil poly drop cloths on floor/ground surfaces prior to beginning removal work to facilitate clean-up.

3.06 WORK AREA CLEAN-UP

- A. The Contractor shall remove all loose chips and debris from floor surfaces and place in hazardous waste disposal bags.
- B. The Contractor shall clean using a HEPA filter equipped vacuum the adjacent surfaces to remove dust and debris.
- C. Poly drop cloths shall be cleaned and properly disposed of general construction and demolition waste.

3.07 WASTE DISPOSAL

- A. The Contractor's contractual liability shall be the proper disposal of all non-hazardous wastes generated at the Site in accordance with all applicable federal, state, and local regulations as referenced herein.
 - 1. Fuss & O'Neill, Inc. did not collect a TCLP sample for disposal characterization of the anticipated waste stream due to the destructive nature of sampling/testing. Because components identified to contain LBP are in contact with presumed PCB bulk product waste, such components cannot be recycled, and therefore will require TCLP sampling/analysis to determine proper disposal. If additional painted materials are to be disturbed at the site that were not previously tested, they will need to be tested for lead content If toxic levels of lead are identified, the materials will need to be handled using RRP contractor and methods and materials in contact with pre-1980 caulk will require TCLP sampling/analysis to determine proper disposal of the waste. The waste stream shall also be considered RCRA lead waste until TCLP sampling proves otherwise.

3.08 CONSULTANT

- A. The Owner may retain a Consultant for the purpose of construction administration and project monitoring during demolition work at the Site.
- B. The Consultant will represent the Owner in all tasks of the project at the discretion of the Owner.

3.09 CONSULTANT'S INSPECTION RESPONSIBILITIES

- A. The Consultant may conduct inspections throughout the progress of the demolition project. Inspections shall be conducted to document the progress of the work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant shall perform the following inspections during the course of abatement activities:
 - 1. <u>Pre-commencement Inspection</u>. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed a minimum of 12 hours prior to the time the inspection is required. If deficiencies are identified during the

- pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
- 2. <u>Work Area Inspections</u>. Work area inspections shall be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant will observe the Contractor's removal methods and procedures, assess project progress, and inform the Contractor of specific remedial activities if deficiencies are noted.

END OF SECTION 02 83 19

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions, shall apply to this Section.
- B. Fuss & O'Neill, Inc. Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Lead Paint Awareness Section 02 83 19.
- F. Abatement Plan HM-01

1.02 CONSULTANT

- A. The Owner may retain Fuss & O'Neill, Inc. (the "Consultant") for the purposes of project management and monitoring during presumed Polychlorinated Biphenyl (PCB) Bulk Product Waste Removal & Disposal. The Consultant will represent the Owner in all phases of the project at the discretion of the Owner. The PCB Abatement Contractor, Asbestos Abatement Contractor, RRP Contractor, Demolition Contractor, and/or other Building Trades (collectively the "Contractor") shall regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
 - 1. Work area approval
 - 2. Monitoring results review
 - 3. Various segments of work completion
 - 4. Abatement final completion
 - 5. Data submission review
 - 6. Daily field punch list items

1.03 SCOPE OF WORK

- A. Work outlined in this Section includes all work necessary for the removal and disposal of the presumed greater than or equal to (≥) 50 parts per million (ppm) PCB-containing material (PCB Bulk Product Waste herein) impacted during the Joseph O. Goodwin Elementary School renovation project (the "Work") at 1235 Forbes Street, East Hartford, Connecticut (the "Site").
- B. The Work of this Section includes the following:
 - 1. Site preparation and controls to facilitate renovation and minor disturbance of PCB Bulk Product Waste.
 - 2. Health and Safety in accordance with Occupational Safety and Health Administration (OSHA) requirements.

- 3. Removal and cleaning of the work areas following impacts to identified presumed PCB Bulk Product materials.
- 4. Packaging, transportation, and disposal of presumed PCB Bulk Product Waste at a facility permitted to accept PCB Bulk Product Waste (Contractor's Responsibility).
- 5. Packaging, transportation, and disposal of containment, personal protective equipment (PPE), cleaning materials and supplies, and waste generated during impacts to presumed PCB Bulk Product Waste as PCB Remediation Waste at a facility permitted to accept PCB Remediation Waste (Contractor's Responsibility).
- Recordkeeping and distribution as required in accordance with EPA Title 40 CFR, Part 6. 761.125 (c) (5).

1.04 **USE OF THE CONTRACT DOCUMENTS**

- All work shall comply with the Contract Documents and with applicable codes, laws, regulations, Α. and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.
- В. It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all materials and labor necessary for the completion of the Work in accordance with the intent of the Specifications.
- C. In case of ambiguity among the Contract documents, the more stringent requirement as determined by the Consultant shall prevail.
- D. The Work of this Contract includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts between Contract Documents.
- E. All items not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

1.05 SITE EXAMINATION

Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor Α. shall make no claim for additional cost due to the existing Site conditions.

1.06 ADDITIONAL GENERAL REQUIREMENTS

- The Contractor shall furnish all labor, materials, equipment, current employee training medical Α. surveillance clearance and fit tests for assigned respirators and incidentals necessary to perform the specified work. Work shall be performed in accordance with the Contract Documents, the latest regulations from OSHA, the United State Environmental Protection Agency (EPA), and all other applicable federal, state, and local agencies. Whenever the requirements of the above references conflict or overlap, the more stringent provision shall apply.
- B. All project personnel engaged in the work covered under this Section shall be trained in accordance with OSHA Title 29 CFR, Parts 1910.1000 and 1910.1200.
- This Section specifies the procedures for removal and disposal of identified materials as C. presumed PCB Bulk Product Waste.
- D. This Section also specifies the procedures for removal of containment, PPE, cleaning materials and supplies, and waste generated during removal of presumed PCB Bulk Product Waste and

- disposal of containment, PPE, cleaning materials and supplies, and waste generated during removal of PCB Bulk Product Waste as PCB Remediation Waste.
- E. Subsequent cleaning of all adjacent surfaces upon completion of Work is also included in this Section.
- F. Disturbance or removal of presumed PCB-containing material may cause a health hazard to workers and building occupants. The Contractor shall disclose to workers, supervisory personnel, sub-contractors, and consultants who will be at the Site of the seriousness of the hazard and proper work procedures that must be followed.
- G. During performance of the Work, workers, supervisory personnel, Subcontractors, or consultants who may encounter, disturb, or otherwise function in the immediate vicinity of the presumed PCB-containing material, shall take continuous measures as necessary to protect workers from the hazard of exposure. Such measures shall include the procedures and methods described in this Section, OSHA regulations, EPA regulations, and local requirements, as applicable.
- H. If requested or required by local, state, federal, and any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this Contract to be inspected. The Contractor shall immediately notify the Owner and the Consultant and shall maintain written evidence of such inspection for review by the Owner and the Consultant.
- I. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance, as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance, or negligence.

1.07 PROJECT DESCRIPTION

A. This work includes impacts to the following Presumed PCB Bulk Product Waste and the generation of PCB Remediation Waste:

BASE BID - PRESUMED PCB BULK PRODUCT WASTE

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
All Window Systems/Lovers/Window Openings Throughout School	All Caulks, Adhesives, Sealants, Flashings, Damp Proofing & Glazing Compounds Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 82 13 See Section Asbestos Abatement	Window Frame Caulk: 35 Units @ 24 LF EA 80 Units @ 18 LF EA 7 Units @ 20 LF EA 2 Units @ 18 LF EA 4 Units @ 24 LF EA Window Glazing: 28 @ 30 LF EA 54 Units @ 24 LF EA 7 Units @ 19 LF EA 2 Units @ 17 LF EA 4 Units @ 20 LF EA	1,2,3,4,5

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Exterior Door Windows & Door Frame/Sills/ Window Wall Systems & Door/Window Wall Openings Throughout Building	All Caulks, Adhesives, Sealants, Flashings, Damp Proofing & Glazing Compounds Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 82 13 See Section Asbestos Abatement	Door/Window Wall Frame Caulk: 13 Door Frames @ 20 LF EA 5 Door Frames @ 17 LF EA 2 Doors Frames @ 24 LF EA 3 Door Frames @ 26 LF EA 24 Sections @ 20 LF Each Window Glazing: 25 Doors @ 16 LF EA 7 Doors @ 4 LF EA Door Sidelight/Window Walls: 2 Sections @ 16 LF EA 3 Sections @ 18 LF EA 24 Sections @ 30 LF Each	1,2,3,4,5

BASE BID - PRESUMED PCB REMEDIATION WASTE

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Caulk & Glazing Removal Locations	Personal Protective Equipment (PPE), Polyethylene Sheeting and Used Cleaning Supplies	1 Cubic Yard Waste Cube	1,2,3,4,5

Remediation Notes:

- 1. Location of PCB waste storage containers shall be verified by the Contractor during the time of the walk through. The Contractor shall cross-reference their work scope with areas that presumed PCB Bulk Product in the form of window & door caulk and window glazing compound that will be disturbed. Discrepancies of locations of presumed PCB-containing building materials shall be addressed prior to the work with the Owner and Consultant.
- All window caulk and components in contact with caulk, as well as window sash/glazing compound shall be disposed of as asbestos and PCB Bulk Product Waste. The waste stream from the cafeteria windows shall also be considered RCRA lead waste until TCLP sampling proves otherwise.
- 3. Polyethylene sheeting, PPE, cleaning materials and supplies, and other waste generated during removal of presumed PCB Bulk Product Waste shall be disposed of as PCB Remediation Waste.
- 4. Coordinate with Architectural, Demolition and Construction Annotation Drawings for areas and locations that will be impacted.
- 5. Window and door openings shall be sealed on the inside of openings with critical barriers and windows/doors removed from the exterior within a PCB and Asbestos regulated work area. Cafeteria windows and any work that will disturb the painted steel beam above windows shall also be conducted within a lead RRP regulated work area complying with the EPA's RRP Rule (40 CFR 745.80 through 92). Work includes removing the window and door frames and window sash\door windows for disposal as asbestos and PCB Bulk Product Waste. The window\door openings shall be removed of all caulking materials to a clean substrate. The caulking (asbestos containing) and window\door frames and sills that were in contact with caulk are presumed > 50ppm PCB Bulk Product Waste, and shall be packaged, stored, and disposed of as asbestos and > 50ppm PCB Bulk Product Waste. The waste stream from the cafeteria window removal shall also be considered RCRA lead waste until TCLP sampling proves otherwise. Work shall be coordinated with the CM to allow proper timing between window removal and replacement. The contractor is responsible for securing and weatherproofing the openings at the completion of each shift

when openings are made. Materials also contain asbestos. See Asbestos Specification Section 028213 – Abatement Note 3.

- B. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to Site delivery.
- The Contractor shall be responsible for providing temporary water, power, and heat as needed at C. the Site. Temporary lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels, installed by a State of Connecticut-licensed electrician, permitted as required, and located outside of the work area.

DEFINITIONS 1.08

- The following definitions relative to PCB abatement shall apply: Α.
 - 1. Abatement - Procedures to control PCB release from PCB Bulk Product Waste and PCB Remediation Waste: includes removal, encapsulation, and enclosure.
 - Air Monitoring The process of measuring PCB concentrations of an area or exposure of 2.
 - 3. CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (Title 42 CFR, Parts 9601-9657).
 - 4. Chemical Waste Landfill - A landfill at which protection against risk of injury to health or the environment from migration of PCBs to land, water, or the atmosphere is provided from PCBs and PCB Items deposited therein by locating, engineering, and operating the landfill as specified in EPA Title 40 CFR, Part 761.75.
 - 5. Cleanup Site - The areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of a cleanup of PCB Remediation Waste, regardless of whether the Site was intended for management of waste
 - 6. Competent Person - As defined by OSHA, a representative of the Contractor who is capable of identifying existing PCBs hazards in the workplace and selecting the appropriate control strategy for PCB exposure. A person who has authority to take prompt corrective measures to eliminate such hazards during PCB removal.
 - Consultant Fuss & O'Neill, Inc. 7.
 - Containment An enclosure within the building which establishes a contaminated area and surrounds the location where PCB and/or other toxic or hazardous substance removal is performed and establishes a Control Work Area.
 - 9. Designated Facility - An off-site disposer or commercial storer of PCB-containing waste designated on the manifest as the facility that will receive a manifested shipment of PCB containing waste.
 - Disposal An intentional or accidental act of discarding, throwing away, completing, or 10. terminating the useful life of PCBs and PCB-containing items. Disposal includes spills. leaks, and other uncontrolled discharges of PCBs, as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB items.
 - DOT The United States Department of Transportation. 11.
 - EPA Identification Number The 12-digit number assigned to a facility by EPA upon 12. notification of PCB waste activity under EPA Title 40 CFR, Part 761.205.
 - 13. Fixed Object - Mechanical equipment, electrical equipment, fire detection systems, alarms, or all other fixed equipment, fixtures, or items which cannot be removed from the work
 - 14. Generator of PCB Waste - Any person who acts, processes, or produces PCBs that are regulated for disposal under EPA Title 40 CFR, Part 761, Subpart D, whose act first causes PCBs or PCB-containing -items to become subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D, or who has physical control over the PCBs when a

decision is made that the use of the PCBs has been terminated, and is therefore subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D. Unless another provision of EPA Title 40 CFR, Part 761 specifically requires a site-specific meaning, "generator of PCB waste" includes all of the sites of PCB waste generation owned or operated by the person who generates PCB waste.

- 15. GFCI - Ground Fault Circuit Interrupter
- 16. HEPA - High Efficiency Particulate Air
- 17. HEPA Filter - Filter in compliance with ANSI Z9.2 1979.
- HEPA Vacuum Equipment Vacuum equipment equipped with a HEPA filter system for 18. filtering the air effluent.
- 19. Laboratory - A facility that analyzes samples for PCBs and is unaffiliated with any entity whose activities involve PCBs.
- 20. Large PCB Mark (M_L) - Mark that includes letters and striping on a white or yellow background and shall be sufficiently durable to equal or exceed the life (including storage for disposal) of the PCB Article, PCB Equipment, or PCB Container. The size of the mark shall be at least six inches (6") on each side. If the PCB Article or PCB Equipment is too small to accommodate this size, the mark may be reduced in size proportionately down to a minimum of two inches on each side.
- Manifest The shipping document EPA form 8700-22 and any continuation sheet attached 21. to EPA form 8700-22, originated and signed by the generator of PCB-containing waste.
- 22. Mark - The descriptive name, instructions, cautions, or other information applied to PCBs, and PCB Items, or other objects.
- 23. Marked - The marking of PCB Items and PCB storage areas and transport vehicles by means of applying a legible mark by painting, fixation of an adhesive label, or by any other method that meets the requirements of the EPA Title 40 CFR, Part 761.
- 24. Movable Object - Unit of equipment of furniture in the work area that can be removed from the work area.
- 25. Negative Air Pressure Equipment - A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 26. On-Site - Within the boundaries of a contiguous property unit.
- 27. Owner - East Hartford Public Schools: An employee or executive who has the principle responsibility for a process, program, or project.
- 28. PCB(s) - A chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances that contain such substance. Refer to EPA Title 40 CFR, Part 761.1(b) for applicable concentrations of PCBs. PCB and PCBs as contained in PCB items are defined in EPA Title 40 CFR, Part 761.3.
- 29. PCB Article - A manufactured article, other than a PCB Article Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. Includes capacitors, transformers, electric motors, pumps, pipes, and other manufactured item which (1) is formed to a specific shape or design during manufacture, (2) has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) has either no change of chemical composition during its end use, or only those changes of composition that have no commercial purpose separate from that of the PCB Article.
- 30. PCB Article Container - A package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.
- 31. PCB Bulk Product Waste - A waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is greater than (≥) 50 ppm PCBs. Does not include PCBs or PCB Items regulated for disposal under EPA Title 40 CFR Parts 761.60(a)-(c), 7611.61, 761.63, or 761.64. PCB Bulk Product Waste is further defined in EPA Title 40 CFR, Part 761.3.

- 32. <u>PCB Item</u> A PCB Article, PCB Article Container, PCB Container, PCB Equipment, or anything that deliberately or unintentionally contains, or has as a part of it any PCB or PCBs.
- 33. <u>PCB Remediation Waste</u> Waste containing PCBs in concentrations greater than 1 ppm as a result of a spill, release, or other unauthorized disposal.
- 34. <u>PCB Waste(s)</u> PCBs and PCB Items that are subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D.
- 35. <u>RCRA</u> The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 265).
- 36. Regulated Work Area An area established by the employer to demarcate where PCB abatement is conducted and any adjoining area where debris and waste from such abatement work accumulate.
- 37. <u>Storage for Disposal</u> Temporary storage area for PCBs that have been designated for disposal.
- 38. <u>Totally Enclosed Manner</u> A manner that will ensure no exposure of human beings or the environment to the concentration of PCBs.
- 39. <u>Transfer Facility</u> A transportation-related facility including loading docks, parking areas, and other similar areas where shipments of PCB waste are held during normal transportation. Transport vehicles are not transfer facilities under this definition, unless they are used for the storage of PCB waste, rather than for actual transport activities. Storage areas for PCB waste at transfer facilities are subject to the storage facility standards of EPA Title 40 CFR, Part 761.65, but such storage areas are exempt from the approval requirements of EPA Title 40 CFR, Part 761.65(d) and the recordkeeping requirements of EPA Title 40 CFR, Part 761.180, unless the same PCB waste is stored there for a period of more than 10 consecutive days between destinations.
- 40. <u>Transporter of PCB Waste</u> For the purposes of Title 40 CFR, Part 761, Subpart K, any person engaged in the transportation of regulated PCB waste by air, rail, highway, or water for purposes other than consolidation by a generator.
- 41. <u>Transport Vehicle</u> A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle
- 42. TSCA The Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

1.09 SUBMITTALS

- A. The Contractor shall submit the following to the Consultant in one complete package prior to the pre-construction meeting, and no later than 10 business days prior to the anticipated start of the Work:
 - 1. <u>Site-Specific Health and Safety Plan (HASP)</u>: The Contractor shall prepare a site-specific HASP plan for protection of workers and control of the work site in accordance with OSHA regulatory requirements (Title 29 CFR, Part 1910.120). The HASP shall govern all work conducted at the site during the removal of PCB-Containing Materials and related debris, waste handling, sampling, waste management, and waste transportation. At a minimum, the HASP shall address the requirements set forth in OSHA Title 29 CFR, Part 1910.120, as further outlined below:
 - a. Health and Safety Organization
 - b. Site Description and Hazard Assessment
 - c. Training
 - d. Medical Surveillance
 - e. Work Areas
 - f. Personal Protective Equipment
 - g. Personal Hygiene and Decontamination
 - h. Standard Operating Procedures and Engineering Controls

- . Emergency Equipment and First Aid Provisions
- j. Equipment Decontamination
- k. Air Monitoring
- I. Telephone List
- m. Emergency Response and Evacuation Procedures and Routes
- n. Site Control
- o. Heat and Cold Stress
- p. Recordkeeping
- q. Community Protection Plan
- 2. <u>Employee Training, Medical, and Fit Test Documentation</u>: The Contractor submit the following documentation:
 - a. Documentation of Training for all employees and Sub-contractors to be used for the removal work.
 - b. Medical clearance and respirator fit test records of each employee who may be on the project site.
- 3. <u>PCB and/or other Toxic or Hazardous Substances Disposal Plan</u> (Contractor Responsibility):

A written plan that details the Contractor's plan for transportation and disposal of PCB-Containing Materials, or other Toxic or Hazardous Substance wastes generated during the project. The Disposal Plan shall identify:

- a. The Contractor's insurance certificate and landfill's operating permits and insurance certificates.
- b. Waste packaging, labeling, placarding, and manifesting procedures.
- c. The name, address, and 24-hour contact number for the proposed treatment or disposal facility, or facilities to which waste generated during the project will be transported.
- d. The name, address, contact person(s) and state-specific permit numbers for proposed waste transporters, and EPA and DOT identification number for firms that will transport PCB-Containing Material waste.
- e. The license plate numbers of vehicles to be used in transporting of the waste from the Site to the disposal facility.
- f. The route(s) by which the waste will be transported to the designated disposal facility, and states or territories through which the waste will pass.
- 4. <u>Air Sampling Professional Qualifications</u>: The qualifications of the air sampling professional that the Contractor proposed to use for this project to perform OSHA required employee exposure monitoring.
- B. The following documents shall be submitted to the Consultant within 15 working days following removal of waste from the Site (Contractor Responsibility):
 - 1. Waste Profile Sheets
 - 2. Pre-Disposal Analysis Test Results (if required by disposal facility)
 - 3. Waste Manifests signed by the disposal facility
 - 4. Tipping Receipts provided by the disposal facility
 - 5. Certification of Final Treatment/Disposal signed by the responsible disposal facility official
- C. The following shall be submitted to the Consultant at the completion of the Work (Abatement Contractor Responsibility):
 - 1. <u>Disposal Site Receipts</u>: Copy of waste shipment record(s) and disposal site receipt(s) that indicate that PCB-Containing Materials or other Toxic, or Hazardous Substances materials have been properly disposed.

1.10 REGULATIONS AND STANDARDS

- A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to presumed PCB Bulk Product impacted by work. Specifically, the Contractor shall comply with the requirements of the following:
 - 1. EPA TSCA (Title 40 CFR, Part 761);
 - 2. OSHA Hazardous Waste Operations and Emergency Response Regulations (Title 29 CFR, Parts 1910.120);
 - 3. OSHA Respiratory Protection Standard (Title 29 CFR, Part 1910.134);
 - 4. OSHA Hazard Communication (Title 29 CFR, Part 1910.1200);
 - 5. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 180);
 - 6. CTDEEP Regulations;
 - 7. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, 2016, and 2018 amendments;
 - 8. Life Safety Code (National Fire Protection Association [NFPA]); and
 - 9. Local health and safety codes, ordinances or regulations pertaining to PCB remediation and all national codes and standards including American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

1.11 POSTING AND RECORD MAINTENANCE REQUIREMENTS

- A. The following items shall be conspicuously displayed proximate but outside of the regulated work areas.
 - 1. <u>Warning Signs</u>: Warning signs shall be in English and the language of any workers on-site who do not speak English, and be of sufficient size to be clearly legible and display the following or similar language in accordance with OSHA Title 29 CFR, Part 1910.1200:

WARNING HAZARDOUS WASTE WORK AREA PCBs-POISON NO SMOKING, EATING OR DRINKING AUTHORIZED PERSONNEL ONLY PROTECTIVE CLOTHING IS REQUIRED IN THIS AREA

In addition, all entrances to work areas shall be posted with a PCB M_L large marker.

- B. The Contractor shall maintain the following items on-site and available for review by all employees and authorized visitors:
 - 1. Documentation of Training, Medical Clearance, and Fit Test Records for all employees and the project Supervisor.
 - 2. SDS for all chemicals used during the project.
 - 3. Copies of Contractor's written hazard communication and respiratory protection programs.

1.12 MINIMUM REQUIREMENTS FOR WORKER HEALTH AND SAFETY

A. The Contractor is responsible and liable for the health and safety of all on-site personnel and the off-site community affected by the Work. All on-site workers or other persons entering the

regulated work areas shall be knowledgeable of and comply with all applicable federal, state, and local regulations protecting human health and the environment from the hazards posed by the Work.

B. In addition to exposure concerns relating to the presence of PCBs, other health and safety considerations will apply to the Work. The Contractor shall be responsible for recognizing such hazards and shall be responsible for the health and safety of the Contractor's employees at all times. It is the Contractor's responsibility to comply with all applicable health and safety regulations.

1.13 WORK AREA IDENTIFICATION

- A. The Contractor shall lay out and clearly identify regulated work areas at the Site. Access by equipment, site personnel, and the public to the work areas shall be limited as follows:
 - 1. Abatement Zone: The Abatement Zone(s) shall consist of all areas where removal of PCB-Containing Materials and other Toxic or Hazardous Substances, and waste handling and staging activities are on-going and the immediately surrounding locale or other areas where contamination could occur. Each Abatement Zone for purposes of removal of PCB-Containing Materials or other Toxic or Hazardous Substances for disposal shall be performed within a regulated work area (refer to Section 3.2 of this Specification) to demarcate work areas from non-work areas. The regulated work area shall be visibly delineated with appropriate warning signs at all approaches to the area (including a large PCB M_L marker) and be restricted from access by all personnel except those directly necessary for the completion of the respective abatement tasks. The Abatement Zones shall be relocated and delineated as necessary as work progresses from one portion of the Site to another, to limit access to each area and to minimize risk of exposure to Site workers and the general public. Access shall be controlled at the periphery of the Abatement Zones to regulate the flow of personnel and equipment into and out of each zone and to help verify that proper procedures for entering and exiting are followed. All persons within the Abatement Zones shall wear the appropriate level of protection established in the Contractor's HASP.
 - 2. Decontamination Zone: The Decontamination Zone is the transition zone between the Abatement Zone and the clean support zone of the project site and is intended to reduce the potential for contaminants from being dispersed from the Abatement Zone to clean areas of the Site. The Decontamination Zone shall consist of a buffer area surrounding each Abatement Zone through which the transfer of equipment, materials, personnel, and containerized waste products will occur, and in which decontamination of equipment, personnel, and clothing will occur. The Decontamination Zones shall be constructed as a three-chamber decontamination unit for workers and a two-chamber equipment room for waste load out as detailed in Section 3.3 of this Specification. All emergency response and first aid equipment shall be readily maintained in this zone. All PPE and clothing shall be removed or decontaminated in the Decontamination Zone prior to exiting the Support Zone.
 - 3. Support Zone: The Support Zone shall consist of the area outside the Decontamination Zones and the remainder of the project site. Administrative and other support functions and any activities that by nature need not be conducted in the Abatement or Decontamination Zone related to the project shall occur in the Support Zone. Access to the Abatement and Decontamination Zones shall be controlled by the Contractor Site Supervisor and limited to those persons necessary to complete the abatement work, and who have reviewed and signed the HASP.

1.14 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

- A. The Contractor shall be responsible for determining and to provide the appropriate level of PPE in accordance with applicable regulations and standards necessary to protect the Contractor's employees from all hazards that are present.
- B. The Contractor shall provide all employees with the appropriate safety equipment and protective clothing to ensure an appropriate level of protection for each task, taking into consideration the chemical, physical, ergonomic, and biological hazards posed by the Site and Work.
- C. The PPE to be utilized for the project shall be selected based upon the potential hazards associated with the Site and the Work. Appropriate PPE shall be worn at all times within the regulated work area.
- D. The Contractor shall provide the appropriate level of respiratory protection to all field personnel engaged in activities where respiratory hazards exist, or where there is a potential for such hazard to exit.
- E. The Contractor shall provide, as necessary, protective coveralls, disposable gloves and other protective clothing for all personnel that will be actively involved in abatement activities or waste handling activities, or otherwise present in the regulated work area. Coveralls shall be TyvekTM or equivalent material. Should the potential for exposure to liquids exist, splash resistant disposable suits shall be provided and utilized.
- F. Protective coveralls, and other protective clothing shall be donned and removed outside of the regulated work area and shall be disposed of at the end of each day. Ripped coveralls shall be immediately replaced after appropriate decontamination has been completed to the satisfaction of the Contractor Site Supervisor. Protective clothing shall not be worn outside of the regulated work area.
- G. Hard hats, protective eyewear, rubber boots, and/or other non-skid footwear shall be provided by the Contractor as required for workers and authorized visitors.
- H. All contaminated protective clothing, respirator cartridges, disposable protective items HEPA filters, vacuum bags/collection devices, etc. shall be placed into proper containers provided by the Abatement Contractor for transport and proper disposal in accordance with EPA regulations as presumed PCB Remediation Waste.

1.15 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

- A. At a minimum, the Contractor shall provide and maintain at the Site the following Emergency and First Aid Equipment:
 - 1. <u>Fire Extinguishers</u>: At a minimum, one fire extinguisher shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work. Each extinguisher shall be a minimum of a 20-pound Class ABC dry fire extinguisher with Underwriters Laboratory approval per OSHA Title 29 CFR, Part 1910.157.
 - 2. <u>First Aid Kit</u>: At a minimum, one first aid kit meeting the requirements of OSHA Title 29 CFR, Part 1910.151 shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work.
 - 3. <u>Communications</u>: Telephone communications (either cellular or land line) shall be provided by the Contractor for use by site personnel at all times during the Work.

B. The Contractor Site Supervisor shall be notified immediately in the event of personal injury, potential exposure to contaminants, or another emergency. The Contractor Site Supervisor shall then immediately notify the Owner and Consultant.

1.16 STANDARD SAFETY AND HEALTH PROCEDURES AND ENGINEERING CONTROLS

- A. The following provisions shall be employed to promote overall safety, personnel hygiene, and personnel decontamination:
 - Each Contractor or Subcontractor shall ensure that all safety equipment and protective clothing to be utilized by its personnel is maintained in a clean and readily accessible manner at the Site.
 - 2. All prescription eyeglasses in use on this project shall be safety glasses conforming to ANSI Standard Z87.1. No contact lenses shall be allowed on the Site.
 - 3. Prior to exiting the regulated work area(s), all personnel shall remove protective clothing, and place disposable items in appropriate disposal containers to be dedicated to that purpose. Following removal of PPE, personnel shall thoroughly wash and rinse their face, hands, arms, and other exposed areas with soap and tap water wash and subsequent tap water rinse. A fresh supply of tap water shall be provided at the Site on each workday by the Contractor for this purpose.
 - 4. All PPE used on-site shall be decontaminated or disposed of at the end of each workday. Discarded PPE shall be placed in sealed DOT-approved 55-gallon drums for off-site disposal provided by the Abatement Contractor.
 - 5. Respirators shall be dedicated to each employee, and not interchanged between workers without cleaning and sanitizing.
 - 6. Eating, drinking, chewing gum or tobacco, smoking, and any other practice that increases the likelihood of hand to mouth contact shall be prohibited within the delineated abatement and decontamination work zones. Prior to performing these activities, each employee shall thoroughly cleanse their face, hands, arms, and other exposed areas.
 - 7. All personnel shall thoroughly cleanse their face hands, arms, and other exposed areas prior to using toilet facilities.
 - 8. No alcohol, illicit drugs, or firearms will be allowed on the Site at any time.
 - 9. Contact with potentially contaminated surfaces should be avoided, if possible. Field personnel should minimize walking through standing water/puddles, mud, or other wet or discolored surfaces, kneeling on the ground, and placing equipment, materials, or food on the ground, or other potentially contaminated surface.
- B. Workers must wear protective suits, protective gloves, and eye protection. Respiratory protection shall be in accordance with OSHA Title 29 CFR Part 1910.134 and ANSI Z88.2.
 - 1. Workers must be trained per OSHA requirements, have medical clearance, and must have recently received a pulmonary function test (PFT) and respirator fit test by a trained professional.
 - 2. A personal air sampling program shall be in place, as required by OSHA.
 - 3. The use of respirators must also follow a complete written respiratory protection program as specified by OSHA.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with PCBs shall be decontaminated or disposed of as PCB waste.
- B. Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 4 or 6-mil thickness.
- C. Poly disposable bags shall be 6-mil thickness with pertinent pre-printed label. Tie wraps for bags shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- D. Tape or adhesive spray will be capable of sealing joints in adjacent poly and for attachment of poly to finished or unfinished surfaces of dissimilar materials, and capable of adhering under both dry and wet conditions, including use of cleaning products.
- E. The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with PCBs.

2.02 TOOLS AND EQUIPMENT

- A. The Contractor shall provide all tools and equipment necessary for PCB removal.
- B. The Contractor's air monitoring professional shall have air monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work including protective clothing, respirators, filter cartridges, poly of proper size and thickness, tape, and air filters.
- C. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticut-licensed electrician.
- D. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.

- B. The Contractor shall present a detailed project schedule and project submittals at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.
- C. Following the Pre-Construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORK AREA PROTECTION - REGULATED AREA

- A. Where necessary, deactivate electrical power. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician, permitted as required, and located outside the work area.
- B. Post warning signs in accordance with OSHA Title 29 CFR, Part 1910.1200 at all approaches to the regulated work area(s). Signs shall be conspicuously posted to permit a person to read signs and take precautionary measures to avoid exposure to PCBs or other Toxic or Hazardous Substances. These signs should include the large PCB M_L markers at each entrance to the work area.
- C. Waste Containers for PCB Bulk Product Waste and PCB Remediation Waste shall be located onsite and shall be placed adjacent to the regulated area. Containers shall be lined, covered, and secured. The PCB waste containers shall be properly marked as described in EPA Title 40 CFR, Part 761.40. Marking shall include a PCB M_L marker formatted in accordance with EPA Title 40 CFR, Part 761.45.

3.03 DECONTAMINATION SYSTEM

- A. The Contractor shall establish an on-site wash facility as near as possible to the regulated work area(s). If a wash facility is not present at the Site, A portable facility will be made available by the Contractor. Hands, face, and all other potentially contaminated areas of the skin will be thoroughly cleaned prior to smoking, eating, or leaving the site.
- B. All equipment which is potentially contaminated is decontaminated prior to leaving the regulated work area. Equipment decontamination procedures will consist of the following:
 - 1. Physically remove packed dirt and debris with a stiff bristle brush and with tap water and hexane or equivalent
 - 2. Tap water rinse
 - 3. Second tap water and hexane or equivalent wash
 - 4. Second tap water rinse
 - 5. Allow to air dry

Note: Most electronic monitoring equipment can be wrapped in plastic to eliminate the need for extensive decontamination protocols which could harm the electronics.

3.04 PRESUMED PCB BULK PRODUCT WASTE REMOVAL PROCEDURES

A. The Contractor shall have a designated "competent person" on the Site at all times to ensure proper work practices throughout the project.

- B. The Contractor shall regulate the work area as required for compliance with OSHA Title 29 CFR. Part 1910.1200 to prohibit non-trained workers from entering areas where PCBs are to be removed.
- C. The Contractor shall establish a wash facility adjacent the work area.
- D. Materials shall be removed or impacted in a manner which does not breakdown the materials into fine dust or powder to the extent feasible. Equipment and tools to be utilized shall include hand tools and mechanical equipment such as coring drills, mechanical grinders, etc. to remove materials from adjacent substrates. Mechanical removal equipment shall as appropriate be fitted with HEPA filtered vacuum attachments.
- E. The use of minimal quantities of water to moisten the generated dust prior to collection shall be utilized. Under no circumstances shall the presumed PCB waste show evidence of free liquid water, pooling, or ponding within the waste stream. Any liquid used to wet the dust and debris to control fugitive emissions shall be properly containerized and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1) or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- F. Dry or brittle presumed PCB-Containing Material shall be removed with additional engineering controls such as use of a HEPA filtered vacuum to remove accumulated dust or debris during removal.
- G. Sequence of removal shall follow the following general requirements:
 - 1. Site preparation and controls to facilitate impacts to presumed PCB Bulk Product Waste including establishing a regulated area, preparing polyethylene sheeting drop cloths and the use of engineering controls such as tools and equipment equipped with HEPA filtration. These procedures must be utilized for PCB Waste removal.
 - Health and Safety in accordance with OSHA requirements. 2.
 - Remove and containerize all visible accumulations of presumed PCB Bulk Product Waste. Waste shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5 inches long (minimum), pointed and looped to secure filled plastic bags. Disposal bags shall then be placed in steel 55-gallon DOT-approved drums to be provided by the Abatement Contractor. Packaging and movement of the presumed PCB Bulk Product Waste and PCB Remediation Waste Storage area for PCB waste is the responsibility of the Contractor.
 - 4. Transportation, and disposal of presumed PCB Bulk Product Waste at a facility permitted to accept PCB Bulk Product Waste and shall be the responsibility of the Abatement
 - 5. Transportation, and disposal of containment, personal protection equipment (PPE), cleaning materials and supplies, and waste generated during removal of PCB Bulk Product Waste as PCB Remediation Waste at a facility permitted to accept PCB Remediation Waste and shall be the responsibility of the Abatement Contractor.
 - Following complete removal of PCB Bulk Product Waste and PCB Remediation Waste, the 6. regulated work area shall be left clean with no remaining debris.
 - Recordkeeping and distribution as required in accordance with EPA Title 40 CFR, Part 7. 761.125 (c) (5).
- H. At any time during impacts to presumed PCB-containing materials should the Consultant suspect contamination of areas outside the regulated work area, the Consultant shall issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections indicate acceptable decontamination.

I. If requested by the Owner, the Consultant shall conduct a final visual inspection of the work area. If residual suspect presumed PCB-containing debris is identified during the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all residual PCB.

3.05 CLEANING AND DECONTAMINATION

- A. The Contractor shall be responsible for complete cleaning and decontamination of the regulated work area upon completion of work. The regulated work area will be required to meet proposed final visual inspection requirements.
- B. The Contractor shall utilize HEPA filtered vacuum equipment and wet cleaning products to remove all visible dust and debris from all surfaces within the work area. If specialty cleaning products are utilized, the Contractor shall utilize the product(s) in accordance with manufacturer's specifications including any additional safety and disposal requirements for such use. The Contractor shall assure proper ventilation and engineering controls to prevent an odor or volatile organic compound (VOC) issue in the building when using specialty cleaning products.
- C. Any liquid used to wet the dust and debris to control fugitive emissions shall be collected and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- D. All rags and other cleaning materials used to clean the work area shall be properly disposed of as presumed PCB Remediation Waste. All presumed PCB Remediation Waste shall be stored for disposal in accordance with EPA Title 40 CFR, Part 761.61(a)(5)(v)(A). All waste containers shall be appropriately marked and labeled in accordance with EPA Title 40 CFR, Parts 761.40 and 761.45. Waste disposal is the responsibility of the Contractor.
- E. Equipment to be utilized in connection with the removal of PCB Bulk Product Waste including waste collection, or that will or may come in direct contact with the Site contaminants shall be decontaminated prior to leaving the Site to prevent migration of the potential contaminated residues. Decontamination shall be in accordance with EPA Title 40 CFR Part 761.79 and Subpart S procedures.
- F. All non-disposable equipment and tools employed in the Work will be decontaminated at the conclusion of each workday utilizing the following sequence:
 - 1. Initial tap water rinse to remove gross debris
 - 2. Tap water and hexane or equivalent wash
 - 3. Tap water rinse
 - 4. Second tap water and hexane or equivalent wash
 - 5. Second tap water rinse
- G. The wash water and decontamination liquids shall be captured and containerized in DOT approved 55-gallon drums for off-site disposal in accordance with EPA Title 40 CFR, Part 761.60(a). Waste disposal is the responsibility of the Contractor.

3.06 CONSULTANT'S RESPONSIBILITIES

A. Consultant may conduct inspections throughout the progress of the removal project. Inspections may be conducted to document the progress of the removal work, as well as the procedures and practices employed by the Contractor.

B. The Consultant's project monitor shall provide continual evaluation of the condition of the building during removal, using their best professional judgments in respect to EPA and CTDEEP regulations.

3.07 CONSULTANT'S INSPECTION RESPONSIBILITIES

- Consultant may conduct inspections throughout the progress of the removal project. Inspections Α. may be conducted to document the progress of the removal work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant may perform the following inspections during abatement activities:
 - 1. Pre-commencement Inspection. If requested by the Owner, Pre-commencement inspections shall be performed by the Consultant. The Consultant shall be informed 12hours prior to the time the inspection is needed. If deficiencies are identified during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
 - 2. Work Area Inspection. If requested by the Owner, Work area inspections may be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant shall observe the Contractor's removal procedures, verify isolation barrier integrity, assess project progress, and inform the Contractor of specific remedial activities if deficiencies are noted.
- C. The Consultant shall perform the following inspection during abatement activities:
 - 1. Final Visual Inspection. The Consultant shall conduct a final visual inspection of the work area. The final visual inspection shall be conducted after completion of the final cleaning procedures. The final visual inspection shall verify that all PCB Waste(s) have been removed from the work area. If during the inspection the Consultant identifies residual dust or debris, the Contractor shall comply with the request of the Consultant to render the area "dust free".

MARKING OF WASTE CONTAINERS (ABATEMENT CONTRACTOR RESPONSIBILITY) 3.08

- All waste containers must be marked with the name of the waste contained, the date in which the Α. first material was placed in the vessel, and the last date at which addition of waste occurred. All waste containers must be marked with a large PCB M_L marker.
- B. All waste containers containing PCB Bulk Product Waste, and PCB Remediation Waste in the form of waste and contaminated debris, containment system components, used PPE, personal and equipment wash water and decontamination fluids, or other wastes generated during the abatement work shall be labeled as follows:

DOT Class 9 UN3432 (solid) Or UN2315 (liquid) PCB Waste RQ Waste for Disposal Federal law prohibits improper disposal. If found, contact the nearest police or public safety authority or The U.S. Environmental Protection Agency. Generator's Information: Manifest Tracking No.: Accumulation Start Date:

EPA ID No.:
EPA Waste No.:
Total Weight:
Container No.:
HANDLE WITH CARE

C. In addition, these containers must be marked with a PCB M_L marker. Such marking must be durable, in English and printed on, or affixed to the surface of the package, or on a label, tag or sign, and displayed on a background of sharply contrasting color, is unobscured by labels or attachments, and located away from any other marking (such as advertising) that could substantially reduce its effectiveness.

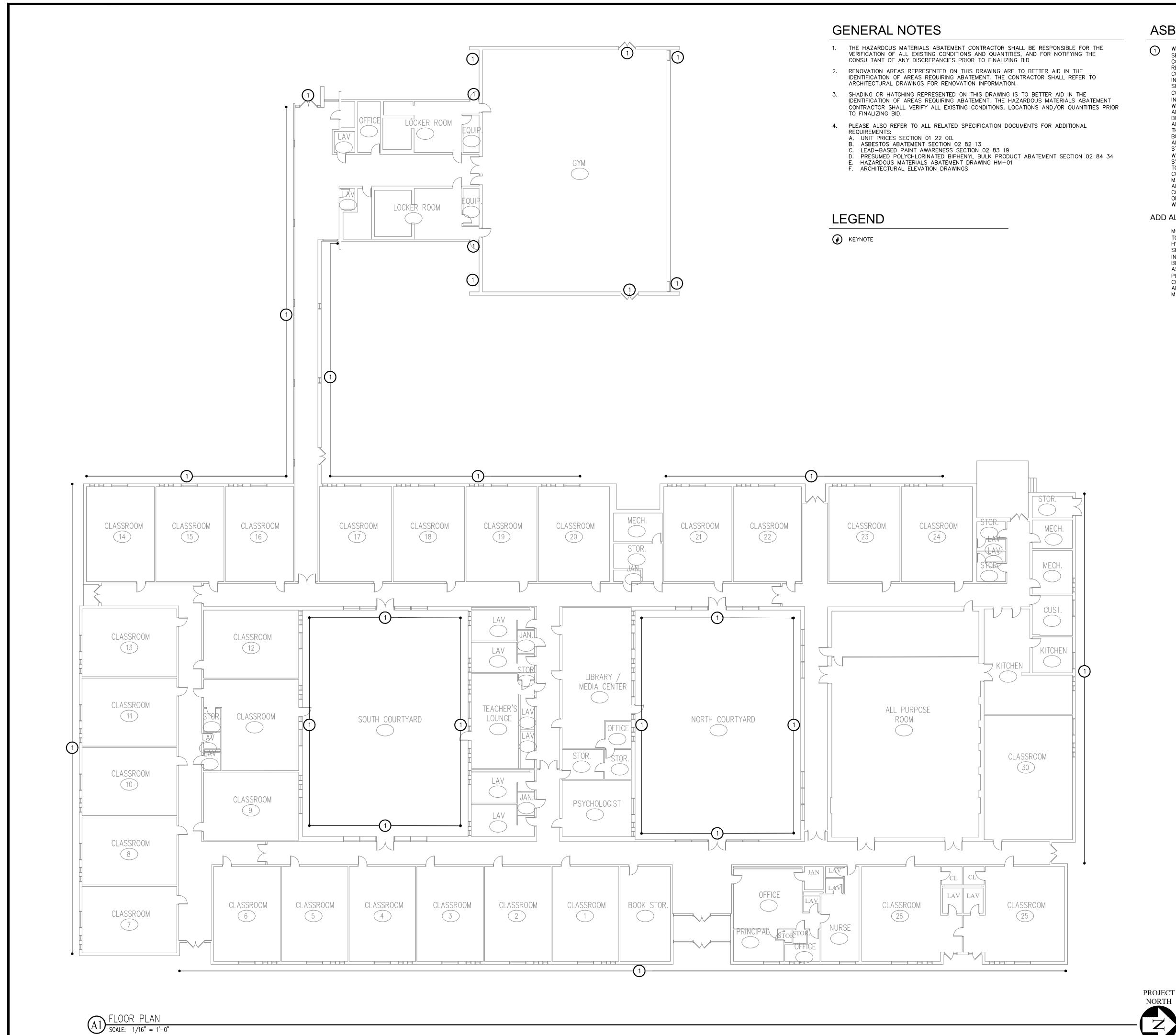
3.09 ON-SITE WASTE MANAGEMENT AND DISPOSAL OF SOLID HAZARDOUS WASTES (ABATEMENT CONTRACTOR RESPONSIBILITY)

- A. The materials as identified in Presumed Polychlorinated Biphenyls Removal and Disposal Section 02 84 34, 1.7 Project Description were presumed to contain PCBs and were classified as PCB Bulk Product Waste. Due to the material being presumed, TCLP analysis is necessary to satisfy landfill requirements for waste characterization. The Owner's Consultant shall collect waste characterization samples for TCLP PCB analysis of the presumed PCB Bulk Product Material and PCB Remediation Waste which is anticipated to be required by the disposal site the Contractor identifies. The Contractor shall factor in time for TCLP testing, TCLP analysis and staging of waste as necessary to complete the waste profile and subsequent landfill facility acceptance of waste.
- B. All solid waste material, containment system components, used PPE, and other solid wastes generated during the Work, shall be placed directly in appropriate waste receptacles immediately upon removal from its in-situ position. Suitable waste receptacles may consist of roll-off containers or DOT approved 55-gallon drums.
- C. The Contractor shall be responsible for all packaging, labeling, transport, disposal, and recordkeeping associated with PCB Bulk Product Waste and PCB Remediation Waste in accordance with all federal, state, and local regulations.
- D. The Contractor shall ensure that the person transporting the waste holds a valid permit issued in accordance with appropriate federal, state, and local regulations.
- E. The Contractor shall provide to the transporter at the time of transfer appropriate shipping records or uniform waste manifests as required by the federal, state, and local regulations with a copy to the Owner and Consultant.
- F. The Contractor shall maintain proper follow-up procedures to assure that waste materials have been received by the designated waste site in a timely manner, and in accordance with all federal, state, and local regulations.
- G. The Contractor shall assure that disposal of PCB Bulk Product Waste and PCB Remediation Waste at a facility approved to accept such waste(s) and shall provide a tracking/manifest form signed by the landfill's authorized representative.
- H. The impermeable cover shall remain securely in place at all times when material is not being actively placed in the vessels. The Contractor shall be responsible for ensuring that the cover remains securely intact until the container is removed from the Site.
- I. If 55-gallon drums are to be utilized for waste containerization, the drums shall consist of suitable DOT approved 55-gallon drums that are watertight and free of corrosion, perforations, punctures,

- or other damage. All drums shall be securely covered and sealed at the conclusion of each work day.
- J. The waste containers shall remain staged at the Site with a secure impermeable cover in-place until the materials are transported from the Site to be delivered to the designated waste disposal facility.
- K. Drum staging area shall be designated prior to initiation of the abatement work and approved by the Consultant. If this area is located outside of the building, the area (or areas) shall be surrounded by a chain-link fence with a minimum height of six feet. The fence shall be labeled with a PCB M_L marker.
- L. Properly containerized waste must be transported by a licensed hauler and shipped as PCB Bulk Product Waste for disposal at a permitted waste facility in accordance with EPA Title 40 CFR, Part 761.62(b).
- M. PCB Remediation Waste must be transported by a licensed hauler and shipped as PCB Remediation for disposal in accordance with EPA Title 40 CFR, Part 761.61(b) at one of the following facilities:
 - 1. A hazardous waste landfill permitted by EPA under Section 3004 of EPA RCRA,
 - 2. A State authorized landfill under Section 3006 of EPA RCRA, or
 - 3. A chemical waste landfill approved under EPA Title 40 CFR, Part 761.75.
- N. Provide required copies of the uniform waste manifests for PCB Remediation Waste to the Owner, waste generation State, and waste destination State, as required. The Consultant shall review the waste manifest to assure the proper information has been supplied prior to waste shipment, which includes, but is not limited to, Site address, generator information, waste description, waste profile, quantity, etc.
- O. Any PCB liquid water waste shall be properly containerized and decontaminated in accordance with EPA Title 40 CFR, Part 761.79 (b)(1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- P. Any chemicals, solvents or other products used during decontamination shall be properly containerized as PCB liquid waste. Waste must be properly decontaminated in accordance with EPA Title 40 CFR, Part 761.79 (b) (1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(g).
- Q. All contaminated waste shall be carefully loaded on trucks or other appropriate vehicles for transport. Before and during transport, care shall be exercised to ensure that no unauthorized persons have access to the waste materials.
- R. Waste transporters are prohibited from "back hauling" any freight after the PCB waste disposal, until decontamination of the vehicle and/or trailer is assured.

END OF SECTION 02 84 34

DRAWING HM-01



ASBESTOS ABATEMENT NOTES

WINDOWS/WINDOW WALLS AND DOORS/DOOR SYSTEMS OPENINGS SHALL BE SEALED ON THE INSIDE WITH CRITICAL BARRIERS AND WINDOW/DOOR COMPONENTS REMOVED FROM THE EXTERIOR WITHIN AN ASBESTOS AND PCB REGULATED WORK AREA. ANY WORK THAT WILL DISTURB THE LEAD PAINTED COMPONENTS AS IDENTIFIED IN THE HAZARDOUS BUILDING MATERIALS INSPECTION REPORT AND LEAD-BASED PAINT AWARENESS SECTION 02 83 19 SHALL ALSO BE CONDUCTED WITHIN A LEAD RRP REGULATED WORK AREA COMPLYING WITH THE EPA'S RRP RULE (40 CFR 745.80 THROUGH 92). WORK INCLUDES REMOVING OF THE WINDOW\DOOR FRAMES AND WINDOW SASH\DOOR WINDOWS FOR DISPOSAL AS ACM & PCB BULK PRODUCT WASTE. THE WINDOW AND DOOR OPENINGS SHALL BE REMOVED OF ALL SUSPECT ACM TO INCLUDE, BUT NOT LIMITED TO CAULK, ADHESIVES, SEALANTS VAPOR BARRIER ADHESIVES AND FLASHING MATERIALS TO A CLEAN UNDAMAGED SUBSTRATE. THE CAULKING AND GLAZING COMPOUND ARE ALSO PRESUMED > 50PPM PCB BULK PRODUCT WASTE. CAULK, GLAZING COMPOUND, SEALANTS, FLASHING AND ALL ADJACENT CONTAMINATED COMPONENTS SHALL BE PACKAGED, STORED, AND DISPOSED OF AS ASBESTOS AND > 50PPM PCB BULK PRODUCT WASTE. THE WASTE STREAM FROM AREAS OF LEAD COATED WINDOW/DOOR SYSTEMS REMOVAL SHALL ALSO BE CONSIDERED RCRA LEAD WASTE UNTIL TCLP SAMPLING PROVES OTHERWISE. WHERE FEASIBLE LEAD COATED METAL COMPONENTS SHOULD BE REMOVED OF ALL ASBESTOS AND PRESUMED PCB MATERIALS AND RECYCLED. WORK SHALL BE COORDINATED WITH THE CM TO ALLOW PROPER TIMING BETWEEN WINDOW REMOVAL AND REPLACEMENT. THE CONTRACTOR IS RESPONSIBLE FOR SECURING AND WEATHERPROOFING THE OPENINGS AT THE COMPLETION OF EACH SHIFT WHEN OPENINGS ARE MADE BY

WINDOW REMOVAL. ADD ALTERNATE WORK

MOISTURE/VAPOR BARRIER DAMP PROOFING BEHIND BRICK FACADE ASSUMED TO BE PRESENT & ACM. BEFORE WALLS ARE PENETRATED FOR UTILITIES / HVAC LINE SETS OR FOR ANY OTHER REASON, THE ABATEMENT CONTRACTOR SHALL OPEN THE WALL TO PROVIDE ACCESS FOR THE CONSULTANT TO INSPECT AND SAMPLE ANY VAPOR BARRIER / DAMP PROOFING MATERIALS BEHIND THE BRICK FACADE. IF ACM IS IDENTIFIED WITHIN THE WALL, OR IF ASBESTOS CEMENT SOFFITS OR WALL PANELS REQUIRE CORING, OR OTHER PENETRATIONS/DISTURBANCE OF <3 SQUARE FEET, SUCH WORK SHALL BE CONDUCTED BY THE ASBESTOS ABATEMENT CONTRACTOR WITHIN A REGULATED AREA FROM THE EXTERIOR, USING ENGINEERING CONTROLS TO PREVENT MAKING DUST.



ANTINOZZI ASSOCIATES

ARCHITECTURE & INTERIORS

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FUSS & O'NEILI

146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040

REVISIONS:

DATE DESCRIPTION

DESCRIPTION

TARY SCHOOL REPLACEMENT

SCHOOLS

GOODWIN ELEMENTARY SC

UOSEPH O EXTERIOR

HAZARDOUS
MATERIALS
ABATEMENT DRAWING

AS NOTED

DRAWING NO.

HM-01

DATE: JOB NUMBER: SEPTEMBER 2023 22014

ATTACHMENT A LIMITED HAZARDOUS BUILDING MATERIALS INSPECTION REPORT DATED SEPTEMBER 2023

Limited Hazardous Building Materials Inspection

Inspection Date: August 23 and 24, 2022 & August 30, 2023
Window and Door Replacement Project
Joseph O. Goodwin School
1235 Forbes Street, East Hartford, Connecticut

Antinozzi Associates, P.C. Bridgeport, CT

September 19, 2023



Fuss & O'Neill, Inc. 146 Hartford Road Manchester, CT 06040



September 19, 2023

Mr. Paul Lisi, AIA Antinozzi Associates, P.C. 271 Fairfield Avenue Bridgeport, CT 06604

Re: Limited Hazardous Building Materials Inspection
Window and Door Replacement Project
Joseph O. Goodwin School
1235 Forbes Street, East Hartford, CT
Fuss & O'Neill Project No. 20210525.A10

Dear Mr. Lisi:

Enclosed is the report for the limited hazardous building materials inspection conducted in response to the proposed window and door replacement project for the Joseph O. Goodwin School located at 1235 Forbes Street, East Hartford, CT (the "Site"). The work was conducted for Antinozzi Associates, P.C. (the "Client").

The services were performed on August 23 and 24, 2022 and August 30, 2023 by Fuss & O'Neill, Inc. licensed inspectors and included a limited asbestos-containing material (ACM) inspection, lead-based paint (LBP) determination, and presumed polychlorinated biphenyl (PCB)-containing source building materials inspection. The information summarized in this report is for the above-mentioned materials only. The work was performed in accordance with our written proposal dated June 25, 2021.

If you should have any questions regarding the contents of this report, please do not hesitate to contact me at (860) 783-4673. Thank you for this opportunity to have served your environmental needs.

146 Hartford Road Manchester, CT

06040 t 860.646.2469 800.286.2469

f 860.533.5143

Sincerely,

Eric W. Cooley

www.fando.com

Project Manager

California

EWC/kr

Connecticut

Maine Enclosure

Massachusetts

New Hampshire

Rhode Island

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1 Introduction

On August 23 and 24, 2022 and August 30, 2023, Fuss & O'Neill, Inc. (Fuss & O'Neill) representatives Mr. Benjamin Silverman and Mr. Eric Cooley performed a limited hazardous building materials inspection for the proposed window and door replacement project at Joseph O. Goodwin School located at 1235 Forbes Street in East Hartford, Connecticut (the "Site"). The work was conducted for Antinozzi Associates, P.C. (the "Client") in accordance with our written scope of services dated June 25, 2021 and is subject to the limitations included in *Appendix A*.

This limited hazardous building materials inspection was performed in response to the proposed window and door replacement project.

This inspection was limited to non-invasive and discrete sampling techniques. Specific areas that were not inspected include the following:

- Areas and building materials not anticipated to be disturbed by this project;
- Interior ceilings and building roofs
- Beneath and behind window and door frames;
- Behind the brick façade;
- Inside wall cavities;
- Spaces above fixed ceilings and within solid walls, and
- Sub slab/subgrade vapor barriers or utilities

We have excluded collection and analysis of building materials for polychlorinated biphenyls (PCBs). Sampling for PCBs is presently not mandated by the Environmental Protection Agency (EPA); however, significant liability risk for disposing of PCB-containing wastes exists. Recent knowledge of PCBs within these matrices has become more prevalent, especially with remediation contractors, waste haulers, and disposal facilities. Many property Owners have become subject to large changes in schedule, scope, and costs as a result of failure to identify this possible contaminant prior to renovation or demolition.

1.1 Building and Mechanical System Description

The building structure includes a single story with no basement and was constructed in 1968. The masonry and steel constructed building contains approximately 54,000 square feet (SF) of total floor area. The building is heated by a hot water boiler system.

2 Asbestos Inspection

A property Owner must ensure that a thorough ACM inspection is performed prior to possible disturbance of suspect ACM during renovation or demolition activities. This is a requirement of the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation located at Title 40 CFR, Part 61, Subpart M.



On August 23 and 24, 2022 and August 30, 2023, Mr. Benjamin Silverman and Mr. Eric Cooley of Fuss & O'Neill conducted the limited inspection. Mr. Silverman and Mr. Cooley are State of Connecticut Department of Public Health (CTDPH)-licensed Asbestos Inspectors. Refer to *Appendix B* for the Asbestos Inspector licenses and accreditations.

2.1 Methodology

The limited inspection was conducted by visually inspecting for suspect ACM and touching each of the suspect materials. The suspect materials were categorized into three EPA NESHAP groups: friable and non-friable Category I and Category II type ACM.

- A Friable Material is defined as material that contains greater than 1 percent (> 1%) asbestos that when dry **can** be crumbled, pulverized, or reduced to powder by hand pressure.
- A Category I Non-Friable Material refers to material that contains > 1% asbestos (i.e., packings, gaskets, resilient floor coverings, and asphalt roofing products) that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- A Category II Non-Friable Material refers to any non-friable material excluding Category I
 materials that contain > 1% asbestos that when dry, cannot be crumbled, pulverized, or
 reduced to powder by hand pressure.

The suspect ACM were also categorized into their applications including Thermal System Insulation (TSI), Surfacing ACM (S), and Miscellaneous ACM (M). TSI includes those materials used to prevent heat loss/gain or water condensation on mechanical systems. Examples of TSI are pipe insulation, boiler insulation, duct insulation, and mudded pipe fitting insulations. Surfacing ACM includes those ACM that are applied by spray, trowel, or otherwise applied to an existing surface. Surfacing ACM is commonly used for fireproofing, decorative, and acoustical applications. Miscellaneous materials include those ACM not listed as thermal or surfacing, such as linoleum, vinyl asbestos flooring, ceiling tiles, caulkings, glues, construction adhesives, etc.

The EPA recommends collecting suspect ACM samples in a manner sufficient to determine asbestos content and to segregate each suspect type of homogeneous (similar in color, texture, and date of application) materials. The EPA NESHAP regulation does not specifically identify a minimum number of samples to be collected for each homogeneous material, but the NESHAP regulation does recommend the use of sampling protocols included in Title 40 CFR, Part 763, Subpart E: Asbestos Hazard Emergency Response Act (AHERA).

The EPA AHERA regulation requires a specific number of samples be collected based on the type of material and quantity present. This regulation includes the following protocol:

- Surfacing Materials (S) (i.e., plasters, spray-applied fireproofings, etc.) must be collected in a randomly distributed manner representing each homogeneous area based on the overall quantity represented by the sampling as follows:
 - a. Three (3) samples collected from each homogeneous area that is less than or equal to 1,000 square feet.



- b. Five (5) samples collected from each homogeneous area that is greater than 1,000 square feet but less than or equal to 5,000 square feet.
- c. Seven (7) samples collected from each homogeneous area greater than 5,000 square feet.
- 2. Thermal System Insulation (TSI) (i.e., pipe insulations, tank insulations, etc.) must be collected in a randomly distributed manner representing each homogeneous area. Three (3) samples must be collected from each material. Also, a minimum of one (1) sample of any patching materials applied to TSI presuming the patched area is less than 6 linear or square feet should be collected.
- 3. Miscellaneous materials (M) (i.e., floor tile, gaskets, construction mastics, etc.) should have a minimum of two (2) samples collected for each type of homogeneous material. Sample collection was conducted in a manner sufficient to determine asbestos content of the homogeneous material as determined by the inspector.

The inspector collected samples of those suspected ACM anticipated to be disturbed by the proposed window and door replacement project and prepared a proper chain of custody form for transmission of the samples to EMSL Analytical, Inc. (EMSL) for analysis. EMSL is a State of Connecticut-licensed and American Industrial Hygiene Association (AIHA)-accredited asbestos laboratory. The sample locations, material type, sample identification, and asbestos content are identified by bulk sample analysis in **Table 1** attached hereto. Suspect ACM not listed in the table that may be identified at a later date at the Site, should be assumed to be ACM until sample collection and analysis indicate otherwise. Initial asbestos sample analysis was conducted using the EPA Interim Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116) via Polarized Light Microscopy with Dispersion Staining (PLM/DS).

If samples of suspect materials could not be collected or were inaccessible but observed elsewhere, these materials were assumed to contain asbestos and the inspectors approximated quantities. Intrusive or destructive investigative techniques were not performed at the Site to access and observe concealed areas that may have had suspected ACM that were hidden or obstructed from normal view. Limitations are discussed in Section 1 of this report.

2.2 Results

Utilizing the EPA protocol and criteria, the following materials were determined to contain asbestos:

- Window frame caulk;
- Window glazing compound;
- Cementitious Paneling;
- Glazing compound used with steel frame and reinforced glass door sidelights; and
- Glazing compound associated with 12"x12" & full glass door windows.



The following materials were assumed to contain asbestos but could not be inspected and sampled due to the limitations noted:

- Vapor barrier/flashing materials behind brick façade and behind/between window frames and adjacent substrates.
- Original door frame/window wall caulk between frames/sills and masonry and behind replacement caulk.

Refer to **Table 1** for a complete list of ACM and non-ACM sampled as part of this limited inspection. Refer to **Table 2** attached hereto for the identified and assumed ACM inventory. Refer to *Appendix C* for the asbestos laboratory report and chain of custody form. Refer to *Appendix D* for Site photographs and *Appendix E* for the Site floor plan.

2.3 Discussion

The EPA and the Occupational Safety and Health Administration (OSHA) define a material that contains greater than one percent (> 1%) asbestos, utilizing PLM/DS, as being an ACM. The CTDPH defines any material that contains equal to or greater than one percent (≥ 1%) asbestos, utilizing PLM/DS, as being an ACM. Materials that are identified as "none detected" are specified as not containing asbestos.

Suspect ACM not identified during this limited inspection should be presumed to contain asbestos until sample collection and laboratory analysis indicate otherwise.

Additionally, the EPA has suggested that materials that are non-friable organically bound (NOB) materials (e.g., asphaltic-based materials, adhesives, etc.) are recommended for further confirmatory analysis utilizing Transmission Electron Microscopy (TEM). The Client did not choose to have TEM analysis conducted on samples collected for this project.

2.4 Conclusions and Recommendations

Based on visual observations, sample collection, and laboratory analysis, asbestos has been identified in some of the materials sampled at the Site.

Prior to disturbance, ACM that would likely be impacted by the proposed renovation/demolition activities must first be abated by a state-licensed Asbestos Abatement Contractor. This is a requirement of CTDPH and EPA NESHAP regulations governing asbestos abatement.

It can sometimes be ineffective to separate asbestos window components from non-ACM, these materials are considered asbestos-contaminated and must be managed as ACM for the purposes of removal and disposal. Components that can be removed and do not have suspect ACM or PCB materials on them, as verified by an environmental consultant may be recycled.



Fuss & O'Neill will develop a comprehensive scope of work and technical specification as part of renovation plans for the Site. We have provided a cost in our proposal to develop the specifications for inclusion in the window and door replacement project.

Suspect materials encountered during renovation that are not identified in this report as being non-ACM should be presumed to be ACM until sample collection and laboratory analysis indicate otherwise.

This report is not intended to be utilized as a bidding document or as a project specification document. The report is designed to aid the Client in locating identified and assumed ACM.

3 Lead-Based Paint Determination

On August 23 and 24, 2022, Mr. Benjamin Silverman of Fuss & O'Neill performed a lead-based paint (LBP) determination associated with coated building components at the Site that may be disturbed during renovation activities. An x-ray fluorescence (XRF) analyzer was used to perform the LBP determination.

3.1 Methodology

A Radiation Monitoring Device Model LPA-1, serial number 1157, was utilized for the LBP determination. The instrument was checked for proper calibration prior to use as detailed by the manufacturer and the Performance Characteristic Sheet (PCS) developed for the instruments.

For the purpose of this LBP determination, representative building components were tested that may be impacted by the window and door replacement project. Individual repainting efforts are not discoverable in such a limited program. LBP issues involving properties that are not residential are regulated for worker protection relating to paint-disturbing work activities and waste disposal.

Worker protection is regulated by OSHA regulations, as well as CTDPH regulations. These regulations involve air monitoring of workers to determine exposure levels when disturbing lead-containing paint. An LBP determination cannot determine a safe level of lead but is intended to provide guidance for implementing industry standards for lead in paint at identified locations. Contractors may then better determine exposure of workers to airborne lead by understanding the different concentrations of LBP activities that disturb paint on representative surfaces.

The EPA Resource Conservation and Recovery Act (RCRA), as well as the Connecticut Department of Energy and Environmental Protection (CTDEEP), regulate disposal of lead-containing waste. Lead-containing materials that will be impacted during renovation or demolition activities, and result in waste for disposal must either be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) analysis if lead is determined to be present in non-residential buildings or be presumed as a hazardous waste. A TCLP sample is a representative sample of the intended waste stream. The results are compared to a threshold value of 5.0 milligrams per liter (mg/L); results equal to or exceeding this value is considered hazardous lead waste. If the result is below the established level, the material is not considered hazardous and may be disposed of as general construction debris.



A level of LBP equal to or exceeding 1.0 milligrams of lead per square centimeter (mg/cm²) by XRF is considered toxic or dangerous for compliance with residential standards. For the purpose of this LBP determination the level of 1.0 mg/cm² has been utilized as a threshold for areas where possible worker exposures may occur.

3.2 XRF Determination Results

The LBP determination indicated consistent painting trends associated with representative building components that may be impacted by potential renovation work. The following building components were determined to contain levels of lead (≥ 1.0 mg/cm²) by XRF:

- Exterior Metal Doors;
- Exterior Metal Vents in the Window Systems;
- Exterior Metal Window Sashes in the Connector Hallway;
- Exterior and Interior Wood Window Components in the Gymnasium; and
- Exterior Metal Door Lintels in the Gymnasium;

Refer to Appendix F for the XRF lead determination field data sheets.

3.3 Discussion

OSHA published a Lead in Construction Standard (OSHA Lead Standard) Title 29 CFR, Part 1926.62 in May 1993. The OSHA Lead Standard has no set limit for the content of lead in paint below which the standards do not apply. The OSHA Lead Standards are task based and derived from airborne exposure and blood lead levels.

The results of this LBP determination are intended to provide guidance to contractors for occupational lead exposure controls. Building components coated with lead levels above industry standards may cause exposure to lead above OSHA standards during proposed demolition and renovation activities. The results of this determination are also intended to provide insight into waste disposal requirements, in accordance with EPA RCRA regulations. Due to the destructive nature, TCLP sampling was not conducted.

3.4 Conclusion and Recommendations

Based on our LBP determination results, LBP is present on coated building components located on the building that were tested by XRF as part of this limited inspection.

Contractors must be made aware that OSHA has not established a level of lead in the material below which Title 29 CFR, Part 1926.62 does not apply. Contractors shall comply with exposure assessment criteria, interim worker protection, and other requirements of the regulation as necessary to protect workers during any renovation work that will impact lead paint.



If disturbed by renovation or demolition activities, LBP-coated building components should be segregated from the general waste stream for sample collection and analysis by TCLP to determine proper off-site waste disposal. Metal LBP-coated building components cannot be subject to grinding, sawing, drilling, sanding, or torch cutting. Components that are in contact with caulking or glazing compound will be asbestos and assumed PCB bulk product waste. Future work involving surface preparation of identified painted surface(s) must be performed in accordance with OSHA worker protection requirements, as well as EPA Renovation, Repair and Painting Rule (RRP).

For purposes of complying with the EPA's RRP Rule (40 CFR 745.80 through 92) a Comprehensive Lead Inspection of the entire structure or targeted areas scheduled for renovation is necessary to determine if the RRP rule is applicable. A Comprehensive Lead Inspection includes testing representative coated surfaces of each building component in each room or room equivalent for LBP content. Other types of lead surveys, such as lead paint screening, determination, and risk assessments, do not include testing all coated surfaces for LBP and typically do not satisfy the LBP testing requirements of the RRP Rule. Since the testing performed was not a comprehensive inspection, the testing will not satisfy applicability requirements of the RRP for any untested surfaces. The testing was performed for surfaces targeted for renovation or demolition as described by the Client. Only the results for those specific surfaces and locations tested within this targeted testing can be utilized to determine applicability requirements for RRP. Reliance on this report for determining RRP applicability for any other surfaces than those tested is not authorized by Fuss & O'Neill, Inc.

The building is considered a "child-occupied facility" and therefore, it is subject to lead safe renovation requirements. If a specific component or surface is not identified as having been tested it should be presumed to contain lead paint unless tested.

Those surfaces which contain LBP are subject to RRP work practice and training requirements if more than de-minimus amounts are disturbed in renovation or for projects involving window replacement. Those surfaces which do not contain LBP are not subject to the RRP requirements. If a specific component or surface is not identified as having been tested it should be presumed to contain lead paint unless tested. Contractors should be aware that the threshold limit of 1.0 mg/cm² for purposes of RRP requirements is not recognized by OSHA and workers exposures are still subject to lead in construction regulation 29 CFR 1926.62 regardless of paint testing results.

4 Presumed PCB-Containing Source Building Materials Inspection

Sampling of building materials for polychlorinated biphenyls (PCBs) is presently not mandated by the EPA. However, significant liability exists for building owners who improperly dispose of PCB-containing waste material. Recent knowledge and awareness of PCBs within matrices such as caulking compounds, glazing compounds, paints, adhesives, and ceiling tiles has become more prevalent, especially amongst remediation contractors, waste haulers, and disposal facilities.

Presently, building materials containing PCBs at concentrations equal to or greater than (≥) 50 parts per million (ppm) or the equivalent units of milligrams per kilogram (mg/kg) are regulated by the EPA and characterized as PCB Bulk Product. Building materials containing less than (<) 50 ppm may also be



regulated unless proven to be an Excluded PCB Product. The definition of an Excluded PCB Product includes those products or source of the products containing < 50 ppm concentration PCBs that were legally manufactured, processed, distributed in commerce, or used before October 1, 1984. Building materials determined to be Excluded PCB Product containing > 1 ppm PCBs but < 50 ppm PCBs are regulated by the CTDEEP. Building materials containing ≤ 1 ppm PCBs are considered non-regulated. Additionally, the identification of building materials containing regulated PCBs requires additional testing of the adjacent porous surfaces and/or soils, asphalt, and concrete located below source materials. The building materials adjacent to the regulated PCB material must be tested to determine if the adjacent materials are PCB contaminated and may also be considered PCB Bulk Products, if disposed of as source materials. Soils, asphalts, and concrete located below source materials must be tested to determine if the materials are PCB contaminated and considered PCB Remediation Waste.

4.1 Methodology

On August 23 and 24, 2022, Mr. Benjamin Silverman performed a visual inventory of caulking and glazing compounds scheduled to be impacted by the proposed window and door replacement project as materials which may contain PCBs. Refer to **Table 3** for a list of presumed PCBS building materials.

4.2 Observations

The following materials are suspect PCB-containing materials that will be impacted by the renovations:

- Window & Door Frame Caulking Compounds; and
- Window, Window Wall & Door Glazing Compounds.

4.3 Conclusions and Recommendations

At a minimum, Fuss & O'Neill recommends the window and door frame caulking compounds and window and door glazing compound scheduled to be removed during the Project be presumed to contain PCBs and handled and disposed of in accordance with EPA regulations as PCB Bulk Product Waste.

As stated in our proposal dated June 25, 2021, Fuss & O'Neill will develop a comprehensive scope of work and technical specification for presumed PCB remediation during the window and door replacement project. This report is not intended to be utilized as a bidding document or as a project specification document. The report is designed to aid the Client in locating presumed PCB-containing building materials.

Reviewed by:

Eric W. Cooley Project Manager Carlos Texidor Associate



Tables



Table 1
Summary of Suspect Asbestos-Containing Materials

Sample No.	Sample Location	Material Type	Asbestos Content	Analysis Method		
August 24, 2022						
082422BS-GW-1A	Exterior	Red Brick	ND	PLM		
082422BS-GW-1B	Exterior	Red Brick	ND	PLM		
082422BS-GW-2A	Exterior	Mortar for Red Brick	ND	PLM		
082422BS-GW-2B	Exterior	Mortar for Red Brick	ND	PLM		
082422BS-GW-3A	Room 3	Brown Interior Window Frame Caulk	5% Chrysotile	PLM		
082422BS-GW-3B	Room 18	Brown Interior Window Frame Caulk	NA/Pos Stop			
082422BS-GW-4A	Room 3	White Interior Window Glazing Compound	2% Chrysotile	PLM		
082422BS-GW-4B	Room 19	White Interior Window Glazing Compound	NA/Pos Stop			
082422BS-GW-5A	Exterior - South Courtyard	Gray Cementitious Soffit Boards	40% Chrysotile	PLM		
082422BS-GW-5B	Exterior - North Courtyard	Gray Cementitious Soffit Boards	NA/Pos Stop			
082422BS-GW-6A	Exterior - South Courtyard	Brown Exterior Window Frame Caulk	ND	PLM		
082422BS-GW-6B	Exterior - North Courtyard	Brown Exterior Window Frame Caulk	ND	PLM		
082422BS-GW-7A	Exterior - Room 18	Red Exterior Window Frame Caulk	ND	PLM		
082422BS-GW-7B	Exterior - Connector Windows	Red Exterior Window Frame Caulk	ND	PLM		
082422BS-GW-7C	Exterior - Connector Windows	Red Exterior Window Frame Caulk	ND	PLM		
082422BS-GW-8A	Exterior - Gym Windows	Tan Exterior Window Frame Caulk	10% Chrysotile	PLM		
082422BS-GW-8B	Exterior - Gym Windows	Tan Exterior Window Frame Caulk	NA/Pos Stop			
082422BS-GW-9A	Exterior - Gym Windows	White Exterior Window Glazing Compound	2% Chrysotile	PLM		
082422BS-GW-9B	Exterior - Gym Windows	White Exterior Window Glazing Compound	NA/Pos Stop			
082422BS-GW-10A	Exterior - Room 3 (Original)	White Exterior Window Glazing Compound	3% Chrysotile	PLM		
082422BS-GW-10B	Exterior - Room 18 (Original)	White Exterior Window Glazing Compound	NA/Pos Stop			
082422BS-GW-11A	Exterior - Main Office Window	Dark Gray Exterior Window Glazing Compound	ND	PLM		



Sample No.	Sample Location	Material Type	Asbestos Content	Analysis Method
082422BS-GW-11B	Exterior - Main Office Window	Dark Gray Exterior Window Glazing Compound	ND	PLM
082422BS-GW-12A	Exterior - Connector	Black Exterior Window Glazing Compound	ND	PLM
082422BS-GW-12B	Exterior - Connector	Black Exterior Window Glazing Compound	ND	PLM
082422BS-GW-13A	Exterior - Door E09	Tan Exterior Door Frame Caulk	ND	PLM
082422BS-GW-13B	Exterior - Door E09	Tan Exterior Door Frame Caulk	ND	PLM
082422BS-GW-14A	Exterior - Door E02	Red Exterior Door Frame Caulk	ND	PLM
082422BS-GW-14B	Exterior - Main Door	Red Exterior Door Frame Caulk	ND	PLM
082422BS-GW-14C	Exterior - Door E06	Red Exterior Door Frame Caulk	ND	PLM
		August 30, 2023		
20230830EC-01A	Main Entry E-01 Window Wall Sidelight	Gray Glazing Compound used with Steel Frame & Reinforced Glass	2% Chrysotile	PLM
20230830EC-01B	Gym Corridor West Exit Door Sidelight-E04	Gray Glazing Compound used with Steel Frame & Reinforced Glass	NA/Pos Stop	PLM
20230830EC-02A	North Corridor West Exit Door E-11 12"x12" Window Glazing	Gray Glazing Compound used between steel door and window	2% Chrysotile	PLM
20230830EC-02B	Classroom 26 Exit Door E-14 Full Glass Door	Gray Glazing Compound used between Steel Door and Window	NA/Pos Stop	PLM

NA/Pos Stop = Not Analyzed/Positive Stop

ND = None Detected

Table 2
Summary of Identified and Assumed Asbestos-Containing Materials Inventory

Location	Material Type	Asbestos Content	Estimated Total Quantity	Comments
Window Systems/Louvers &	Brown Interior & Tan Exterior Window Frame Caulk	5% - 10% Chrysotile	35 Units @ 24 LF EA 80 Units @18 LF EA 7 Units @ 20 LF EA 2 Units @ 18 LF EA 4 Units @ 24 LF EA	Material also presumed PCBs >50 ppm
Window Openings Throughout Building	White Interior/Exterior Window Glazing Compound	2% - 3% Chrysotile	28 @ 30 LF EA 54 Units @24 LF EA 7 Units @ 19 LF EA 2 Units @ 17 LF EA 4 Units @ 20 LF EA	Material also presumed PCBs >50 ppm



Location	Material Type	Asbestos Content	Estimated Total Quantity	Comments
Exterior Door Windows, Door Frame/Window Wall Systems Throughout Building	Grey Window Glazing Compound	2% Chrysotile	25 Doors @ 16 LF EA 7 Doors @ 4 LF EA Door Sidelight/Window Walls: 2 Sections @ 16 LF EA 3 Sections @ 18 LF EA 24 Sections @ 30 LF Each	Material also presumed PCBs >50 ppm
Exterior Door Windows, Door Frame/Sills/Window Wall Systems & Openings Throughout Building	Door & Window Wall Frame Caulk, sealants and or Flashings	Assumed	Door/Window Wall Frames: 13 Door Frames @ 20 LF EA 5 Door Frames @ 17 LF EA 2 Doors Frames @ 24 LF EA 3 Door Frames @ 26 LF EA 24 Sections @ 20 LF Each	Original ACM Caulk Assumed Present Behind Newer Caulk & presumed PCBs >50 ppm
Exterior Soffits/Entryway Ceilings of Original Building, Connector and Upper Wall Panels (Above Gymnasium Windows)	Gray Cementitious Panels	40% Chrysotile	Not Estimated	Impact Dependent upon Scope of Work
All Exterior Building Walls behind Brick Facade	Flashing/Damp proofing	Assumed	Not Estimated	Assumed present

LF = Linear Feet; SF = Square Feet; EA = Each

Table 3
Summary of Presumed PCB-Containing Source Building Materials Inventory

Location	Material Type	Estimated Total Quantity	Comments
Window Systems &	Window Frame Caulk	35 Units @ 24 LF EA 80 Units @18 LF EA 7 Units @ 20 LF EA 2 Units @ 18 LF EA 4 Units @ 24 LF EA	Material also ACM
Openings Throughout Building	Window Glazing Compound	28 @ 30 LF EA 54 Units @ 24 LF EA 7 Units @ 19 LF EA 2 Units @ 17 LF EA 4 Units @ 20 LF EA	Material also ACM
Exterior Door Windows & Door Frame/Window Wall Systems Throughout Building	Window Glazing Compound	25 Doors @ 16 LF EA 7 Doors @ 4 LF EA Door Sidelight/Window Walls: 2 Sections @ 16 LF EA 3 Sections @ 18 LF EA 24 Sections @ 30 LF Each	Material also Assumed ACM



Location	Material Type	Estimated Total Quantity	Comments
		Door/Window Wall Frames:	
Exterior Door Windows,		13 Door Frames @ 20 LF EA	Original ACM
Door Frame/Sills/Window	Door & Window Wall	5 Door Frames @ 17 LF EA	Caulk Assumed
Wall Systems & openings	Frame Caulk	2 Doors Frames @ 24 LF EA	Present Behind
Throughout Building		3 Door Frames @ 26 LF EA	Newer Caulk
		24 Wall Frames @ 20 LF Each	



Appendix A

Limitations



APPENDIX A

Site: Joseph O. Goodwin School, 1235 Forbes Street, East Hartford, CT

- 1. This inspection report has been prepared for the exclusive use of the Antinozzi Associates, P.C. (the "Client") and is subject to and is issued in connection with the terms and conditions of the original Agreement and all of its provisions. Any use or reliance upon information provided in this report, without the specific written authorization of the Client and Fuss & O'Neill, Inc. (Fuss & O'Neill) shall be at the User's individual risk. This report should not be used as an abatement specification. All quantities of materials identified during this inspection are approximate.
- 2. Fuss & O'Neill has obtained and relied upon information from multiple sources to form certain conclusions regarding likely environmental issues at and in the vicinity of the subject property in conducting this inspection. Except as otherwise noted, no attempt has been made to verify the accuracy or completeness of such information or verify compliance by any party with federal, state, or local laws or regulations.
- 3. Fuss & O'Neill has obtained and relied upon laboratory analytical results in conducting the inspection. This information was used to form conclusions regarding the types and quantities of ACM that must be managed prior to renovation or demolition activities that may disturb these materials at the Site. Fuss & O'Neill has not performed an independent review of the reliability of this laboratory data.
- 4. Unless otherwise noted, only suspect hazardous materials associated within or located on the building (aboveground) were included in this inspection. Suspect hazardous materials may exist below the ground surface that were not included in the scope of work of this inspection. Fuss & O'Neill cannot guarantee all asbestos or suspect hazardous materials were identified within the areas included in the scope of work. Only visible and accessible areas were included in the scope of work for this inspection.
- 5. The findings, observations and conclusions presented in this report are limited by the scope of services outlined in our original Agreement dated June 25, 2021 which reflects schedule and budgetary constraints imposed by Client. Furthermore, the assessment has been conducted in accordance with generally accepted environmental practices. No other warranty, expressed or implied, is made.
- 6. The conclusions presented in this report are based solely upon information gathered by Fuss & O'Neill to date. Should further environmental or other relevant information be discovered at a later date, the Client should immediately bring the information to the Fuss & O'Neill's attention. Based upon an evaluation and assessment of relevant information, Fuss & O'Neill may modify the letter report and its conclusions.



Appendix B

Fuss & O'Neill Inspector Licenses and Accreditations

Dear BENJAMIN L SILVERMAN,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health P.O. Box 340308 M.S.#12MQA Hartford, CT 06134-0308 (860) 509-7603 oplc.dph@ct.gov www.ct.gov/dph/license

Sincerely,

DEIDRE S. GIFFORD, MD, MPH, ACTING COMMISSIONER

DEPARTMENT OF PUBLIC HEALTH

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED BY THIS DEPARTMENT AS A

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

CERTIFICATE NO.

000349

CURRENT THROUGH

08/31/22

VALIDATION NO.

03-902348

Wew enh

BENJAMIN L SILVERMAN

Deidre 5 57

EMPLOYER'S COPY

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO.

CERTIFICATE NO. 000349

CURRENT THROUGH 08/31/22

03-902348

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

Den de

SIGNATUR

Derite S. S. F.

INSTRUCTIONS:

- 1. Detach and sign each of the cards on this form
- 2. Display the large card in a prominent place in your office or place of business.
- 3. The wallet card is for you to carry on your person. If you do not wish to carry the wallet card, place it in a secure place.
- 4. The employer's copy is for persons who must demonstrate current licensure/certification in order to retain employment or privileges. The employer's card is to be presented to the employer and kept by them as a part of your personnel file. Only one copy of this card can be supplied to you.

WALLET CARD

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-902348

CERTIFICATE NO. 000349

CURRENT THROUGH 08/31/22

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

sen of

ACTING COMMISSIONER



CERTIFICATE OF ACHIEVEMENT

This certifies that

Benjamin Silverman

has successfully completed the 8 Hour Asbestos Site Inspector/Management Planner Refresher Training Asbestos Accreditation Under TSCA Title II 40 CFR Part 763 and CT Department of Public Health Title 20

Training held via a Live Webinar

Score: 92%

conducted by: ATC Group Services LLC dba ATLAS Technical 73 William Franks Drive West Springfield, MA 01089

(413) 781-0070

Dregory J. morsel

Principal Instructor: Gregory Morsch

Dregory J. Morsel

January 20, 2022 Date of Course

Expiration Date

January 20, 2023

Regional Training Director: Gregory Morsch

MPAR-3435

Certificate Number

January 20, 2022 Examination Date

Dear BENJAMIN L SILVERMAN,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health P.O. Box 340308 M.S.#12MQA Hartford, CT 06134-0308

(860) 509-7603 oplc.dph@ct.gov www.ct.gov/dph/license

Sincerely,

DEIDRE S. GIFFORD, MD, MPH, ACTING COMMISSIONER DEPARTMENT OF PUBLIC HEALTH

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED BY THIS DEPARTMENT AS A

LEAD INSPECTOR RISK ASSESSOR

CERTIFICATE NO.

002241

CURRENT THROUGH

08/31/22

VALIDATION NO.

03-901676

BENJAMIN L SILVERMAN

EMPLOYER'S COPY

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-901676

CERTIFICATE NO.

CURRENT THROUGH

002241 08/31/22

PROFESSION

LEAD INSPECTOR RISK ASSESSOR

INSTRUCTIONS:

- 1. Detach and sign each of the eards on this form
- 2. Display the large card in a prominent place in your office or place of business.
- 3. The wallet eard is for you to carry on your person. If you do not wish to carry the wallet card, place it in a secure place.
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WALLET CARD

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-901676

CERTIFICATE NO. 002241

CURRENT THROUGH 08/31/22

PROFESSION

LEAD INSPECTOR RISK ASSESSOR

CERT#: L-600-Virtual.1212

CHEMSCOPE TRAINING DIVISION LEAD INSPECTOR/RISK ASSESSOR REFRESHER 8-HOUR TRAINING CERTIFICATE

Benjamin Silverman

146 Hartford Road, Manchester CT

Has attended an 8-hour course on the subject discipline on

02/28/2022 and has passed a written examination.

The above individual has successfully completed the above training course approved in accordance with the Department of Public Health Standards established pursuant to Section 20-477 of the Connecticut General Statutes.

Course topics include all required topics of State of Connecticut DPH and EPA.

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (U.S.C. 1001 and 15 U.S. C. 2615), I certify that this training complies with all applicable requirements of Title IV of TSCA, 40 CFR part 745 and any other applicable Federal, State or local requirements.

Examination Score: 100% Exam Date: 02/28/2022 Expiration Date: 02/28/2023

> Daniel Sullivan Training Manager

Chem Scope, Inc. 15 Moulthrop Street North Haven CT 06473 Phone: 203.865.5605 www.chem-scope.com



ERIC W. COOLEY FUSS & O'NEILL INC 146 HARTFORD RD **MANCHESTER CT 06040-5992**

Dear ERIC W. COOLEY,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health P.O. Box 340308 M.S.#12MQA Hartford, CT 06134-0308

(860) 509-7603 oplc.dph@ct.gov www.ct.gov/dph/license

Sincerely,

MANISHA JUTHANI, MD, COMMISSIONER **DEPARTMENT OF PUBLIC HEALTH**

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED BY THIS DEPARTMENT AS A

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

ERIC W. COOLEY

CERTIFICATE NO.

000279

CURRENT THROUGH

01/31/24

VALIDATION NO. 03-003713

COMMISSIONER



STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

ERIC W. COOLEY

VALIDATION NO. 03-003713

CERTIFICATE NO.

CURRENT THROUGH

01/31/24

000279

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

INSTRUCTIONS:

VALIDATION NO.

03-003713

- 1. Detach and sign each of the cards on this form
- 2. Display the large card in a prominent place in your office or place of business
- 3. The wallet card is for you to carry on your person. If you do not wish to carry the wallet card, place it in a secure place.
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WALLET CARD

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

ERIC W. COOLEY

CERTIFICATE NO

CURRENT THROUGH 01/31/24

000279

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER



CERTIFICATE OF ACHIEVEMENT

This certifies that

Eric Cooley

has successfully completed the

8 Hour Asbestos Site Inspector/Management Planner Refresher Training
Asbestos Accreditation Under TSCA Title II
40 CFR Part 763

Course training provided via Live Webinar

Principal Instructor: Gregory Morsch

Score: 84%

conducted by:
ATC Group Services LLC dba ATLAS Technical
73 William Franks Drive
West Springfield, MA 01089
(413) 781-0070

Dregoy J. Mersch

.....

July 13, 2023

Date of Course

July 13, 2024
Expiration Date

Dregoy J. Mersel

Regional Training Director: Gregory Morsch

MPAR-3548

Certificate Number

July 13, 2023

Examination Date



Appendix C

Asbestos Laboratory Reports and Chain of Custody Forms

146 Hartford Road, Manchester, CT 06040

www.fando.com

Phone (860) 646-2469

Page 1 of 2

Date: 9/01/2022

032215117

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

Project Name: Goodwin ES - Window & Door Replacement

Project No. 20210525.A10

Task No .: 000015

Site Address: 1235 Forbes Street, East Hartford, CT

Location:

Project Manager: Eric Cooley

Sample ID	Sample Location	Type of Material
082422BS-GW-1A	Exterior	Red Brick
082422BS-GW-1B	Exterior	Red Brick
082422BS-GW-2A	Exterior	Mortar for Red Brick
082422BS-GW-2B	Exterior	Mortar for Red Brick
082422BS-GW-3A	Room 3	Brown Interior Window Frame Caulk
082422BS-GW-3B	Room 18	Brown Interior Window Frame Caulk
082422BS-GW-4A	Room 3	White Interior Window Glazing Compound
082422BS-GW-4B	Room 19	White Interior Window Glazing Compound
082422BS-GW-5A	Exterior – South Courtyard	Gray Cementitious Soffit Boards
082422BS-GW-5B	Exterior - North Courtyard	Gray Cementitious Soffit Boards
082422BS-GW-6A	Exterior – South Courtyard	Brown Exterior Window Frame Caulk
082422BS-GW-6B	Exterior – North Courtyard	Brown Exterior Window Frame Caulk
082422BS-GW-7A	Exterior – Room 18	Red Exterior Window Frame Caulk
082422BS-GW-7B	Exterior - Connector Windows	Red Exterior Window Frame Caulk
082422BS-GW-7C	Exterior – Connector Windows	Red Exterior Window Frame Caulk
082422BS-GW-8A	Exterior – Gym Windows	Tan Exterior Window Frame Caulk
082422BS-GW-8B	Exterior – Gym Windows	Tan Exterior Window Frame Caulk
082422BS-GW-9A	Exterior – Gym Windows	White Exterior Window Glazing Compound
082422BS-GW-9B	Exterior – Gym Windows	White Exterior Window Glazing Compound
082422BS-GW-10A	Exterior – Room 3 (Original)	White Exterior Window Glazing Compound
082422BS-GW-10B	Exterior – Room 18 (Original)	White Exterior Window Glazing Compound
082422BS-GW-11A	Exterior – Main Office Window	Dark Gray Exterior Window Glazing Compound
082422BS-GW-11B	Exterior - Main Office Window	Dark Gray Exterior Window Glazing Compound
082422BS-GW-12A	Exterior - Connector	Black Exterior Window Glazing Compound



146 Hartford Road, Manchester, CT 06040

032215117

www.fando.com

Phone (860) 646-2469

Page 2 of 2

Date: 9/01/2022

Sample ID	Sample Location	Type of Material
082422BS-GW-12B	Exterior - Connector	Black Exterior Window Glazing Compound
082422BS-GW-13A	Exterior – Door E09	Tan Exterior Door Frame Caulk
082422BS-GW-13B	Exterior - Door E09	Tan Exterior Door Frame Caulk
082422BS-GW-14A	Exterior – Door E02	Red Exterior Door Frame Caulk
082422BS-GW-14B	Exterior – Main Door	Red Exterior Door Frame Caulk
082422BS-GW-14C	Exterior – Door E06	Red Exterior Door Frame Caulk
nalysis Method: PLM 6	Other	Turnaround Time: PLM: 1 Week
Neill if analyses will not be commail Results to: <u>LabResults@</u> tal # of Samples: 30	npleted for requested t/a/t at (860) 646-246 fando.com and ECooley@fando.com	
Neill if analyses will not be commail Results to: LabResults@tal# of Samples: 30	fando.com and ECooley@fando.com rsis on first positive sample in each homoge Count. DO NOT ANALYZE ANY SAMP	Do Not Mail Hard Copy Report eneous set of samples unless otherwise noted. Do not layer samples
Neill if analyses will not be commail Results to: LabResults@tal # of Samples: 30 ecial Instructions: Stop analytess indicated. Do Not Point Command	repleted for requested t/a/t at (860) 646-240 Franco.com and ECooley@fando.com The sist on first positive sample in each homoge count. DO: NOT ANALYZE ANY SAMP Da	Do Not Mail Hard Copy Report eneous set of samples unless otherwise noted. Do not layer samples PLES VIA TEM NOB
Neill if analyses will not be commail Results to: LabResults@tal # of Samples: 30 ecial Instructions: Stop analytess indicated. Do Not Point Comples collected by:	repleted for requested t/a/t at (860) 646-240 Franco.com and ECooley@fando.com The sist on first positive sample in each homoge count. DO: NOT ANALYZE ANY SAMP Da	Do Not Mail Hard Copy Report encous set of samples unless otherwise noted. Do not layer samples PLES VIA TEM NOB ate: 9442 5/24 Time:
Neill if analyses will not be commail Results to: LabResults(and tal # of Samples: 30) ectial Instructions: Stop analytics indicated. Do Not Point Comples collected by: Blands mples Sent by: Blands mples Received by: Blands	repleted for requested t/a/t at (860) 646-240 Frando.com and ECooley@fando.com Priss on first positive sample in each homoge Count. DO: NOT ANALYZE ANY SAMP Da Da	Do Not Mail Hard Copy Report eneous set of samples unless otherwise noted. Do not layer samples PLES VIA TEM NOB ate: 9/1/22 Time: Time:
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Neill if analyses will not be commail Results to: LabResults(a) tal # of Samples: 30 ccial Instructions: Stop analyses indicated. Do Not Point Comples collected by: Black mples Sent by: Black mples Received by: Black mples	risis on first positive sample in each homoge Count. DO NOT ANALYZE ANY SAMP Da Other	Do Not Mail Hard Copy Report encous set of samples unless otherwise noted. Do not layer samples PLES VIA TEM NOB ate: 9/1/22 Time: Date: 9/2/n Time: Page 1/2/2 Time: Date: 9/2/n Time:
Neill if analyses will not be commail Results to: LabResults(a) tal # of Samples: 30 ceial Instructions: Stop analyses indicated. Do Not Point Comples collected by: Black mples Sent by: Black mples Received by: Black mples	risis on first positive sample in each homoge Count. DO NOT ANALYZE ANY SAMP Da Other	Do Not Mail Hard Copy Report encous set of samples unless otherwise noted. Do not layer samples PLES VIA TEM NOB ate: 9/1/22 Time: Date: 9/2/n Time: Page 19/2/n Time:

Dreft yopi



307 West 38th Street New York, NY 10018 Phone/Fax: (212) 290-0051 / (212) 290-0058 http://www.EMSL.com / manhattanlab@emsl.com EMSL Order ID: Customer ID:

032215117 ENVI54 20210525.A10

Customer PO: Project ID:

Attn: Eric Cooley

Fuss & O'Neill, Inc.

146 Hartford Road Manchester, CT 06040 Phone:

(860) 646-2469

Fax: Collected:

9/ 1/2022

Received:

9/02/2022

Analyzed: 9/10/2022

Proj: 20210525.A10/ Task No. 000015/ GoodWin ES - Window & Door Replacement/ 1235 Forbes Street, East Hartford CT

Summary Test Report for Asbestos Analysis of Bulk Material via EPA 600/R-93/116 Method

 Client Sample ID:
 082422BS-GW-1A
 Lab Sample ID:
 032215117-0001

Sample Description: Exterior/Red Brick

	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Red	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-1B					Lab Sample ID:	032215117-0002

Sample Description: Exterior/Red Brick

	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Red	0.0%	100.0%	None Detected		

 Client Sample ID:
 082422BS-GW-2A
 Lab Sample ID:
 032215117-0003

Sample Description: Exterior/Mortar for Red Brick

	Analyzed		Non	-Asbestos				
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment		
PLM	09/09/2022	Tan	0.0%	100.0%	None Detected			
Client Sample ID:	082422BS-GW-2B	_				Lab Sample ID:	032215117-0004	

Sample Description: Exterior/Mortar for Red Brick

	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Gray	0.0%	100.0%	None Detected		

 Client Sample ID:
 082422BS-GW-3A
 Lab Sample ID:
 032215117-0005

Sample Description: Room 3/Brown Interior Window Frame Caulk

	Analyzed		Non-	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Brown/Gray	0.0%	95.0%	5% Chrysotile		
						1 - 1 - 0 1 - 10	

 Client Sample ID:
 082422BS-GW-3B

 Lab Sample ID:
 032215117-0006

Sample Description: Room 18/Brown Interior Window Frame Caulk

	Analyzed		Non-Asbestos				
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022			Positiv	e Stop (Not Analyzed)		
Client Sample ID:	082422BS-GW-4A					Lab Sample ID:	032215117-0007

Sample Description: Room 3/White Interior Window Glazing Compound

	Analyzed		Non-Asbestos			
TEST	Date	Color	Fibrous Non-Fibrous		Comment	
PLM	09/09/2022	White	0.0% 98.0%	2% Chrysotile		



307 West 38th Street New York, NY 10018 Phone/Fax: (212) 290-0051 / (212) 290-0058 http://www.EMSL.com/manhattanlab@emsl.com EMSL Order ID: Customer ID: Customer PO: 032215117 ENVI54 20210525.A10

Project ID:

Summary Test Report for Asbestos Analysis of Bulk Material via EPA 600/R-93/116 Method

	ummary Test Report	TOT ASSEST	OS Allalys	13 OI Baik II	atoriai via El A c		
Client Sample ID:	082422BS-GW-4B	01 - : 0				Lab Sample ID:	032215117-0008
Sample Description:	Room 19/White Interior Wind	ow Glazing Com	oound				
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022						
Client Sample ID:	082422BS-GW-5A					Lab Sample ID:	032215117-0009
Sample Description:	Exterior - South Courtyard/Gr	ay Cementitious	Soffit Boards				
	Analyzod		Non	-Asbestos			
TEST	Analyzed Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Gray	0.0%	60.0%	40% Chrysotile	Result includes a	small amount of
						inseparable attach	ed material
Client Sample ID:	082422BS-GW-5B					Lab Sample ID:	032215117-0010
Sample Description:	Exterior - North Courtyard/Gr	ay Cementitious	Soffit Boards				
	Analyzed		Non	-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022				ve Stop (Not Analyzed)		
Client Sample ID:	082422BS-GW-6A					Lab Sample ID:	032215117-0011
Sample Description:	Exterior - South Courtyard/Br	own Exterior Win	dow Frame Ca	ulk			
. , ,	Extendi Godin Godinyara, Bi	OWN Extensi Will	dow i famo od	unt			
	Analyzed			-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Brown	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-6B					Lab Sample ID:	032215117-0012
Sample Description:	Exterior - North Courtyard/Bro	own Exterior Win	dow Frame Ca	ulk			
	Analyzed		Non	-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Brown	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-7A					Lab Sample ID:	032215117-0013
Sample Description:	Exterior - Room 18/Red Exter	rior Window Fran	ne Caulk			·	
TEOT	Analyzed	0.1.		-Asbestos	A.1	0	
TEST PLM	09/09/2022	Color Red	0.0%	Non-Fibrous 100.0%	Asbestos Nana Datastad	Comment	
		Neu	0.070	100.0%	None Detected		
Client Sample ID:	082422BS-GW-7B					Lab Sample ID:	032215117-0014
Sample Description:	Exterior - Connector Windows	s/Red Exterior W	indow Frame C	aulk			
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Red	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-7C					Lab Sample ID:	032215117-0015
Sample Description:	Exterior - Connector Windows	s/Red Exterior W	indow Frame C	aulk			
TEST	Analyzed	Color		-Asbestos Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Color Brown	0.0%		None Detected	Comment	
		DIOWII	0.070	100.070	140HE DEIECIEU	1-6-0	000045447 0040
Client Sample ID:	082422BS-GW-8A					Lab Sample ID:	032215117-0016
Sample Description:	Exterior - Gym Windows/Tan	Exterior Window	Frame Caulk				
	Analyzed		Non	-Asbestos			
TEST	Analyzed Date	Color		-Asbestos Non-Fibrous	Asbestos	Comment	



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Project ID:

Summary Test Report for Asbestos Analysis of Bulk Material via EPA 600/R-93/116 Method

Client Sample ID:	082422BS-GW-8B					Lab Sample ID:	032215117-0017
Sample Description:	Exterior - Gym Windows/Tan	Exterior Window I	Frame Caulk				
	Exterior - Cym Windows/ fair	Exterior William	Tarrie Gaaik				
	Analyzed			-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022			/e Stop (Not Analyzed)			
Client Sample ID:	082422BS-GW-9A					Lab Sample ID:	032215117-0018
Sample Description:	Exterior - Gym Windows/Wh	ite Exterior Windo	v Glazing Com	pound			
	Analyzed		Non	-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	White	0.0%	98.0%	2% Chrysotile		
Client Sample ID:	082422BS-GW-9B					Lab Sample ID:	032215117-0019
Sample Description:		ita Exterior Windo	v Clazina Com	nound			
Campie Description.	Exterior - Gym Windows/Wh	ite Exterior William	v Glazing Con	ipouriu			
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022			Positiv	ve Stop (Not Analyzed)		
Client Sample ID:	082422BS-GW-10A					Lab Sample ID:	032215117-0020
Sample Description:	Exterior - Room 3 (Original)/	White Exterior Win	dow Glazing C	Compound			
	A			A . I			
TEST	Analyzed Date	Color		-Asbestos Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Gray/White	0.0%	97.0%	3% Chrysotile	Comment	
		Oldy/Willie		37.070	070 Omysouic	Lab Camada ID	000045447.0004
Client Sample ID:	082422BS-GW-10B					Lab Sample ID:	032215117-0021
Sample Description:	Exterior - Room 18 (Original))/White Exterior Wi	ndow Glazing	Compound			
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022			Positiv	ve Stop (Not Analyzed)		
Client Sample ID:	082422BS-GW-11A					Lab Sample ID:	032215117-0022
Sample Description:	Exterior - Main Office Windo	w/Dark Grav Exter	ior Window Gl	azina Compound			
		,		g			
	Analyzed			-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Gray	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-11B					Lab Sample ID:	032215117-0023
Sample Description:	Exterior - Main Office Windo	w/Dark Gray Exter	ior Window Gl	azing Compound			
	Analyzed		Non	-Asbestos			
TEST	Date	Color		Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Gray	0.0%	100.0%	None Detected	-	
Client Sample ID:	082422BS-GW-12A			• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	Lab Sample ID:	032215117-0024
Sample Description:		ytorior Window Cl	azina Compou	ad		Zab Gampie izi	002210111 0024
Campic Description.	Exterior - Connector/Black E	ALEHOI WILIDOW GI	zzing Compou	iiu			
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Black	0.0%	100.0%	None Detected		
					·	I ah Cammia ID.	032215117-0025
Client Sample ID:	082422BS-GW-12B					Lab Sample ID:	032213117-0023
	082422BS-GW-12B Exterior - Connector/Black E	xterior Window Gla	azing Compou	nd		Lab Sample ID:	032213117-0023
Client Sample ID:	Exterior - Connector/Black E	xterior Window Gla				Lab Sample ID:	032213117-0023
Client Sample ID: Sample Description:	Exterior - Connector/Black E		Non	-Asbestos	Anhantan	·	032213117-0023
Client Sample ID:	Exterior - Connector/Black E	xterior Window Gla Color Gray	Non		Asbestos None Detected	Comment	032213117-0023



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032215117 ENVI54 20210525.A10

Project ID:

Summary Test Report for Asbestos Analysis of Bulk Material via EPA 600/R-93/116 Method

Client Sample ID:	082422BS-GW-13A					Lab Sample ID:	032215117-0026
Sample Description:	Exterior - Door E09/Tan Exter	rior Door Frame	Caulk				
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Tan	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-13B					Lab Sample ID:	032215117-0027
Sample Description:	Exterior - Door E09/Tan Exter	ior Door Frame	Caulk				
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/10/2022	Brown	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-14A					Lab Sample ID:	032215117-0028
Sample Description:	Exterior - Door E02/Red Exte	rior Door Frame	Caulk				
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Tan	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-14B					Lab Sample ID:	032215117-0029
Sample Description:	Exterior - Main Door/Red Exte	erior Door Frame	Caulk				
	Analyzed		Non	-Asbestos			
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment	
PLM	09/09/2022	Tan	0.0%	100.0%	None Detected		
Client Sample ID:	082422BS-GW-14C					Lab Sample ID:	032215117-0030
Sample Description:	Exterior - Door E06/Red Exte	rior Door Frame	Caulk				
	Analyzed		Non	-Ashastas			

	Analyzed		Non-	Asbestos		
TEST	Date	Color	Fibrous	Non-Fibrous	Asbestos	Comment
PLM	09/10/2022	Brown	0.0%	100.0%	None Detected	



307 West 38th Street New York, NY 10018 Phone/Fax: (212) 290-0051 / (212) 290-0058 http://www.EMSL.com / manhattanlab@emsl.com EMSL Order ID: 032215117 Customer ID:

ENVI54 20210525.A10

Customer PO: Project ID:

Attn: Eric Cooley

Fuss & O'Neill, Inc.

146 Hartford Road Manchester, CT 06040 Phone: (860) 646-2469

Fax: Collected:

9/1/2022

Received:

9/02/2022

9/10/2022 Analyzed:

20210525.A10/ Task No. 000015/ GoodWin ES - Window & Door Replacement/ 1235 Forbes Street, East Hartford CT Proj:

The samples in this report were submitted for asbestos bulk analysis. The reference number for these samples is the Order ID above. Please use this reference number when calling about these samples.

Sample Receipt Date:

09/02/2022

Sample Receipt Time:

9:29 am

Analysis Completed Date:

09/10/2022

Analysis Completed Time:

4:51 am

Analyst(s):

Gabriel Ortiz

Reviewed and approved by:

Charles Johnson, Asbestos Laboratory Manager or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. Estimation of uncertainty available upon request. This report is a summary of multiple methods of analysis, fully compliant reports are available upon request. A combination of PLM and TEM analysis may be necessary to ensure consistently reliable detection of asbestos. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government.

Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC--IHLAP Accredited #102581, NVLAP Lab Code 101048-9, NJ NY022, CT PH-0170, MA AA000170

Initial report from: 09/10/202207:39:08

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ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

Project Name: <u>Goo</u>	Luin Dayn, School Wildows	oject No. 2021 0525, ALO Task No.:
Site Address: \235	For bes St. E. Heridelinand	CT Project Manager F3c Ceroley
Sample ID	Sample Location	Type of Material
20230EC 701A	man enon windowhen	Gray 3(aying Comfound used with Steel France com residuod stage
-016	Sidelight FOY	Con glazing Corneland Used win steel
Αω-	E-14 Caskrow Full	Crey Edgicing Compoun
-v2B	E-14 Cassoon Full	Gry Glazing Comford
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1		

146 Hartford Road, Manchester, CT 06040

Fuss & O'Neill EMSL Customer No. ENVI54

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Page 2 of	

			Date:
Sample ID	Sample Location	Type of Materi	al
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		MEGEUUL	<u> </u>
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		BV AJ W& 15:0	00
Analysis Method: PI	LM	Turnaround Time: PLM: 27	HOLTEM
		•	
O'Neill if analyses will n	d time indicated above, analyses are due to Fuss & O' ot be completed for requested t/a/t at (860) 646-246	Neill on or before this date:9.	Please call Fuss &
Email Results to:	ot be completed for requested t/a/t at (860) 646-246	@fando.com Do Not Ma	uil Hard Copy Report
Special Instructions: S	Stop analysis on first positive sample in each homoge	neous set of samples unless otherwise noted.	Do not laver samples
_	ot Point Count. If NOB group sample results are 0%		· -
group, unless you are to	~ /	0-0-0-0	1400
Samples collected by:	7	te: Sime:	1800
Samples Sent by:	Da Da	te: 8-30-83 Time:	<u>1500</u>
Samples Received by:		Date:	Time:
Shipped To: EM	SL Other Morton		
Method of Shipment:	FedEx Lab Drop Off Other_	MI II TIDI R DAGES 20200225 dage	



Fuss & O'Neill, Inc.

Attention: Eric Cooley

EMSL Order: 242304612 Customer ID: ENVI54

Customer PO: 20210525.A10

Project ID:

Phone: (203) 605-2429

Fax:

146 Hartford Road Received Date: 08/30/2023 3:00 PM

Manchester, CT 06040 Analysis Date: 08/31/2023 Collected Date: 08/30/2023

Project: 20210525.A10/ GOODWIN ELEM. SCHOOL WINDOW, 1235 FORBES ST. E. HARTFORD, CT

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-A	Asbestos	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
20230830EC-01A	Main entry window wal side light - grey	Gray Non-Fibrous		98% Non-fibrous (Other)	2% Chrysotile
242304612-0001	glazing compound used and steel frmae with reinforced glass	Homogeneous			
20230830EC-01B	Gym corridor exit door side light-E04 - grey				Positive Stop (Not Analyzed)
242304612-0002	glazing compound used and steel frmae with reinforced glass				
20230830EC-02A	E-11 12"x12" door window glazing - grey	Gray Non-Fibrous		98% Non-fibrous (Other)	2% Chrysotile
242304612-0003	glazing compound	Homogeneous			
20230830EC-02B	E-14 classroom				Positive Stop (Not Analyzed)
242304612-0004	full/door window glass - grey glazing compound				

Analyst(s)	Damy Sarahur
lailey Rangel (2)	Danny Sandhu, Asbestos Laboratory Manager
	or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Meriden, CT NVLAP Lab Code 200700-0,

Initial report from: 08/31/2023 10:36:55



Appendix D

Site Photographs





Typical Office/Classroom Window System and Asbestos Cement Soffits



Typical Glass Doors/Window Wall System (Entryways & Courtyards)





Gym Window System. ACM Cementitious Panels Above. Panel below Windows are Metal.



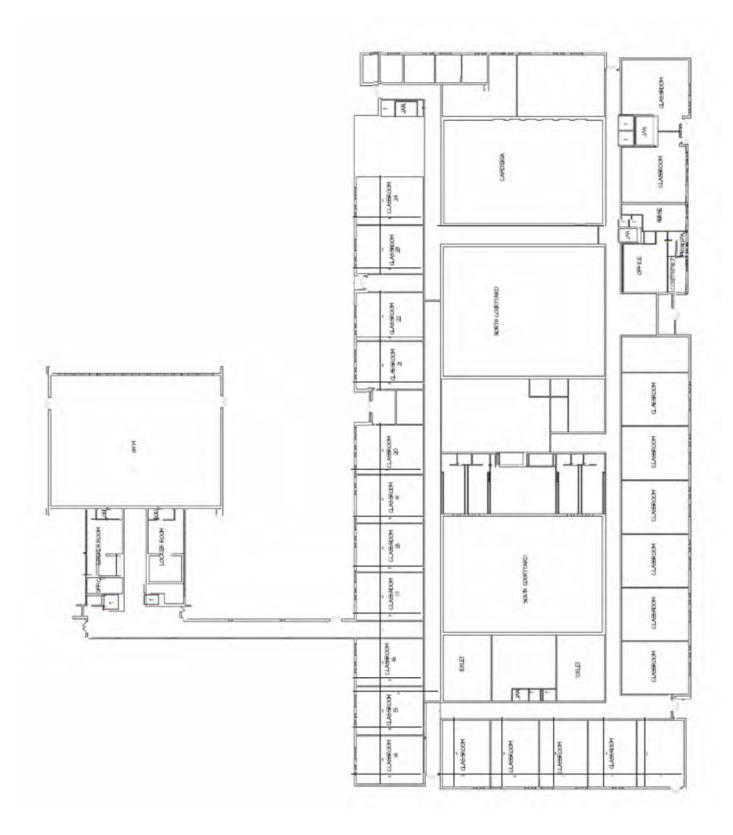
Connector Window



Appendix E

Site Floor Plan







Appendix F

XRF Lead Determination Field Data Sheets



FUSS&O'NEILL Daks: 8/23+8/24/22 KRF: RMD 1157

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XRF FIELD DATA SHEET

Side	Surface	XRF Readings	POS	Substrate/Color	Defective	Chewable	100 100 100 100	Impact	Comments
	(albain	0.8							
	1	0.8							
	2	10							WKKI A
	Dow	0.6		M/msts boun					MNosh Congli
	Dar/ Liden From	c 0.0		w/ from					
	11 Produc	0.2							
	awayay	0.1		M/rista Briga					
	Solfr	0.0		5/white				-	2
	Wh Sich	0.0		M/Brun					Fain 3
	11 Costo ano								
	" Sill Plate	00	100	5					
_	" Hende Plata	4200	20 V	M/ list Gray (MN/White M/red					
	GARA WALL	0.1	0.2	(Mu/white					LAC V
	Day	03		WLCA					Hall & Ruen 17
_	1/ Mude From	0.0		4			-		Hall & From (7
	Maji	0.0		(my/white	-	-			0 10
	Will Sech	0.3		m/Barn				_	Firm 18
	11 Franc	0.5		M/strong (MM/White				_	
	Wall Place	0.0	_	MISTOR					1
_	Wall			(MM/white			-		c V
_	Wilh Bash	05	/	W/ Brun				-	Symposium
	11 (cshy	2.7	/			_	-		
	" Frenc	0,3	V						
_	118 11	0,2	-	10.10	-				
_	Down	0.0		M/ Brent		-			
_	11 Forme	00	-						
_	4 (me)	0.1							1/
_	" Threshold	0.1		CMW/Bick/ shire					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
_	Wall	0.0		CLINA MINA NAME				_	V



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XRF FIELD DATA SHEET

de	Surface	XRF Readings	POS	Substrate/Color	Defective	Chewable	Friction	Impact	Comments
K	Calbanh	0,8							
		08							
_	V	0,8	_						
	altron	1.0							
	(08							
	V	0.7							
-	Dow	03		M/Blue					Gam Wine
	11 France	02	/	1					
	" (mg)	1.7	/	M/ Brown					
2	WH. Sash	0.4	1	W/ Fran					
2	11 (684	1.0	V	1,					
D	Franche Skely	1.0	V	V					V
-	Pur	1.0	/	M/Bres					6-09 (PW)
C	Casas for globales.	0.2_		M/Brin Alymony/Born M/Grown					
	CHITA STYND	0.0		Alymohum/Brung			-		V
	Will Sash	0.2		M/ Pooling					Fee 18
\Box	11 France	0,0	,	- 1					
	Went	1.0	V	Q	_				
	Hower Own	0.7		W/ France				_	1
	SOLAit	0.0		transte whose	-				0/2
5	Dow	0.3	-	M/ flac	-				E-10/Pour
Ç	11 Fram	0.2		4				_	1
4	" Herder	0.0		W/ france W/ Olive W/ Olive	-				10 V-
A	hoh Sash	0.2							Pan 3
7	11 Frame	0.2	1					-	
A	" V (ot	1.0	V						
A	Header Brown	0.2							
A	Jostit	0,0			-			-	
A PA					-				



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XRF FIELD DATA SHEET

00	r;		_ 1	Room:			Pa	ge	of
oje	ect Name: Bhe	ol Housing	Auth	ority - Cambridge Park	f Positive - C	Proheck All T	oject Nu	mber: 2	
le	Surface	XRF Rendings	4	Substrate/Color	-		and the second second	Impact	
3	Way Jack	0.1		My fran	-			-	Row 13
	11 Draw	0.2							
5	9 Heide	0.1		100051					
	Sthr.	0.0	- /-	1 Capt of 1 4 Note					V
2	Will Sast	0,2	V	M/Brun					marth
2	" Hoise	0,0		w/ from					1
>	h Librell	0.0		M/Bmn					4
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PART 1 - GENERAL

1.01 DESCRIPTION

- A. All rough and finished carpentry are included under this Section of the Specifications, unless specifically noted otherwise.
- B. Furnish and erect all wood blocking, studs, sheathing, etc., as required for complete framing job, (Where sleeves are required, they shall be delivered by those trades involved and set by them). The general Contractor shall assume full responsibility for properly coordinating all of the work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. "Grade Mark", "Trade Mark" A and Mill Identification Mark" of the Association having jurisdiction shall appear on each piece of framing lumber when delivered to the job site.
- B. Plywood shall conform to the U.S. Department of Commerce, Commercial Standard CS45-60 and shall branded or stamped with grade.
- C. Structural Lumber shall be as Follows:
 - 1. Light framing lumber used for studs, partitions, and miscellaneous framing shall not be less than standard grade and shall have the following minimum allowable unit stresses:

2.	Extreme fiber in bending	Fb = 550 PSI
	Tension parallel to grain	\dots Ft = 375 PSI
	Compression parallel to grain	Fc = $1,350 \text{ PSI}$
	Modulus of elasticity	E = 1,400,000 PSI

- 3. Nailing shall be as per article 23 of the Connecticut Building Code/2005
- E. The general contractor shall furnish, in place, all necessary blocking as may be required by all other trades.
- F. All lumber shall bear the grade marks and mill identification.
- G. Identify all plywood as to species grade and glue type by the stamp of the American Plywood Association (APA)
- H. All plywood shall be manufactured from a Group 1 or Group 2 species.
- I. Provide APA performance rated panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

PART 3 - EXECUTION

3.01 STORAGE AND PROTECTION

A. Protect lumber, against all dampness or damage of any character during and after delivery. Store under cover in a well-ventilated building.

3.02 WORKMANSHIP

- A. All workmanship shall be of the highest caliber. Brace, plumb, and level all members and secure with sufficient nailing to insure rigidity.
- B. Nails shall be sized to be in length 2 ½ times the thickness of the material which is to be fastened.

3.03 INSTALLATION OF PLYWOOD

- A. Place all plywood with face grain perpendicular to supports and continuous over at least two supports. Center joist accuracy over supports and stagger the end joints.
- B. Allow 1/8" spacing at panel ends and 1/4" at panel edges for square edge panels.
- C. Supply and install all wood blocking as required at plywood openings and end joints.

END OF SECTION 06 10 00

SECTION 07 42 00 - METAL PANELS

PART 1 - GENERAL

1.01 - Scope

- 1. The Panels required are as manufactured by Mapes Architectural Panels, LLC, Lincoln, NE. Panels consist of metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into a window system or curtain wall system.
- 2. Related Work
 - 1. Section 07920 Joint Sealants
 - 2. Section 08500 Windows

1.02 - Quality Assurance

- 1. Panel manufacturer shall have a minimum of 25 years experience.
- 2. Field measurements shall be taken prior to completion of manufacturing and cutting.
- 3. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" (3mm) in 20' (6m) non-commutative.

1.03 - References

- 1. American Society of Testing Materials (ASTM)
 - A. E330-84: Structural Performance of Exterior Windows, Curtain Walls and Doors under the influence of wind loads.
 - B. D1781-76: Climbing Drum Peel Test for Adhesives.
 - C. D3363-74: Method for Film Hardness by Pencil Test.
 - D. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
 - E. D3359-90: Method for Measuring Adhesion by the tape test.

1.04 - Substitutions

- 1. The materials and products specified in this section establish a minimum standard of required function, design, appearance quality and warranty to be met by any proposed substitution.
- 2. No substitutions will be considered unless a written request for approval has been submitted by the bidder and received by the architect 10 days prior to the bid date.

1.05 - Submittals

- 1. Submittals shall be in conformance with section 013300ction number of Division and refer to CSI Division I, Section 1340 Shop Drawings, Product Data and Samples.
- 2. Samples:
 - A. Panel makeup 2 samples 10"x10"
 - B. Two samples of each color and finish texture 3"x5"
- 3. Submission Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.
- 4. Affidavit certifying materials meet all requirements as specified.
- 5. 2 copies of manufacturers standard literature for specified material.

1.06 - Delivery, Storage and Handling

- 1. Protect finish and edge in accordance with panel manufacturer's recommendations.
- 2. Store materials in accordance with panel manufacturer's recommendations.

PART 2 - PRODUCTS

METAL PANELS 074200 - 1

2.01 - Panels - Laminated

- 1. Laminated metal faced Mapes-R+ (5-Ply) panels as manufactured by Mapes Industries, Inc.
- 2. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.

2.02 - Finish

- 1. Finishes
- 2. Exterior: Smooth Primed Aluminum
- 3. Interior: Smooth Primed Aluminum
- 4. Color as selected by architect and owner.

2.03 - Panel Fabrication

- 1. Exterior Substrate: Tempered Hardboard
- 2. Core: Isocyanurate
- 3. Interior Substrate: Tempered Hardboard
- 4. Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
- 5. Panel Thickness 1"
- 6. R-Value 6.56
- 7. U-Value 0.15

2.04 - Accessories

- 1. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
- 2. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

PART 3 - EXECUTION

3.01 - Installation

1. Panel surfaces shall be free from defects prior to installation.

3.02 - Execution

- 1. Erect panels plumb, level and true.
- 2. Glaze panels securely and in accordance with approved shop drawings and manufacturers instructions to allow for necessary thermal movement and structural support.
- 3. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.
- 4. Weatherseal all joints as required using methods and materials as previously specified.
- 5. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.03 - Adjusting and Cleaning

- 1. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.
- 2. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

END OF SECTION 074200

METAL PANELS 074200 - 2

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints windows and adjacent materials.
 - 2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints between interior wall surfaces, sills and frames of windows.
- B. Related Sections include the following:
 - 1. Division 8 Section "Aluminum Windows"

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Field Test Report Log: For each elastomeric sealant application.
- J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
 - E. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
 - 1. Basis of Design: Pecora Corporation Silicone Sealant #890
 - 2. Subject to compliance with the requirements, provide the specified product or a comparable product by the following:
 - a. Pecora Corporation
 - b. Dow Corning Corporation
 - c. Tremco Incorporated
 - d. Sika Corporation

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

- 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Masonry.
- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Vinyl
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab; Method B, Exposed Surface Finish Hand Pull Tab; or Method C, Field-Applied Sealant Joint Hand Pull Flap, in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 2. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type

of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

- b. Whether sealants filled joint cavities and are free of voids.
- c. Whether sealant dimensions and configurations comply with specified requirements.
- 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
- 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081743 - FRP/ ALUMINUM HYBRID DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. SL-17 Pebble Grain FRP/ Aluminum Hybrid Door installed in Thermally Broken Aluminum Framing.

1.02 RELATED SECTIONS

- A. Section 08 71 00 Door Hardware.
- B. Section 08 88 53 Security Glazing.
- C. Section 08 90 00 Louvers.

1.03 REFRENCES

- A. <u>AAMA 1304</u> Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
- B. <u>AAMA 1503-98</u> Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- C. <u>ANSI A250.4</u> Test Procedure and Acceptance Criteria for Physical Endurance of Steel Doors and Hardware Reinforcing.
- D. ASTM-B117 Standard Practices for Operating Salt Spray (Fog) Apparatus.
- E. ASTM-B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- F. <u>ASTM-B221</u> Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- G. <u>ASTM-C518</u> Standard test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
- H. <u>ASTM-D256</u> Standard Test Methods for Determining the Pendulum Impact Resistance of Plastics.
- I. ASTM-D570 Standard Test Method for Water Absorption of Plastics.
- J. ASTM-D638 Standard Test Method for Tensile Properties of Plastics.
- K. <u>ASTM-D790</u> Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- L. <u>ASTM-D1621</u> Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- M. ASTM-D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- N. <u>ASTM-D1623</u> Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- O. <u>ASTM-D2126</u> Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- P. <u>ASTM-D2583</u> Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- Q. <u>ASTM-D3029</u> Test Methods for Impact Resistance of Flat Rigid Plastic Specimens by Means of a Tup (Falling Weight) (Withdrawn 1995) (Replaced by ASTM-D5420).
- R. <u>ASTM-D5116</u> Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/ Products.
- S. <u>ASTM-D5420</u> Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).

- T. <u>ASTM-D6670</u> Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/ Products.
- U. <u>ASTM-E84</u> Standard Test Method for Surface Burning Characteristics of Building Materials.
- V. <u>ASTM-E90</u> Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- W. <u>ASTM-E283</u> Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- X. <u>ASTM-E330</u> Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- Y. <u>ASTM-E1886</u> Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- Z. <u>ASTM-E1996</u> Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes.
- AA. ASTM-F476 Standard Test Methods for Security of Swinging Door Assemblies.
- BB. <u>ASTM-F1642-04</u> Standard Test Method for Glazing Systems Subject to Air Blast Loading.
- CC. NWWDA T.M. 7-90 Cycle Slam Test Method.
- DD. NFRC 100 Procedure for Determining Fenestration Products U-Factors.
- EE. NFRC 400 Procedure for Determining Fenestration Products Air Leakage.
- FF. TAS 201 Impact Test Procedures.
- GG. <u>TAS 202</u> Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure.
- HH. TAS 203 Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

1.04 SUBMITTALS

- A. Must comply with Section 01 33 00 Submittal Procedures.
- B. Action Submittals/ Informational Submittals.
 - 1. Product Data.
 - a. Submit manufacturer's product data sheets, catalog pages illustrating the products, description of materials, components, fabrication, finishes, installation instructions, and applicable test reports.
 - 2. Shop Drawings.
 - a. Submit manufacturer's shop drawings, including elevations, sections, and details indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.
 - 3. Samples.
 - a. Submit manufacturer's door sample composed of door face sheet, core, framing and finish
 - b. Submit manufacturer's sample of standard colors for door face and frame.
 - 4. Testing and Evaluation Reports.
 - a. Submit testing reports and evaluations provided by manufacturer conducted by and accredited independent testing agency certifying doors and frames comply with specified performance requirements listed in Section 2.04.
 - 5. Manufacturer Reports.
 - a. Manufacturer's Project References.
 - 1. Submit list of successfully completed projects including project name, location, name of architect, type, and quantity of doors manufactured.

C. Closeout Submittals.

- 1. Operation and Maintenance Manual.
 - a. Submit manufacturer's maintenance and cleaning instructions for doors and frames, including maintenance and operating instructions for hardware.
- 2. Warranty Documentation.
 - a. Submit manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications.
 - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years concurrent successful experience.
 - 2. Door and frame components must be fabricated by the same manufacturer.
 - 3. Evidence of a documented complaint resolution quality management system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery.
 - 1. Deliver materials to site in manufacturer's original, unopened, containers and packaging.
 - 2. Labels clearly identify opening, door mark, and manufacturer.
- B. Storage
 - 1. Store materials in a clean, dry area, indoors in accordance with manufacturer's instructions.
- C. Handling.
 - 1. Protect materials and finish from damage during handling and installation.

1.07 WARRANTY

- A. Warrant doors, frames, and factory installed hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Standard Period.
 - 1. Ten years starting on date of shipment.
- C. Limited lifetime
 - 1. Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.
- D. Finish
 - 1. Fluropan painted aluminum: 10 years.
 - 2. Anodized, aluminum:10 years.

PART 2 PRODUCTS

2.01 FRP/ALUMINUM HYBRID DOORS

- A. Manufacturer.
 - 1. Special-Lite, Inc. Basis of Design
 - a. Or compatible products by following manufacturers.
 - 2. CMI Architectural
 - 3. Old Castle Building Envelope

2.02 DESCRIPTION

A. Model.

- 1. SL-17 Pebble Grain FRP/ Aluminum Hybrid Door.
- B. Door Opening Size: As indicated on schedule and plans
- C. Construction.
 - 1. Door Thickness.
 - a. 1-3/4".
 - 2. Stiles & Rails.
 - a. Aluminum extrusions made from 6063 aluminum alloys with a minimum temper of T5.
 - b. Minimum 2-5/16" deep one-piece extrusion with integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - c. Screw or snap in place applied caps are not acceptable.
 - d. Top rails must have integral legs for interlocking continuous extruded aluminum flush cap.
 - e. Bottom rails must have integral legs for interlocking continuous weather bar with single nylon brush weather stripping or manually adjustable SL-301 door bottom with two nylon brush weather stripping.
 - f. Meeting stiles to include integral pocket to accept pile brush weather seal.

3. Corners.

- a. Mitered.
- b. Secured with 3/8" diameter full-width steel tie rod through extruded splines top and bottom which are integral to standard tubular shaped rails.
- c. 1-1/4" x 1-1/4" x 3/16" 6061 aluminum angle reinforcement at corner to give strong, flat surface for locking hex nut to bear on.
- d. Weld, glue, or other methods of corner joinery are not acceptable.

4. Core.

- a. Poured-in-place polyurethane foam.
- b. Laid in foam cores are not acceptable.
- c. Foam Plastic Insulated Doors: IBC 2603.4.
 - 1. Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
 - 2. Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.
 - 3. IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032" aluminum or 0.016" steel.
 - 4. Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. If no independent testing is conducted all doors with foam plastic core must have a thermal barrier.

5. Face Sheet.

- a. Exterior
 - 1. 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - 2. Optional painted finish consult manufacturer.
 - 3. Class C standard.
- b. Interior
 - 1. 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.

- 2. Optional painted finish consult manufacturer.
- 3. Class C standard optional Class A available consult manufacturer.
- c. Attachment of face sheet.
 - 1. Extruded stiles and rails to have integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - 2. Use of glue to bond face sheet to core or extrusions is not acceptable.
- 6. Cutouts.
 - a. Manufacture doors with cutouts for required vision lites, louvers, and panels.
- 7. Hardware.
 - a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
 - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
 - c. Factory install door hardware.
- 8. Reinforcements.
 - a. Aluminum extrusions made from 6061 or 6063 aluminum alloys.
 - b. Sheet and plate to conform to ASTM-B209.
 - c. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
 - d. Bars and tubes to meet ASTM-B221.
- D. Sustainability Characteristics.
 - 1. LEED Declaration.
 - a. Entrance Products contribute to point calculations for the following credits:
 - 1. MR Credit 4.1 Recycled Content 10% (post-consumer = ½ pre-consumer) 1 point.
 - 2. MR Credit 4.2 Recycled Content 20% (post-consumer = ½ pre-consumer) 1 point.
 - b. All aluminum extrusions are produced using prime-equivalent billet produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes. The USGBC classifies these extrusions as pre-consumer recycled material.
 - c. Manufacturing facility located within 500 miles of major components and materials, including aluminum extrusions.
 - d. The point of recovery and smelting of pre-consumer recycled material within 500 miles of the manufacturing facility.

2.03 FRAMING

- A. Framing
 - 1. Thermally Broken Aluminum Framing.
 - a. Model: SL-450-TB or SL-600-TB as indicated on details.
 - b. Materials.
 - 1. See 2.05.A.
 - c. Perimeter Frame Members.
 - 1. Storefront frame with thermally broken pocket filler.
 - 2. Factory fabricated.
 - 3. Open-back framing is not acceptable.
 - d. Thermal Strut.
 - 1. Fiber reinforced plastic, no other materials will be accepted.
 - e. Applied Door Stops.

EAST HARTFORD PUBLIC SCHOOLS JOSPEH O. GOODWIN ELEMENTARY SCHOOL EXTERIOR DOOR & WINDOW REPLACEMENTS AND HVAC UPGRADES

- 1. 5/8" x 1-1/4" or 5/8" x 1-3/4", 0.125" wall thickness, with screws and weather-stripping.
- 2. Provide solid ½" aluminum bar behind door stop for closer shoe attachment.
- 3. Pressure gasketing for weathering seal.
- 4. Counterpunch fastener holes in door stop to preserve full-metal thickness under fastener head.
- 5. Minimum ½" aluminum bar reinforcement under doorstop for required hardware attachments, aluminum to meet ASTM-B221.

f. Caulking.

- 1. Caulk joints before assembling frame members.
- g. Frame Member to Member Connections.
 - 1. Secure joints with fasteners.
 - 2. Provide hairline butt joint appearance.
 - 3. Shear block construction only, no screw spline allowed.

h. Hardware

- 1. Pre-machine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
- 2. Surface mounted closures will be reinforced for but not prepped or installed at factory.
- 3. Factory install door hardware.

i. Anchors:

- 1. Anchors appropriate for wall conditions to anchor framing to wall materials.
- 2. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
- 3. Secure head and sill members of transom, side lites, and similar conditions.

2.04 PERFORMANCE

A. Face Sheet.

- 1. Standard Interior and Exterior Class C 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - a. Flexural Strength, ASTM-D790: 21 x 10³ psi.
 - b. Flexural Modulus, ASTM-D790: 0.7 x 10⁶ psi.
 - c. Tensile Strength, ASTM-D638: 13 x 10³ psi.
 - d. Tensile Modulus, ASTM-D638: 1.2 x 10⁶ psi.
 - e. Barcol Hardness, ASTM-D2583: 55.
 - f. Izod Impact, ASTM-D256: 14.0 ft-lb/in.
 - g. Gardner Impact Strength, ASTM-D5420: 120 in-lb.
 - h. Water Absorption, ASTM-D570: 0.20%/24hrs at 77°F.
 - i. Surface Burning, ASTM-E84: Flame Spread ≤ 200, Smoke Developed ≤ 450.
 - j. Taber Abrasion Resistance, Taber Test: 0.007% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
 - k. Chemical Resistance.
 - Excellent Rating.
 - a. Acetic Acid, Concentrated.
 - b. Acetic Acid, 5%.
 - c. Bleach Solution.
 - d. Detergent Solution.
 - e. Distilled Water.
 - f. Ethyl Acetate.
 - g. Formaldehyde.

- h. Heptane.
- i. Hydrochloric Acid, 10%.
- j. Hydrogen Peroxide, 3%.
- k. Isooctane.
- I. Lactic Acid, 10%.
- 1. USDA/FSIS Requirements.
 - 1. FRP face sheet with SpecLite 3[®] integral surfaseal is a finished outer surface material that is rigid; durable; non-toxic; non-corrosive; moisture resistant; a light, solid color such as white; easily inspected; smooth or an easily cleaned texture.
 - 2. FRP face sheet with SpecLite 3[®] integral surfaseal does not contain any known carcinogen, mutagen, or teratogen classified as hazardous substances; heavy metals or toxic substances; antimicrobials; pesticides or substances with pesticidal characteristics.
- 2. Optional Interior Face Only Class A 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - a. Flexural Strength, ASTM-D790: 13 x 10³ psi.
 - b. Flexural Modulus, ASTM-D790: 0.57 x 10⁶ psi.
 - c. Tensile Strength, ASTM-D638: 6.8 x 10³ psi.
 - d. Tensile Modulus, ASTM-D638: 0.90 x 10⁶ psi.
 - e. Barcol Hardness, ASTM-D2583: 40.
 - f. Izod Impact, ASTM-D256: 12.0 ft-lb/in notched.
 - g. Gardner Impact Strength, ASTM-D3029: 45 in-lb.
 - h. Water Absorption, ASTM-D570: 0.32%/24hrs at 77°F.
 - i. Surface Burning, ASTM-E84: Flame Spread \leq 25, Smoke Developed \leq 450.
 - j. Taber Abrasion Resistance, Taber Test: 0.02% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
- B. Door Core.
 - 1. Density, ASTM-D1622: ≤ 5.0 pcf.
 - 2. Compressive Properties, ASTM-D1621: Compressive Strength ≥ 60 psi, Compressive Modulus ≥ 1948 psi.
 - 3. Tensile and Tensile Adhesion Properties, ASTM-D1623: Tensile Adhesion, 3" x 3" FRP Facers ≥ 53 psi, Tensile Adhesion, 1" x 1" Foam ≥ 104 psi.
 - 4. Thermal and Humid Aging, ASTM-D2126: Volume Change at 158 °F, 100% humidity, 14 days < 13%.
 - 5. Thermal Conductivity, ASTM-C518, Thermal Resistance $\geq 0.10 \text{ m}^2\text{K/W}$.
- C. Door Panel.
 - 1. Thermal Transmittance, AAMA 1503-98: U-Factor = 0.29 Btu/hr·ft²-°F, CRFp = 55.
 - 2. Indoor Air Quality, ASTM-D5116, ASTM-D6607: GreenGuard, GreenGuard Gold.
- D. Door and Thermally Broken Aluminum Frame Assembly.
 - 1. Thermal Transmittance, NFRC 100.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. U-Factor = $0.31 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{°F}$.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. U-Factor = $0.64 \text{ Btu/hr} \cdot \text{ft}^2 \cdot {}^{\circ}\text{F}$.
 - 2. Air Leakage, NFRC 400, ASTM-E283.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. 0.01 cfm/sqft @ 1.57 psf.
 - 2. 0.01 cfm/sqft @ 6.24 psf.

- b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. 0.38 cfm/sqft @ 1.57 psf.
 - 2. 0.73 cfm/sqft @ 6.24 psf.
- 3. Sound Transmission, ASTM-E90: STC = 30, OITC = 29.
- E. Door and AF-150 Frame Assembly.
 - 1. Thermal Transmittance, NFRC 100.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. U-Factor = $0.32 \text{ Btu/hr} \cdot \text{ft}^2 \cdot ^{\circ}\text{F}$.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. U-Factor = $0.57 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{°F}$.
 - 2. Air Leakage, NFRC 400, ASTM-E283.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. 0.12 cfm/sqft @ 1.57 psf.
 - 2. 0.06 cfm/sqft @ 6.24 psf.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. 0.04 cfm/sqft @ 1.57 psf.
 - 2. 0.14 cfm/sqft @ 6.24 psf.
- F. Door and Hollow Metal Steel Frame.
 - 1. Cycle Slam, NWWDA T.M. 7-90.
 - a. 5,000,000 cycles.
 - 1. No Operational Damage.
 - 2. No Hinge Separation.

2.05 MATERIALS

- A. Aluminum Members.
 - 1. Aluminum extrusions made 6061 or 6063 aluminum alloys.
 - 2. Sheet and plate to conform to ASTM-B209.
 - 3. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
- B. Fiberglass.
 - 1. See 2.02.C.5.
- C. Fasteners.
 - 1. All exposed fasteners will have a finish to match material being fastened.
 - 2. 410 stainless steel or other non-corrosive metal.
 - 3. Must be compatible with items being fastened.

2.06 FABRICATION

- A. Factory Assembly.
 - 1. Door and frame components from the same manufacturer.
 - 2. Required size for door and frame units, shall be as indicated on the drawings.
 - 3. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 - 4. All cut edges to be free of burs.
 - 5. Welding of doors or frames is not acceptable.
 - 6. Maintain continuity of line and accurate relation of planes and angles.
 - 7. Secure attachments and support at mechanical joints with hairline fit at contact surfaces.
- B. Shop Fabrication
 - 1. All shop fabrication to be completed in accordance with manufactures process work instructions.
 - 2. Quality control to be performed before leaving each department.

2.07 FINISHES

- A. Door & Frame
 - 1. Aluminum.
 - a. Anodizing.
 - 1. Class 1 Anodizing, minimum 0.7 mils thick.
 - a. Color.
 - 1. Clear 215 R1, AA-M10C12C22A41.
 - b. Paint.
 - 1. Aluminum.
 - a. Fluropan[®].
 - 1. Topcoat.
 - a. 70% polyvinylidene difluoride (PVDF) resin, meets or exceeds all AAMA 2605 specifications
 - 2. Color.
 - a. Consult manufacturer.
 - 2. FRP Face Sheets
 - a. Through color.
 - 1. Color. As selected by Owner and Architect

2.08 ACCESSORIES

- A. Hardware.
 - 1. Pre-machine doors in accordance with templates from specified hardware manufactures and hardware schedule.
 - 2. Factory install hardware required to obtain ten-year warranty on hardware attachment.
 - 3. Hardware Schedule.
 - a. Choose an item.
 - 1. Hinges.
 - a. Hinges: SL-11HD continuous hinges by Special-Lite. Hinge covers to be factory painted to match doors
 - 2. Concealed adjustable bottom brush.
 - a. SL-301.
 - 1. Not for use with CVR type hardware.
 - 3. Concealed adjustable meeting stile astragal.
 - a. Adjustable astragal by Special-Lite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive doors.
- B. Notify architect of conditions that would adversely affect installation or subsequent use.
- C. Do no proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.03 ERECTION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.

- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by architect.
- E. Set thresholds in bed of mastic and back seal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by architect.

3.04 FIELD QUALITY CONTROL

- A. Manufacture's Field Services.
 - Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.05 ADJUSTING

A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.06 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish.

3.07 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 081743

SECTION 085113 – ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 WORK INCLUDED

- A. Furnish and install aluminum architectural windows complete with hardware and related components as shown on drawings and specified in this section.
- B. Glass and Glazing
 - 1. All units shall be factory glazed.

1.03 RELATED WORK

A. Section 07 92 00 – Joint Sealants

1.04 PERFORMANCE REQUIREMENTS

A. Test Units

- 1. Air, water, and structural test unit shall conform to requirements set forth in AAMA/WDMA/CSA 101/I.S.2/A440-08 and manufacturer's standard locking/operating hardware and insulated glazing configuration.
- 2. Thermal test unit sizes shall be 24" (610 mm) x 60" (1524 mm). Unit shall consist of a projected vent.

B. Test Procedures and Performances

- 1. Windows shall conform to all AAMA/WDMA/CSA 101/I.S.2/A440-08 requirements for the window type referenced in 1.01.B. In addition, the following specific performance requirements shall be met.
- 2. Life Cycle Testing
 - a. Test in accordance with AAMA 910. There shall be no damage to fasteners, hardware parts, support arms, activating mechanisms, or any other damage that would cause the window to be inoperable. Air infiltration and water resistance tests shall not exceed specified requirements.
- 3. Air Infiltration Test
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).

- b. Air infiltration shall not exceed .10 cfm/SF (.50 l/s•m²) of unit.
- 4. Water Resistance Test
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 331/ASTM E 547 at a static air pressure difference of 15.0 psf (730 Pa).
 - b. There shall be no uncontrolled water leakage.
- 5. Uniform Load Deflection Test (AW80)
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 180.45 psf (8640 Pa), both positive and negative.
 - b. No member shall deflect over L/175 of its span.
- 6. Forced Entry Resistance
 - a. Windows shall be tested in accordance to ASTM F 588 and meet the requirements of performance grade 40.
- 7. Condensation Resistance Test (CRF)
 - a. Test unit in accordance with AAMA 1503.1.
 - b. Condensation Resistance Factor (CRF) shall not be less than 77 (frame) when glazed with 0.24 center of glass U-Factor.
- 8. Condensation Resistance (CR)
 - a. With ventilators closed and locked, test unit in accordance with NFRC 500-2010.
 - b. Condensation Resistance (CR) shall not be less than 60 when glazed with 0.24 center of glass U-Factor.
- 9. Thermal Transmittance Test (Conductive U-Factor)
 - a. With ventilators closed and locked, test unit in accordance with NFRC 100-2010.
 - b. Conductive thermal transmittance (U-Factor) shall not be more than 0.38 BTU/hr•ft²•°F when glazed with 0.24 center of glass U-Factor.

C. Project Wind Loads

1. The system shall be designed to withstand 110 mph wind loads.

1.05 QUALITY ASSURANCE

- A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.04.
- B. Test reports shall be accompanied by the window manufacturer's letter of certification, stating the tested window meets or exceeds the referenced criteria for the appropriate window type.

1.06 SUBMITTALS

- A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.
 - 1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.
- B. Manufacturer must provide NFRC certified and labeled energy performance values for U-factor, Solar Heat Gain Coefficient (SHGC), and Visible Transmittance (VT) for the aluminum windows using NFRC's Component Modeling Approach Software Tool (CMAST). The label certificate shall be project specific and will contain the energy performance values of the manufacturer's approved framing as used on the project, combined with the job specific glass and glass spacer to be

used in the fabrication of the glass. Certified framing sizes and configurations are defined in NFRC 100-2014 table 4-3.

1.07 WARRANTIES

A. Total Window Installation

- 1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings.
- 2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

B. Window Material and Workmanship

1. Provide written guarantee against defects in material and workmanship for ten (10) years from the date of substantial completion.

C. Glass

- 1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
- 2. Warranty period shall be for 10 (ten) years from the date of substantial completion.

D. Finish

- 1. Warranty period shall be for 10 years from the date of substantial completion.
- 2. Provide organic finish warranty based on AAMA standard 2604.

1.08 MAINTENANCE MATERIALS

A. Furnish extra glazing. Provide 5 (five) panes of glazing of each of the 3 (three) most common sized window units to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: The design for the project windows is based on EFCO Corporation Series 325X Thermal Window.
- B. Subject to compliance with the requirements, provide the named product or a comparable product by one of the following:
 - 1. Kawneer North America, an Alcoa Company.
 - 2. Winco Window
- C. Other manufacturers requesting approval to bid their product as an equal must submit the following information ten (10) calendar days prior to close of bidding.
 - 1. A sample window, 36" (914 mm) x 24" (610 mm) single unit, as per requirements of architect.
 - 2. Test reports documenting compliance with requirements of Section 1.05.

3. A CMAST (Component Modeling Approach Software Tool) Bid Report must be provided to ensure compliance with the specified thermal performance.

2.02 MATERIALS

A. Aluminum

1. Extruded aluminum shall be 6063-T6 alloy and tempered.

B. Hardware

- 1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.
- 2. Operating hardware shall be 4-bar stainless steel arms or equal.

C. Weather-Strip

1. All weather-strip shall be Santoprene® or equal.

D. Glass

- 1. Insulated glass shall be 1" thick with a center of glass U-Factor of 0.24 constructed as follows:
 - a. Exterior lite 1/4" thick.
 - b. Air space ½" inch, argon filled.
 - c. Interior lite $-\frac{1}{4}$ " thick.
- 2. Basis of Design: Solarban 60 clear low-E glass as manufactured by PPG Industries with argon filled air space or equal.

E. Thermal Barrier

- 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
- 2. The thermal barrier shall be thermal struts, consisting of glass reinforced polyamide nylon, mechanically crimped in raceways extruded in the exterior and interior extrusions.
- 3. Poured and de-bridged urethane thermal barriers shall not be permitted.

2.03 FABRICATION

A. General

- 1. All aluminum frame and vent extrusions shall have a minimum wall thickness of .125" (3 mm).
- 2. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and vent corners.
- 3. Depth of frame and vent shall not be less than 3 1/4" (82 mm).
- 4. All frame and vent members shall be able to accommodate separate interior and exterior finishes and colors.

B. Frame

1. Frame components shall be mechanically fastened.

ALUMINUM WINDOWS

C. Ventilator

- 1. All vent extrusions shall be tubular.
- 2. Each corner shall be mitered, reinforced with an extruded corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.
- 3. Each vent shall utilize two rows of weather stripping installed in specifically designed dovetail grooves in the extrusion. The exterior gasket will be omitted at the vent top rail for project-in vents, allowing air to pressure equalize the void between the vents and frame.

D. Screens

- 1. Screen frames shall be extruded.
- 2. Screen mounting holes in the window frame shall be factory drilled.
- 3. Screen mesh shall be aluminum or fiberglass.

E. Glazing

- 1. All units shall be glazed with the manufacturer's standard sealant process provided the glass is held in place by a removable, extruded aluminum, glazing bead. The glazing bead must be isolated from the glazing material by a gasket.
- 2. All units shall be glazed with a minimum of 9/16" glass bit.

F. Finish

- 1. Organic
 - a. Finish all exposed areas of aluminum windows and components with 70% PVDF fluoroplymer Ultrapon. Color to be selected from manufacturer's full range of standard colors.

AA Description	Description	AAMA Guide Spec.
AA-M12-C42-R1X	70% PVDF Ultrapon	2605-98

PART 3 - EXECUTION

3.01 INSPECTION

A. Job Conditions

1. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface, and are in accordance with approved shop drawings.

3.02 INSTALLATION

- A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
- B. Plumb and align window faces in a single plane for each wall plane, and erect windows and materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.
- C. Adjust windows for proper operation after installation.
- D. Furnish and apply sealants to provide a weather tight installation at all joints and intersections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

3.03 ANCHORAGE

A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 PROTECTION AND CLEANING

A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the general contractor.

END OF SECTION 085113

AND HVAC UPGRADES

C. Hardware sets:

NOTE: ALL ELECTRONIC HINGES AND HARDWARE ON RIGHT HAND DOORS

SET #01 – EXTERIOR PAIR– N	MAIN ENTRY – Door 102A	
2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG.	
1 Removable Mullion	KR822 6	89 PR
1 Exit Device	C ELR TS 2103 x C03 LD 6	30 PR
1 Exit Device	C ELR TS 2101 LD 6	30 PR
1 Anti-Vandal Pull	1097PHI-21 S-N 6	30 TR
1 Anti-Vandal Pull	1097PHI-21 S-C 6	30 TR
2 Rim Cylinder	AS REQUIRED 6	526 BE
2 Door Closer	QDC115 R 6	89 SH
2 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES 6	589 DM
2 Door Holder	EM508 24120 6	589 DM
1 Video Intercom/Care	d Reader PROVIDED/SPECIFIED BY SECURITY VENI	OOR
2 Wire Harness	WH-192	ST
2 Power Transfer	EPT-12C	PR
2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEND	OR
1 Door Seals	INTEGRAL SEALS BY FRAME MFR.	
1 Door Sweep	C627 A (DOOR WIDTH)	NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WIDT	ΓH AL NA
	(PAIR) SEE DETAILS	

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #02 - INTERIOR - LOBBY/ENTRY - Door 102B

2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG.		
1 Removable Mullion	KR822	689	PR
1 Anti-Vandal Pull	1097PHI-21 S-C	630	TR
1 Exit Device	C ELR TS 2103 x C03 LD	630	PR
1 Exit Device	C ELR TS 2101 LD	630	PR
2 Rim Cylinder	AS REQUIRED	626	BE
2 Door Closer	QDC115 R	689	SH
2 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
2 Door Holder	EM508 24120	689	DM
2 Door Holder	EM508 24120	689	DM
2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1 Door Seals	INTEGRAL SEALS BY FRAME MFR.		
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
	(PAIR) SEE DETAILS		

DOOR HARDWARE 087100 - 17

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28. OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #03 -	- EXTERIOR	PAIR -	- SIDE ENTRY -	 Doors 	107.	108 & 115
DLI II UJ	LILITION	1 1 111		DOOLD	10/9	100 00 113

2	Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1	Removable Mullion	KR822	689	PR
1	Exit Device	C ELR TS 2103 x C03 LD	630	PR
1	Exit Device	C ELR TS 2101 LD	630	PR
1	Anti-Vandal Pull	1097PHI-21 S-N	630	TR
1	Anti-Vandal Pull	1097PHI-21 S-C	630	TR
2	Rim Cylinder	AS REQUIRED	626	BE
2	Door Closer	QDC115 R	689	SH
2	Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
2	Door Holder	EM508 24120	689	DM
1	Video Intercom/Card Reade	er PROVIDED/SPECIFIED BY SECURITY VEN	NDOR	
2	Wire Harness	WH-192		ST
2	Power Transfer	EPT-12C		PR
2	Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1	Door Seals	INTEGRAL SEALS BY FRAME MFR.		
2	Door Sweep	C627 A (DOOR WIDTH)		NA
1	Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
		(PAIR) SEE DETAILS		

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #04 – EXTERIOR PAIR – SIDE ENTRY – Doors 101, 105, 109 & 114

2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1 Removable Mullion	KR822	689	PR
1 Exit Device	C ELR TS 2103 x C03 LD	630	PR
1 Exit Device	C ELR TS 2101 LD	630	PR
1 Anti-Vandal Pull	1097PHI-21 S-N	630	TR
1 Anti-Vandal Pull	1097PHI-21 S-C	630	TR
2 Rim Cylinder	AS REQUIRED	626	BE
2 Door Closer	QDC115 R	689	SH
2 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
1 Video Intercom/Card Reade	er PROVIDED/SPECIFIED BY SECURITY VEN	NDOR	
2 Wire Harness	WH-192		ST
2 Power Transfer	EPT-12C		PR

DOOR HARDWARE 087100 - 18

EAST HARTFORD PUBLIC SCHOOLS JOSEPH O. GOODWIN ELEMENTARY SCHOOL EXTERIOR DOOR & WINDOW REPLACEMENTS AND HVAC UPGRADES

2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VENDOR	
1 Door Seals	INTEGRAL SEALS BY FRAME MFR.	
2 Door Sweep	C627 A (DOOR WIDTH)	NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WIDTH AL	NA
	(PAIR) SEE DETAILS	

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #04 - EXTERIOR SINGLE A	T CL ASSROOM – FXIT ON	[V - Doors 103 104 110 & 1	13
SLI #U4 - LAILMON SINGLL A	I CLASSICOOM - LAIT ON	L I = D0018 103, 104, 110 & 1	. 1.3

1 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1 Exit Device	2101 LD	630	PR
1 Door Closer	QDC115 R	689	SH
1 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
1 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1 Door Seals	INTEGRAL SEALS BY FRAME MFR.		
1 Drip Cap	16 A - 4" ODW		NA
1 Door Sweep	C627 A (DOOR WIDTH)		NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	DTH AL	NA
	(SGL.) SEE DETAILS		

SET #05 - EXTERIOR PAIR - GYM - Door 111 & 112

2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1 Exit Device	2201 LD	630	PR
1 Exit Device	2203 X 4903A LD	630	PR
1 Rim Cylinder	AS REQUIRED	626	BE
2 Door Closer	QDC113 R	689	SH
2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
2 Door Sweep	C627 A (DOOR WIDTH)		NA
1 Drip Cap	16 A - 4" ODW		NA
1 Perimeter Seal	706 E (HEAD & JAMBS - PAIR)		NA
1 Astragal Set	115 NA SET (DOOR HEIGHT)		NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	DTH AL	NA
	(PAIR) SEE DETAILS		

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #06 - EXTERIOR SINGLE - Door 117, 119, & 122

1 Continuous Hinge CONTINUOUS HINGE BY DOOR MFG

1 Exit Device 2201 LD 630 PR

DOOR HARDWARE 087100 - 19

SECTION 089000 - LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fixed, extruded-aluminum louvers.
- B. Related Sections: Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Division 1 Section "Construction and Demolition Waste Management."
 - 2. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.3 HIGH PERFORMANCE BUILDINGS GENERAL REQUIREMENTS

- A. Implement practices and procedures to meet the project's environmental goals, which include complying with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, June, 2015, with additional mandatory building project requirements for schools. Specific project goals which may impact this and the other sections of this specification include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section and other Sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes substantially compromise the stated High Performance Building criteria.
- B. Comply with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, June, 2015, with additional mandatory building project requirements for schools and the Department of Administrative Services / Office of School Construction Grants High Performance School Construction Bulletin, 2015.

1.4 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
- B. Seismic Performance: Provide louvers capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - 1. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of metal finish required.

- E. High Performance Building Submittal Requirements: The contractor or subcontractor shall submit the following High Performance Building certification items:
 - 1. A Connecticut High Performance Building Compliance letter shall be provided verifying agreement with relevant High Performance requirements. Information to be supplied includes, but is not limited to:
 - a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
 - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
 - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
 - 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
 - 3. Product Cut Sheets for all materials of this Section that meet High Performance Building Requirements.
 - 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2, "Structural Welding Code--Aluminum."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.
- D. UL and NEMA Compliance: Provide motors and related components for motor-operated adjustable louvers that are listed and labeled by UL and comply with applicable NEMA standards.
- E. High Performance Buildings Requirements:
 - 1. Adhesives, sealants, paints or coatings used for work in this section for interior applications shall meet the requirements of Division 1, Section 018113: "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings", where applicable.
 - 2. Materials manufactured within a radius of 500 miles from the project site where all or a portion of the raw resources also originate within a radius of 500 miles shall be documented in accordance with the High Performance Building Requirements of this Section.

3. Materials that contain recycled content shall be documented in accordance with the High Performance Building Requirements of this Section.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

1.9 WARRANTY

- A. Manufacturer shall provide standard limited warranty for louver systems for a period of five years (60 months) from date of installation, no more than 60 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without direct financial cost to the Owner.
- B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on extruded aluminum substrates.
 - 1. Finish coating shall not peel, blister, chip, crack or check.
 - 2. Chalking, fading or erosion of finish when measured by the following tests:
 - a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
 - b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.
 - c. Finish coating shall not erode at a rate in excess of 10%/ 5 year as determined by Florida test sample.
- C. Manufacturer shall provide a 5 year limited warranty for Class I and a 3 year limited warranty for Class II anodized finish on extruded aluminum substrates.
 - 1. Seller warrants the Finish under normal atmospheric conditions.
 - a. Will not crack, craze, flake or blister
 - b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM method D-2244
 - c. Will not chalk in excess of ASTM D-4214-07 number (8) rating, determined by the procedure outlined in ASTMD-4214-07 specification test.
 - 2. Any forming or welding must be done prior to finishing. Post forming or welding will void the warranty.
 - 3. This Warranty applies only if the anodized aluminum product is installed in strict accordance with Seller's recommended practices and maintained in accordance with AAMA (American Architectural Manufacturers Association) publication number 609 and 610-09 ("Cleaning and Maintenance Guide for Architecturally Finished Aluminum").

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Louvers:
 - a. Construction Specialties, Inc.
 - b. Greenheck.
 - c. Industrial Louvers, Inc.
 - d. Ruskin Company; Tomkins PLC.
- B. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Basis-of-Design Product: The design for each louver is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 - 1. Use types and sizes to suit unit installation conditions.
 - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.

2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.

- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
 - 1. Frame Type: Channel, unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
 - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
 - 2. Exterior Corners: Prefabricated corner units with mitered blades with concealed close-fitting splices and with fully-recessed mullions at corners.
- F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

- 1. Basis-of-Design: EHH-201 Drainable Aluminum Louver as manufactured by Greenheck
- 2. Louver Depth: 2 inches (100 mm)
- 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.060 inch (1.5 mm) for blades and 0.080 inch (2.0 mm) for frames.
- 4. Performance Requirements:
 - a. Free Area: Not less than 50%.
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area velocity.
 - c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core area intake velocity of 300 fpm (1.5 m/s).
- 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louvers after assembly.

2.7 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603, except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.
 - 2. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
- B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 122400 - SPRING ROLLER SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

1.2 RELATED SECTIONS

- A. Section 06 10 00 Rough Carpentry: Blocking for support of window shade hardware.
- B. Section 07 90 00 Joint Sealers: Sealants for perimeter of shade system.

1.3 REFERENCES

- A. NFPA 701-99 Fire Tests for Flame-Resistant Textiles and Films.
- B. GREENGUARD Environmental Institute Gold.
- C. US Green Building Council.
- D. ANSI/WCMA A100.1-2018

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330 [01 33 26] Submittal Procedures:
- B. Product Data: Manufacturer's data sheets on each product specified, including:
 - 1. Preparation instructions and recommendations.
 - 2. Installation and maintenance instructions.
 - 3. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 4. Storage and handling requirements and recommendations.
 - 5. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, two complete sets of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

- F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use.
- C. Mock-Up: Provide a mock-up of one of each type roller shade assembly specified for evaluation of mounting, appearance and accessories.
 - 1. Locate mock-up in window(s) designated by Architect.
 - 2. Do not proceed with remaining work until mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.
- B. Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.
- C. Label containers and shades according to Window Shade Schedule.
- D. Store products in manufacturer's unopened packaging until ready for installation.

1.7 SEQUENCING

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

A. Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

1.9 WARRANTY

A. Hardware and Shade Fabric: Draper's standard twenty-five year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Draper®z, Inc., which is located at: 411 S. Pearl P. O. Box 425; Spiceland, IN 47385-0425. ASD. Toll Free Tel: 800-238-7999; Tel: 765-987-7999; Fax: 866-637-5611; Web: www.draperinc.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUALLY OPERATED WINDOW SHADES

- A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation; Spring Roller-operated Shade as manufactured by Draper, Inc.
 - 1. Operation: Spring roller operating mechanism with metal roller containing heavy duty spring with positive locking mechanism permitting shade to be stopped at each half turn of roller. Provide cord clasp and braided cotton cord attached to bottom shade slat. Spring sized by manufacturer to accommodate shade size. Provide roller idler assembly of molded nylon and zinc-plated steel pin.
 - 2. Mounting:
 - a. Mounting brackets.
 - 3. Brackets: Plated stamped steel. Provide size compatible with roller size.
 - a. Mounted to ceiling.
 - b. Mounted to wall.
 - c. Mounted to jamb.
 - d. Finish: Clear anodized.
 - 4. Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Minimum roller diameter 1.5 inches. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.
 - 5. Shade slat:
 - a. Closed pocket elliptical slat: 1 inch (25 mm) aluminum elliptical slat inside of a 1-5/8 inch (41 mm) pocket with heat sealed ends.

2.3 FABRIC

- A. Room Darkening Fabrics
 - 1. Butler Printing & Laminating Inc. Blackout Fabrics Collection: 4-Ply Laminated Fiberglass base textile with 100% Blackout Opacity with minimum tensile strength of 240 pounds for warp and 960 pounds for fill. Fire rating: NFPA 701 1006-Test 1, California U.S. Title 19. Environmental Benefits: Certified to GREENGUARD® and GREENGUARD Gold® standards for low chemical emissions into indoor air during product usage. REACH and RoHS compliant Lead Free. Bacterial and fungal

resistance: ASTM E2180, ASTM G21. Washable and stain resistant. Same color both sides. Opaque, .015 inches thick, 12 oz/square yard. 5 year warranty

B. Color and pattern: As selected by Architect and Owner from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.
- C. Install cord in accordance with all safety standards. Cord length shall be installed such that the bottom of cord will be at 5'-0" above floor when the shade is in the open position. Coordinate with Owner.

3.4 TESTING AND DEMONSTRATION

- A. Test window shades to verify that operating mechanism and other operating components are functional. Correct deficiencies.
- B. Demonstrate operation of shades to Owner's designated representatives.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 SCHEDULES

A. Refer to Drawings for shade types and locations.

END OF SECTION

EAST HARTFORD PUBLIC SCHOOLS JOSEPH O. GOODWIN ELEMENTARY SCHOOL

EXTERIOR DOOR & WINDOW REPLACEMENT AND HVAC UPGRADES

1235 FORBES STREET EAST HARTFORD, CONNECTICUT 06108



Thomas Anderson - Superintendent James Rovezzi - Assistant Director of Facilities

> ISSUED FOR BID: NOVEMBER 29, 2023

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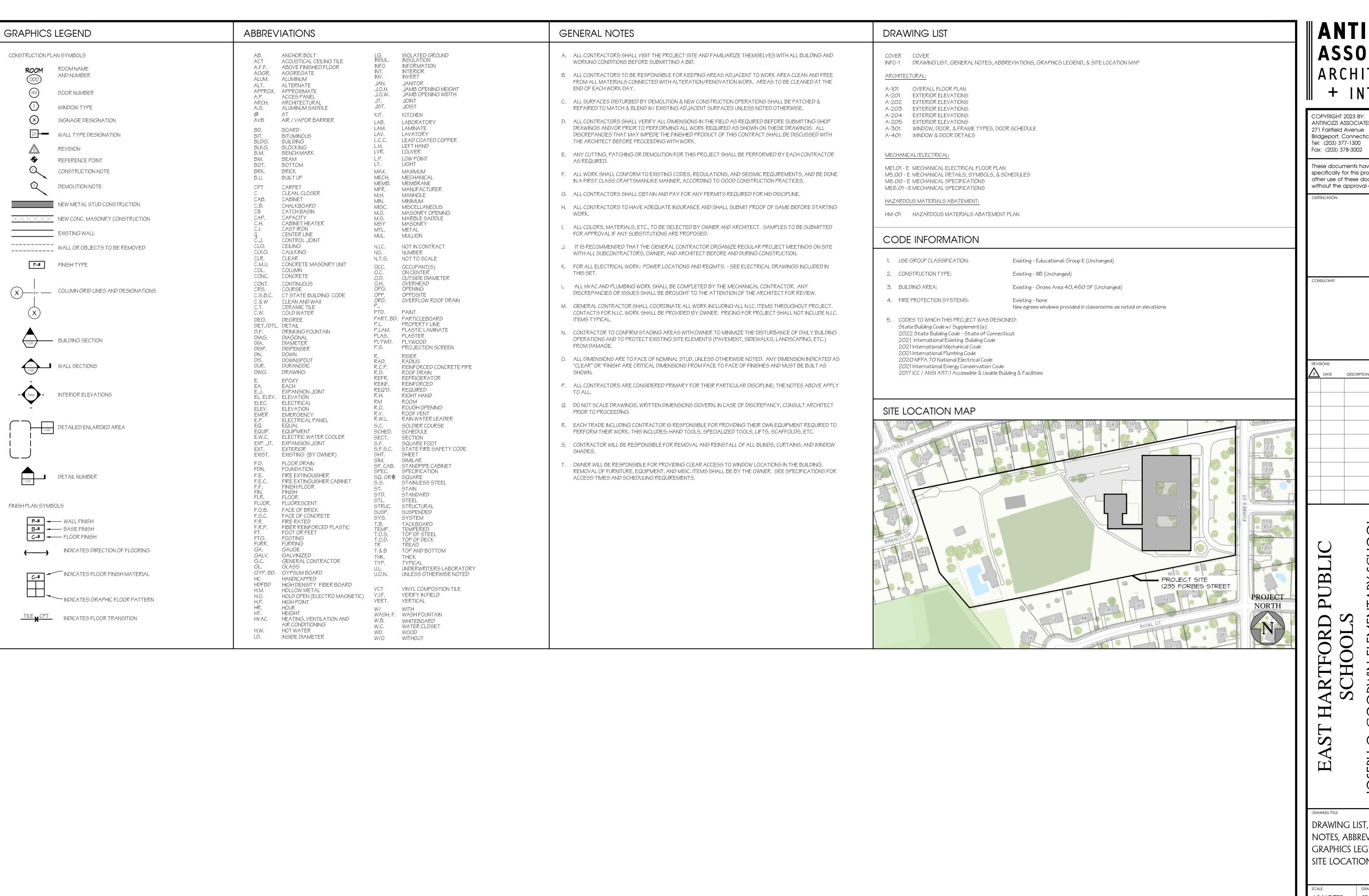
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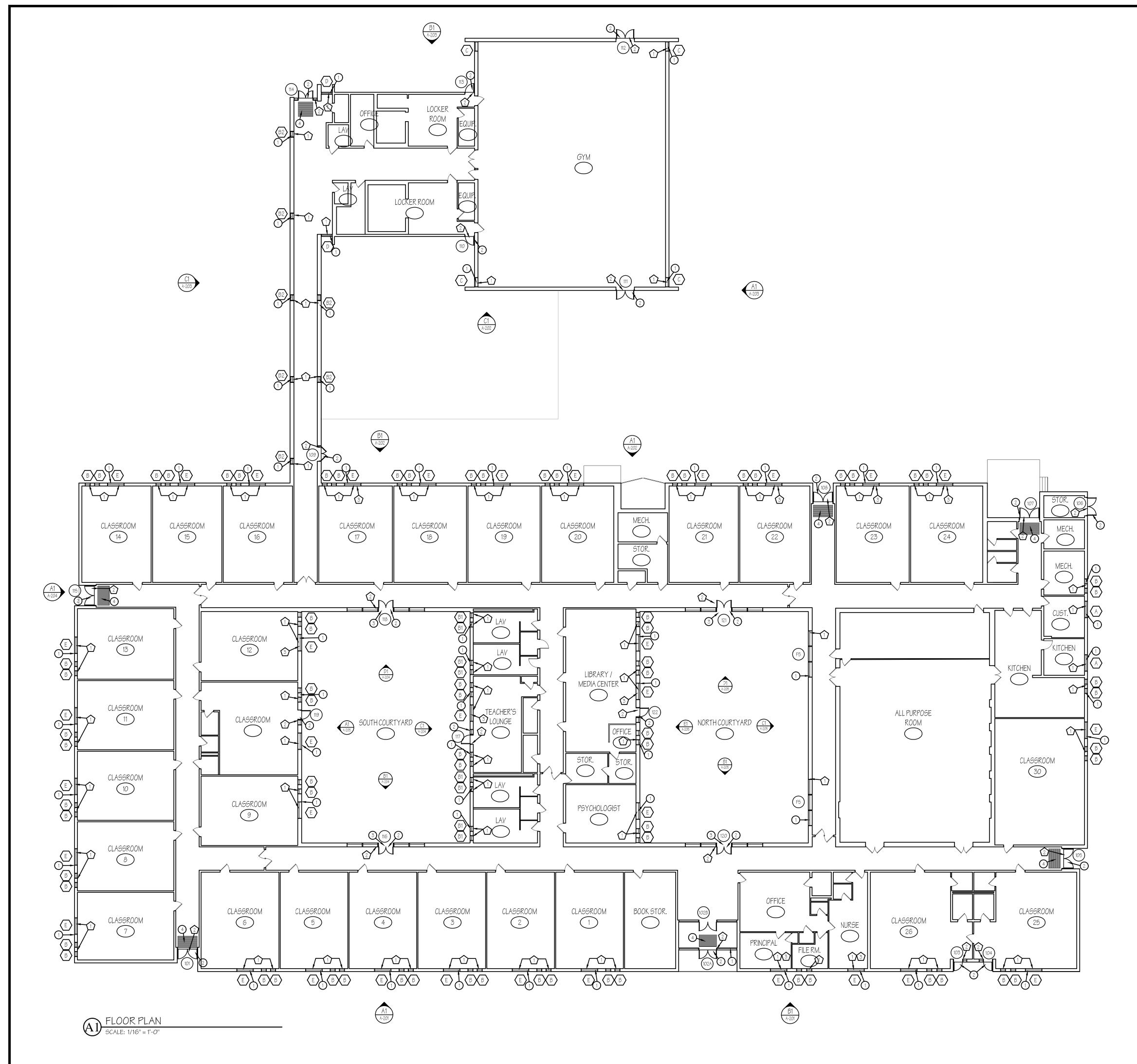
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drawing list, general NOTES, ABBREVIATIONS, GRAPHICS LEGEND, SITE LOCATION MAP

AS NOTED



GENERAL DEMOLITION NOTES

- A. THESE NOTES ARE FOR INTENT PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL QUANTITIES OF ALL ITEMS AS REQUIRED TO COMPLETE THIS PROJECT AS SHOWN ON THE CONSTRUCTION DOCUMENTS.
- B. ALL SURFACES DISTURBED BY DEMOLITION & NEW CONSTRUCTION OPERATIONS MUST BE PATCHED & REPAIRED TO MATCH & BLEND W/ EXISTING ADJACENT SURFACES UNLESS OTHERWISE NOTED
- C. ALL CUTTING, PATCHING & DEMOLITION REQUIRED BY ALL TRADES FOR THIS PROJECT IN EXISTING AREAS SHALL BE PERFORMED BY THE CONTRACTOR.
- D. DISCONNECT OR DISABLE ALL AFFECTED UTILITIES PRIOR TO COMMENCING WORK. ALL ABANDONED UTILITY LINES (PLUMBING, ELECTRICAL, DATA, ALARM) MUST CUT & CAPPED BELOW FLOOR LINE OR BEHIND WALL LINE. FLOOR OR WALL MUST BE FINISHED TO MATCH EXISTING ADJACENT SURFACES.
- E. CONTRACTOR TO CONFIRM STAGING AREAS WITH OWNER TO MINIMIZE THE DISTURBANCE OF DAILY BUILDING OPERATIONS AND TO PROTECT EXISTING SITE ELEMENTS (PAVEMENT, SIDEWALKS, LANDSCAPING, ETC.) FROM DAMAGE.
- F. REMOVE ALL EXISTING BLINDS/SHADES/CURTAINS AND BRACKETS AT ALL WINDOWS BEING REPLACED. TYPICAL.
- G. REMOVE ALL WINDOW AIR CONDITIONER UNITS, BRACKETS, AND ACCESSORIES COMPLETE. COORDINATE REMOVAL WITH OWNER. TURN OVER EXISTING AIR CONDITIONING UNITS TO OWNER.
- H. REMOVE EXISTING UNIT VENTILATOR EXTERIOR GRILLE. UNIT VENTILATOR TO REMAIN. TYPICAL.
- I. REFER TO HAZARDOUS MATERIALS SHEETS FOR HAZARDOUS MATERIAL ABATEMENT AT DOOR AND WINDOW LOCATIONS.

DEMOLITION KEY NOTES

- REMOVE EXISTING ALUMINUM FRAME WINDOW ASSEMBLY, GLAZING, FASTENERS, BLOCKING, AND HARDWARE COMPLETE. REMOVE EXISTING SHADES/BLINDS AND ASSOCIATED HARDWARE COMPLETE. REMOVE EXISTING INTERIOR WINDOW SILL. CLEAN AND PREP EXISTING R.O. TO RECEIVE NEW WINDOW INSTALLATION IN THE SAME LOCATION.
- REMOVE EXISTING DOOR, FRAME, SIDE-LITES, AND ASSOCIATED HARDWARE COMPLETE. CLEAN AND PREP EXISTING R.O. TO RECEIVE NEW FRAME AND DOOR INSTALLATION IN THE SAME LOCATION. EXISTING WIRING AND CONNECTIONS TO ENTRY DEVICES TO REMAIN FOR USE IN CONNECTION TO NEW DOORS.
- (3) REMOVE EXISTING AC WINDOW UNIT COMPLETELY. COORDINATE WITH OWNER.

GENERAL CONSTRUCTION NOTES

- A. PATCH EXISTING FASTENER HOLES, VOIDS, AND CRACKS WITHIN THE EXISTING MASONRY OPENINGS FOLLOWING REMOVAL OF EXISTING WINDOWS. TYPICAL.
- B. PROTECT EXISTING METAL RADIANT HEAT UNIT ENCLOSURE BENEATH EXISTING WINDOWS. TYPICAL.SCRAPE CLEAN & PAINT
- C. ALL TOILET ROOMS SHALL HAVE OBSCURED GLAZING IN WINDOWS, TYPICAL.
- D. PROVIDE A LIMIT DEVICE FOR ALL OPERABLE WINDOWS. COORDINATE WITH OWNER.
- E. ALL WINDOWS SHAVE HAVE PERMANENT VISIBLE NUMBERS AND/OR ROOM NAMES AFFIXED TO GLAZING. COORDINATE LOCATION AND NAMES/NUMBERS WITH OWNER.
- F. ALL DOORS SHALL HAVE PERMANENT VISIBLE NUMBERS AFFIXED. CORDINATE NUMBERS WITH OWNER.
- G. PROVIDE NEW SHADES PER SPECIFICATIONS AT ALL NEW WINDOWS, EXCEPT AT LAVATORIES AND BOILER ROOM.
- H. PROVIDE NEW FLOORING TO MATCH EXISTING AT DOOR THRESHOLD LOCATIONS WHERE NEW THRESHOLD DOES NOT COVER EXPOSED SUB-FLOOR. COORDINATE

CONSTRUCTION KEY NOTES

- INSTALL WINDOW IN EXISTING OPENING. REFER TO BUILDING ELEVATIONS ON DRAWINGS A-201 A-205 FOR ADDITIONAL INFORMATION.
- 2 INSTALL DOOR IN EXISTING OPENING. REFER TO BUILDING ELEVATIONS ON DRAWINGS A-201 - A-205 FOR ADDITIONAL INFORMATION.
- 3 INSTALL NEW EXIT SIGNS. REFER TO MEP DRAWINGS.
- 4 EXISTING WALK OFF MAT TO REMAIN.



PROJECT

NORTH



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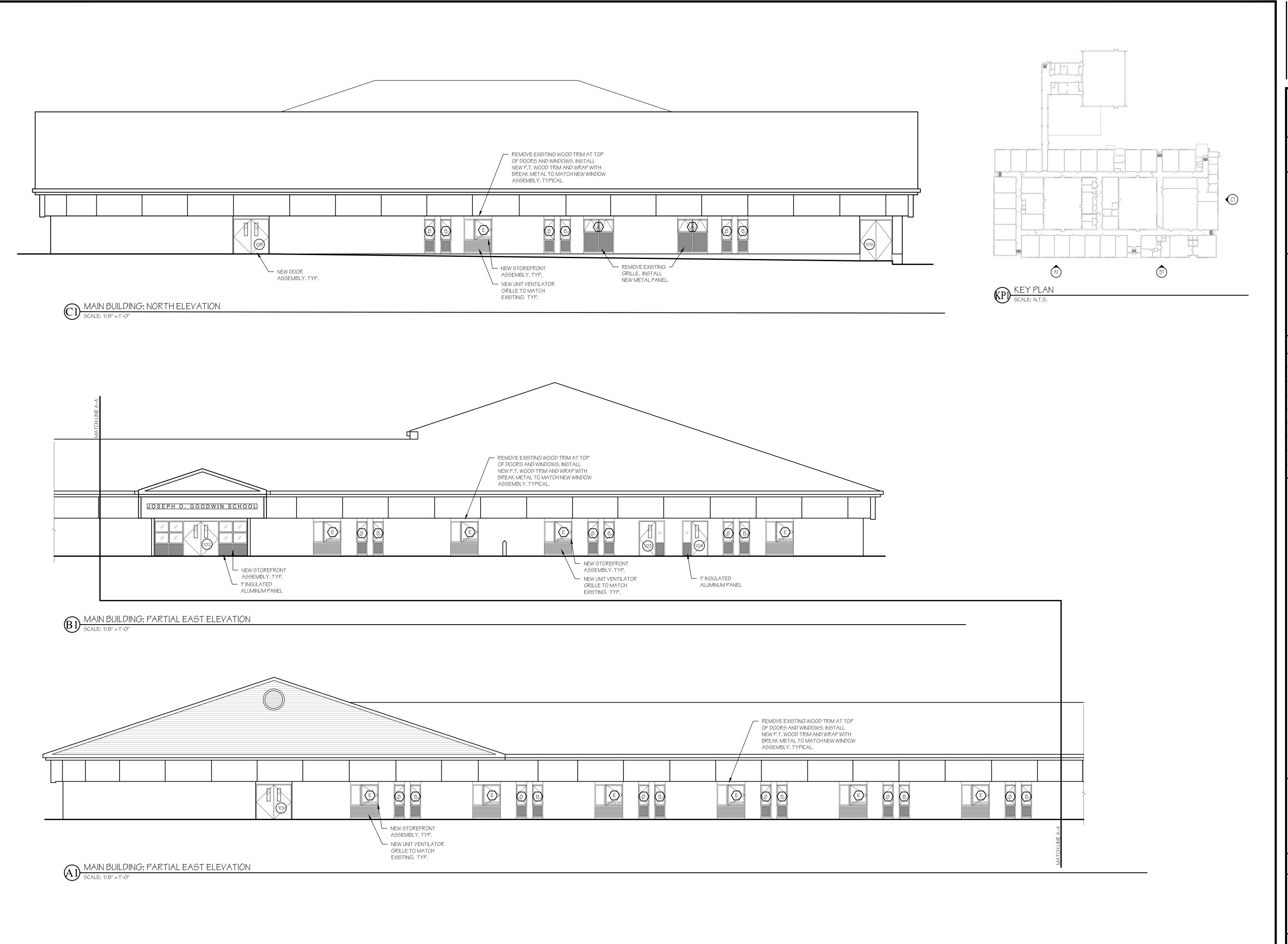
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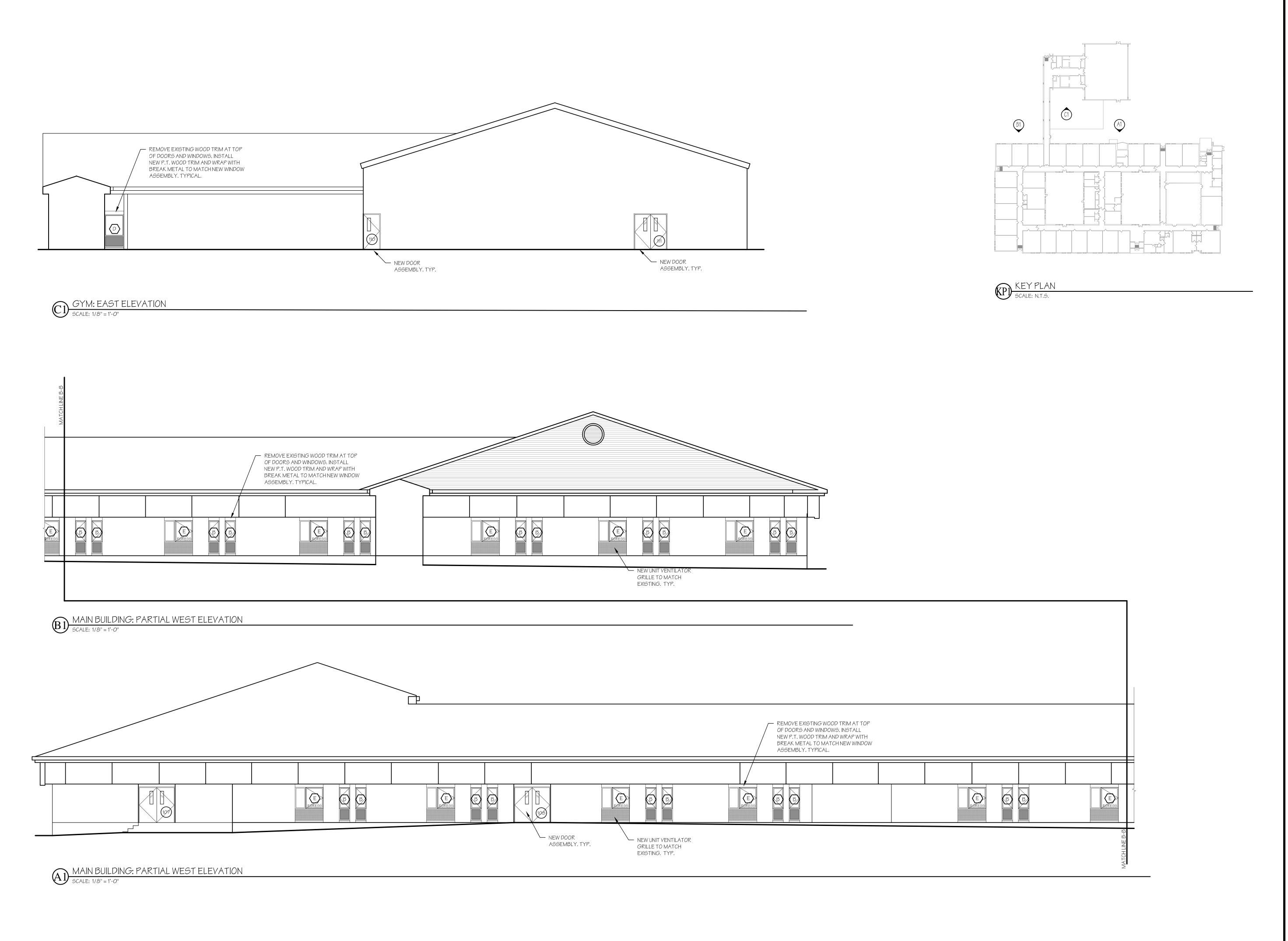
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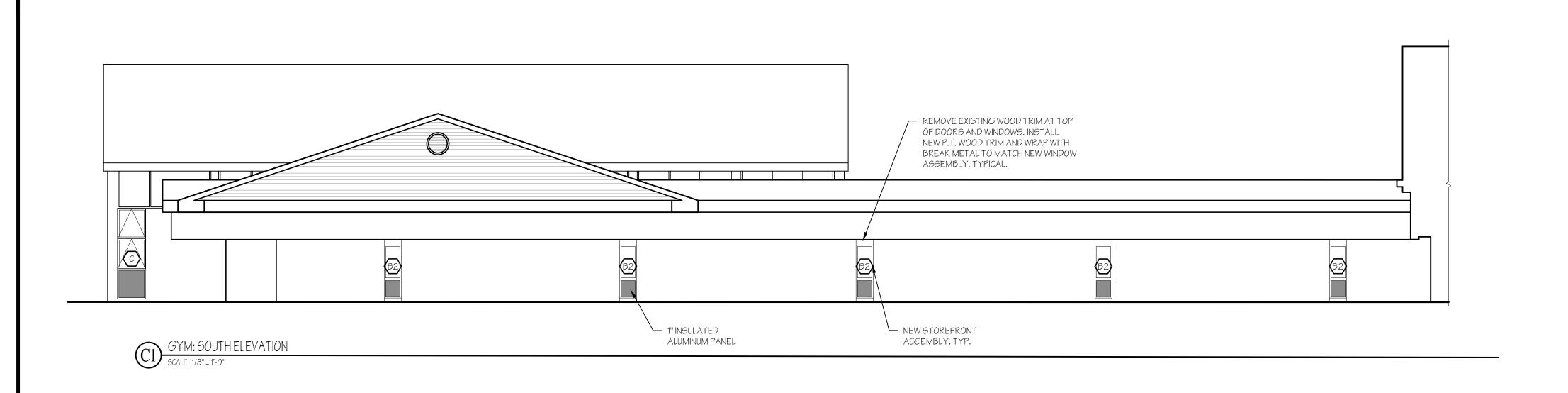
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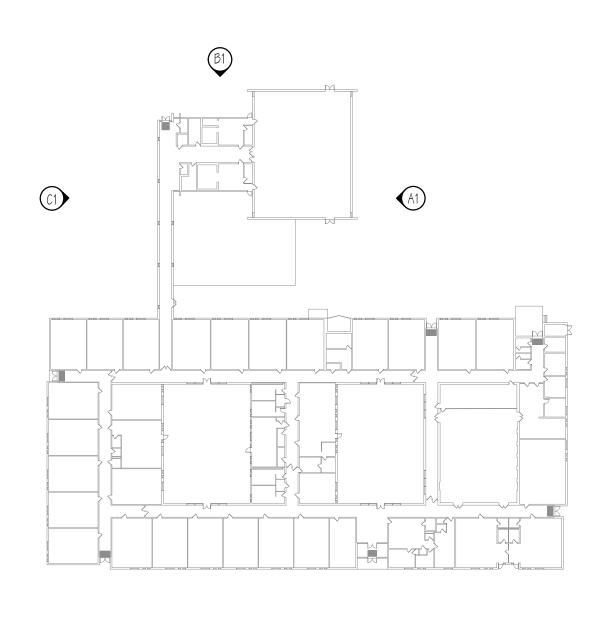
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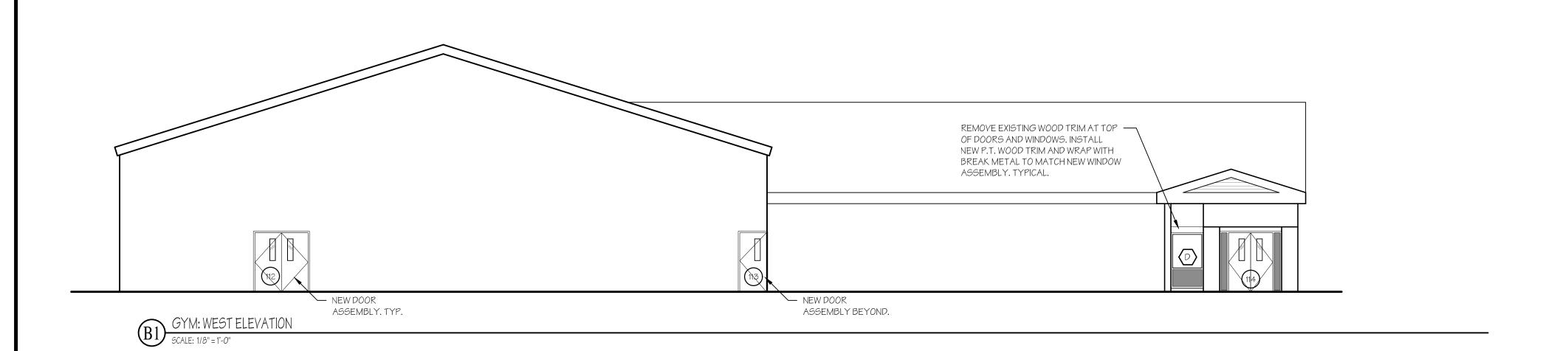
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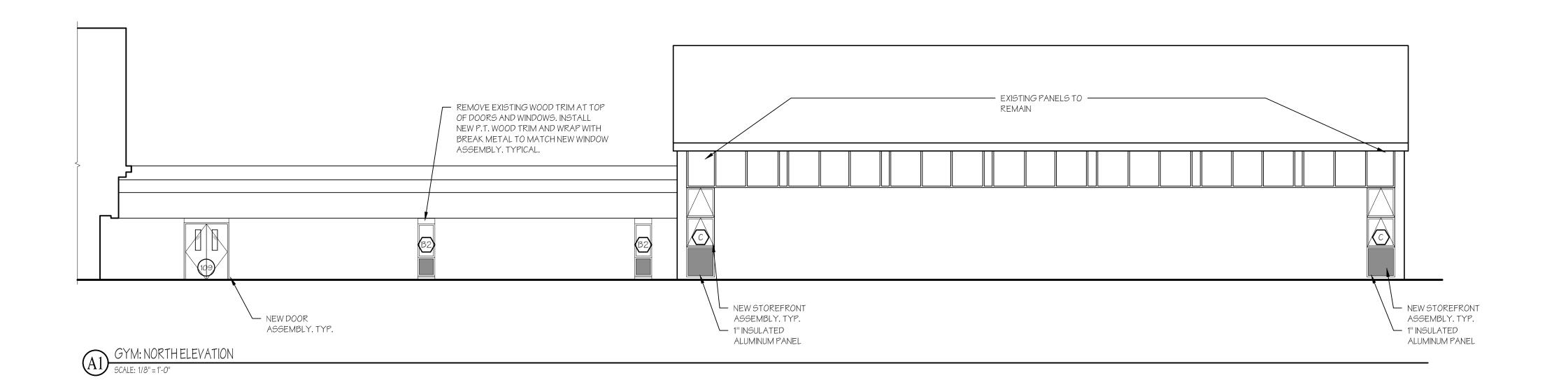
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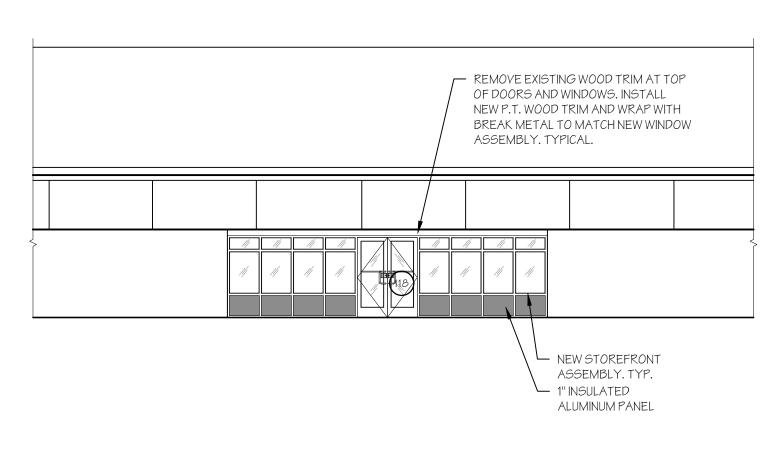


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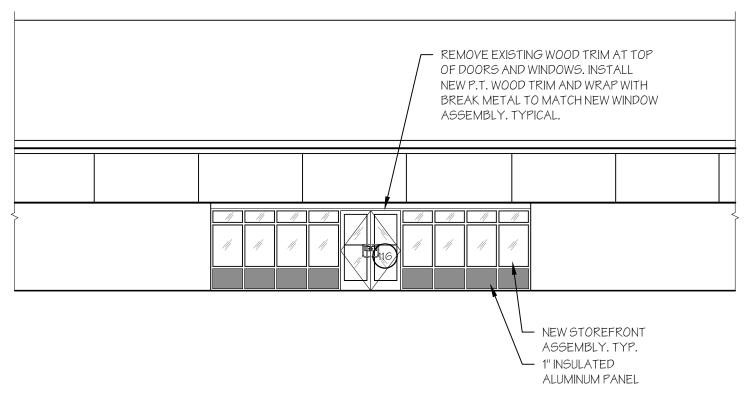
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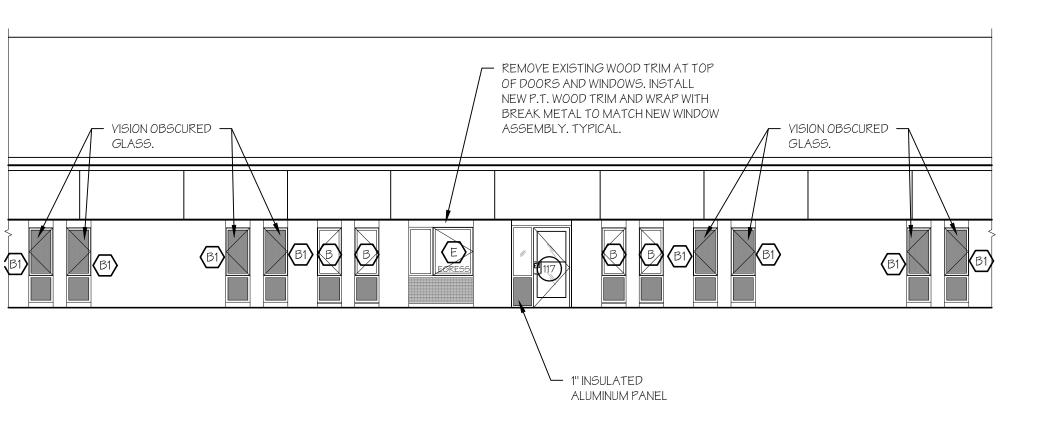
KP) KEY PLAN SCALE: N.T.S.

SOUTHERN COURT YARD: WEST ELEVATION SCALE: 1/8" = 1'-0"



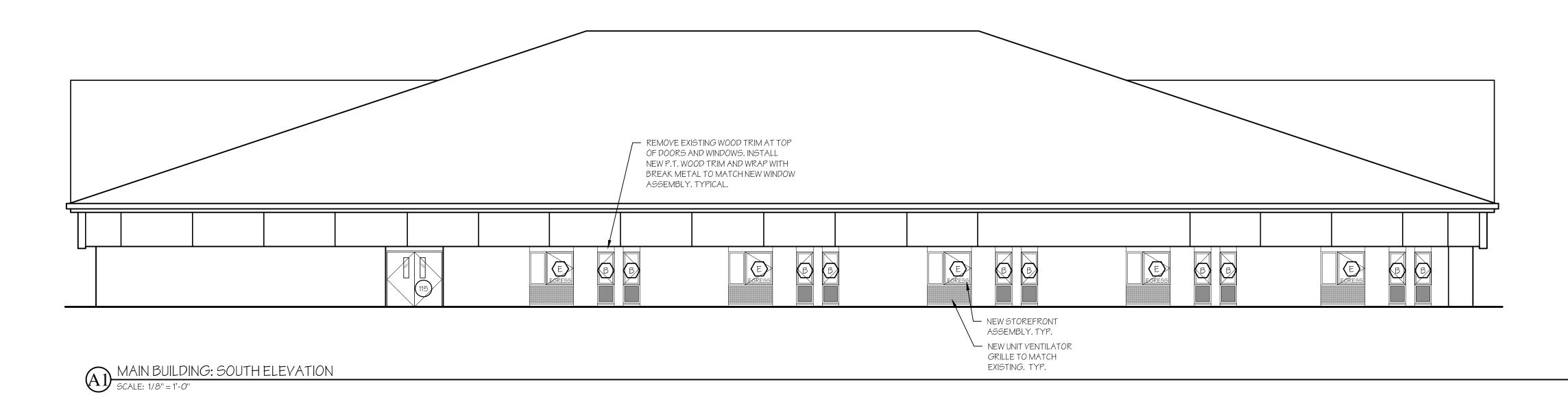
SOUTHERN COURT YARD: EAST ELEVATION

SCALE: 1/8" = 1'-0"



B3 SOUTHERN COURT YARD: NORTH ELEVATION

SCALE: 1/8" = 1'-0"



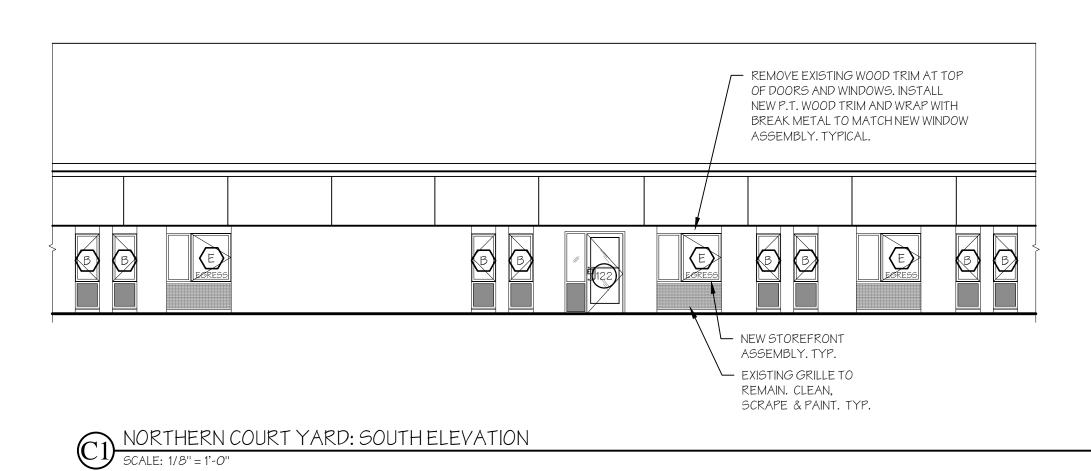
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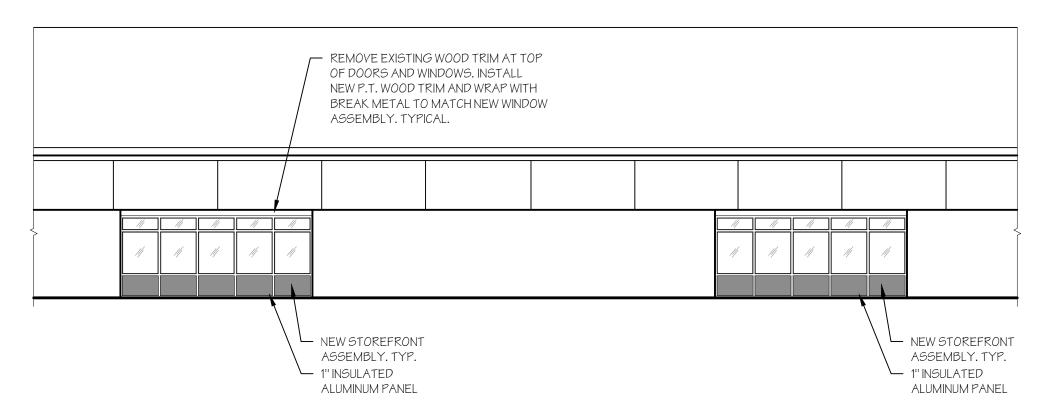


REMOVE EXISTING WOOD TRIM AT TOP OF DOORS AND WINDOWS. INSTALL

NEW P.T. WOOD TRIM AND WRAP WITH

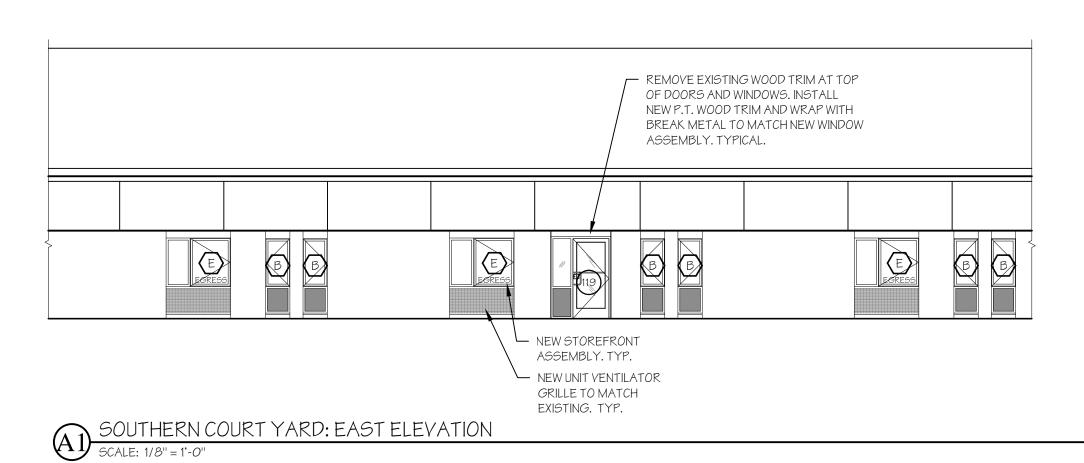
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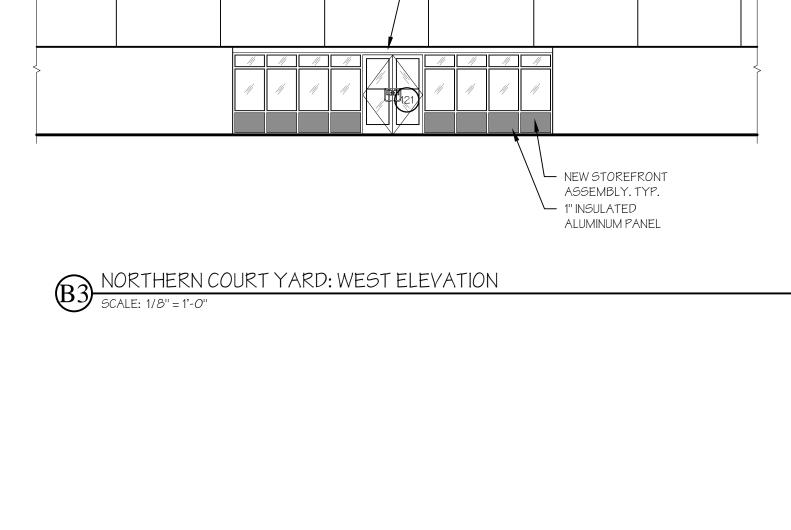
BREAK METAL TO MATCH NEW WINDOW

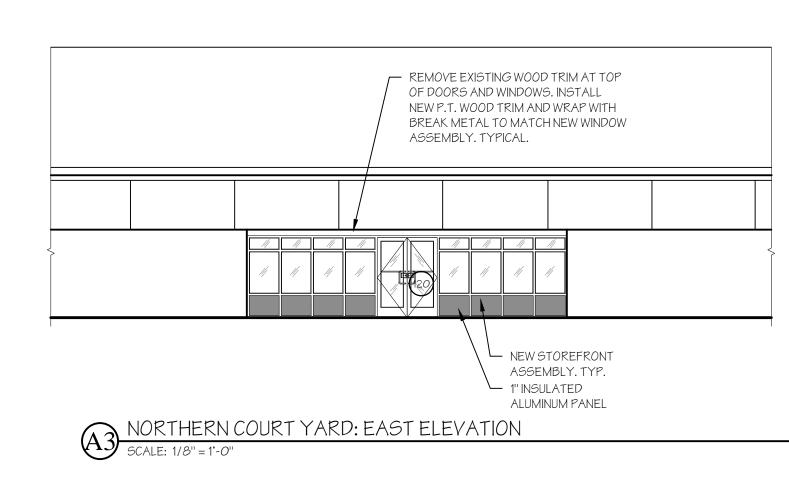


NORTHERN COURT YARD: NORTH ELEVATION

SCALE: 1/8" = 1'-0"



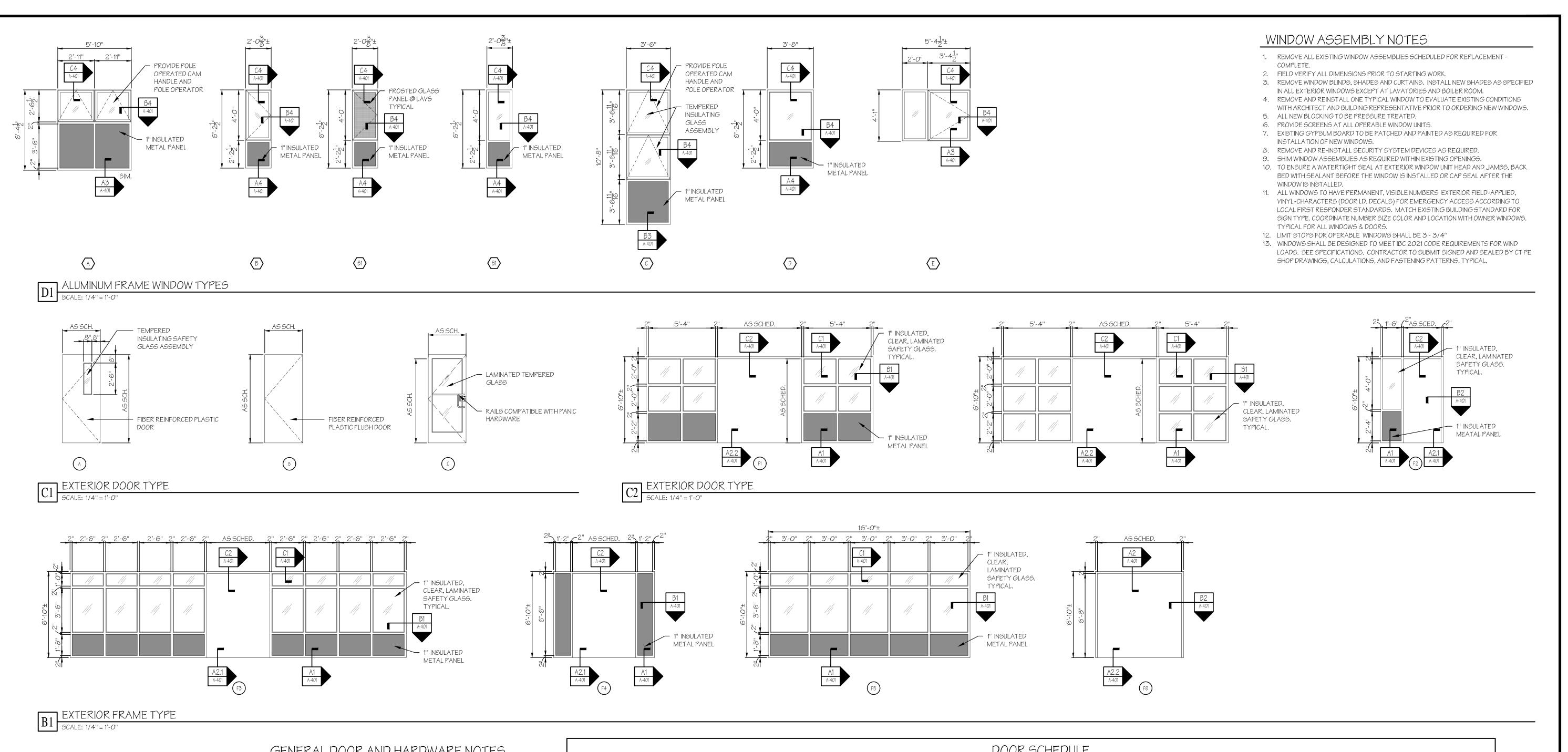




ANTINOZZI **ASSOCIATES** ARCHITECTURE + INTERIORS

KEY PLAN DEMOLITION NOTES CONSTRUCTION NOTES

AS NOTED



GENERAL DOOR AND HARDWARE NOTES

- 1. REMOVE ALL EXISTING DOORS, FRAMES, & HARDWARE ASSEMBLIES SCHEDULED FOR
- REPLACEMENT COMPLETE. 2. FIELD VERIFY ALL DIMENSIONS PRIOR TO STARTING WORK.
- 3. ALL HARDWARE SHALL MEET ADA STANDARDS. G.C. SHALL PROVIDE ALL HARDWARE (U.O.N.) INCLUDING CONSTRUCTION CYLINDERS. FINAL CYLINDERS TO MATCH EXISTING BUILDING STANDARD - COORDINATE WITH OWNER.
- 4. ALL NEW HARDWARE COMPONENTS MUST BE COMPATIBLE WITH EXISTING ELECTRONIC ACCESS SYSTEM.
- 5. ALL DOORS EXITING 100 OR MORE PERSONS SHALL HAVE PANIC EXIT DEVICES.
- 6. SEE SPECIFICATIONS FOR ADDITIONAL DOOR AND HARDWARE INFORMATION. 7. ALL REMOVABLE MULLIONS SHALL BE KEY OPERATED.
- 8. INSULATED SAFETY GLASS PANELS REQUIRED AT ALL EXTERIOR DOORS WITH GLAZING. 9. AT NON-FIRE-RATED EGRESS DOORS, CLOSERS SHALL BE ADJUSTABLE AND SET SO NO
- MORE THAN 5 POUNDS OF FORCE IS NEEDED TO OPEN OR CLOSE THE DOOR. 10. EXISTING GYPSUM BOARD TO BE PATCHED AND PAINTED AS REQUIRED FOR
- INSTALLATION OF NEW FRAMES AND DOORS. 11. EXISTING MASONRY WALLS TO BE PATCHED AND PAINTED AS REQUIRED FOR
- INSTALLATION OF NEW FRAMES AND DOORS.
- 12. REMOVE AND RE-INSTALL SECURITY SYSTEM DEVICES AS REQUIRED. 13. SHIM DOOR FRAME ASSEMBLIES AS REQUIRED WITHIN EXISTING OPENINGS.
- 14. TO ENSURE A WATERTIGHT SEAL AT EXTERIOR DOOR FRAME HEAD AND JAMBS, BACK BED WITH SEALANT BEFORE THE FRAME IS INSTALLED OR CAP SEAL AFTER THE FRAME IS INSTALLED.
- 15. ALL EXTERIOR DOOR OPENINGS TO HAVE PERMANENT, VISIBLE NUMBERS FOR EMERGENCY ACCESS ACCORDING TO LOCAL FIRST RESPONDER STANDARDS. MATCH EXISTING BUILDING STANDARD FOR SIGN TYPE.
- 16. CONTRACTOR TO SUPPLY ALL P.T. WOOD BLOCKING AS REQUIRED FOR NEW WORK,

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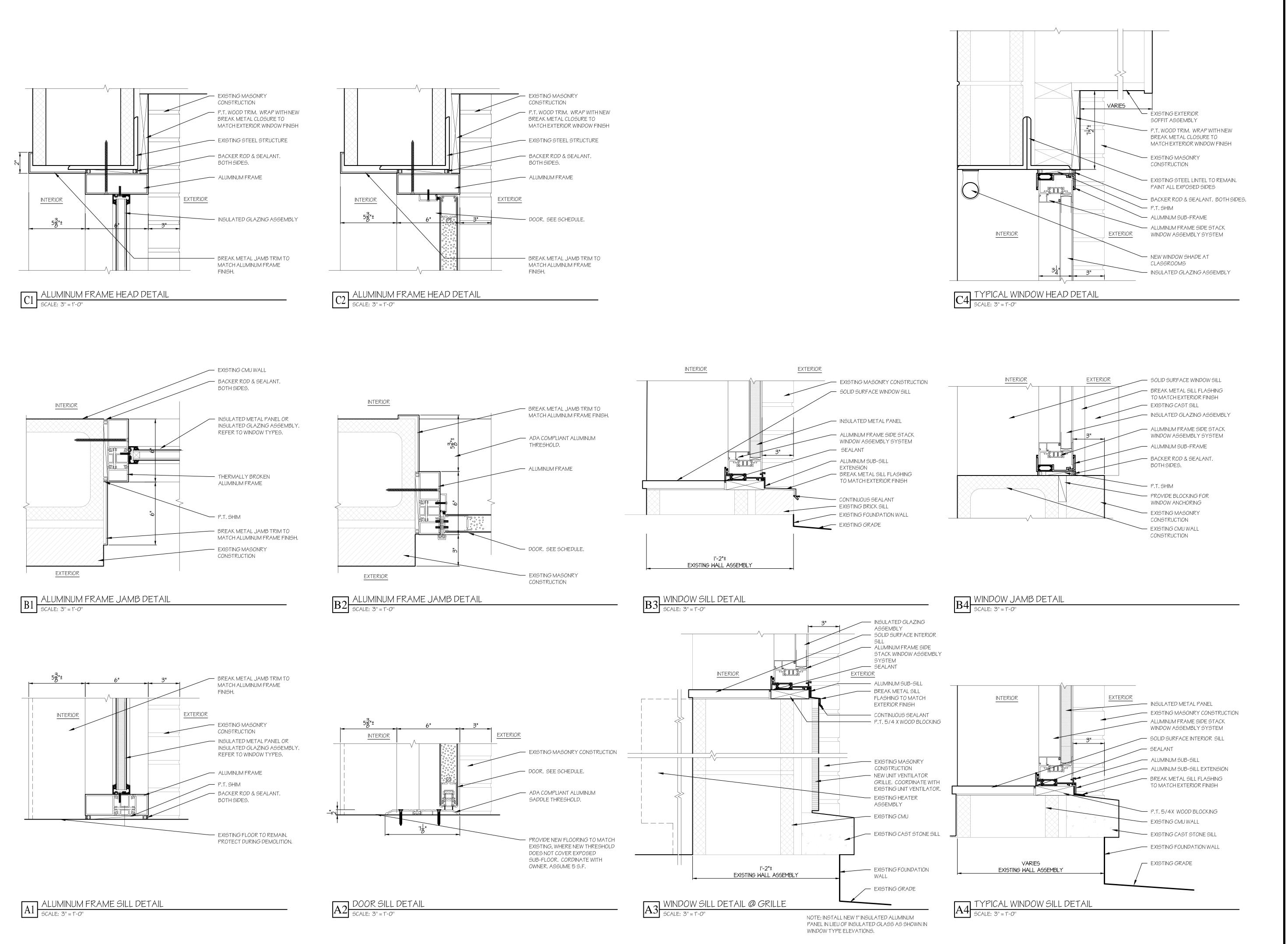
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CERTIFICATION:
CONSULTANT:
CONSULTANI.

DESCRIPTION

WINDOW TYPES & Frame Elevations SCHEDULES

SCALE:	DRAWN B
as noted	RMR

NOVEMBER 29, 2023 | 22014



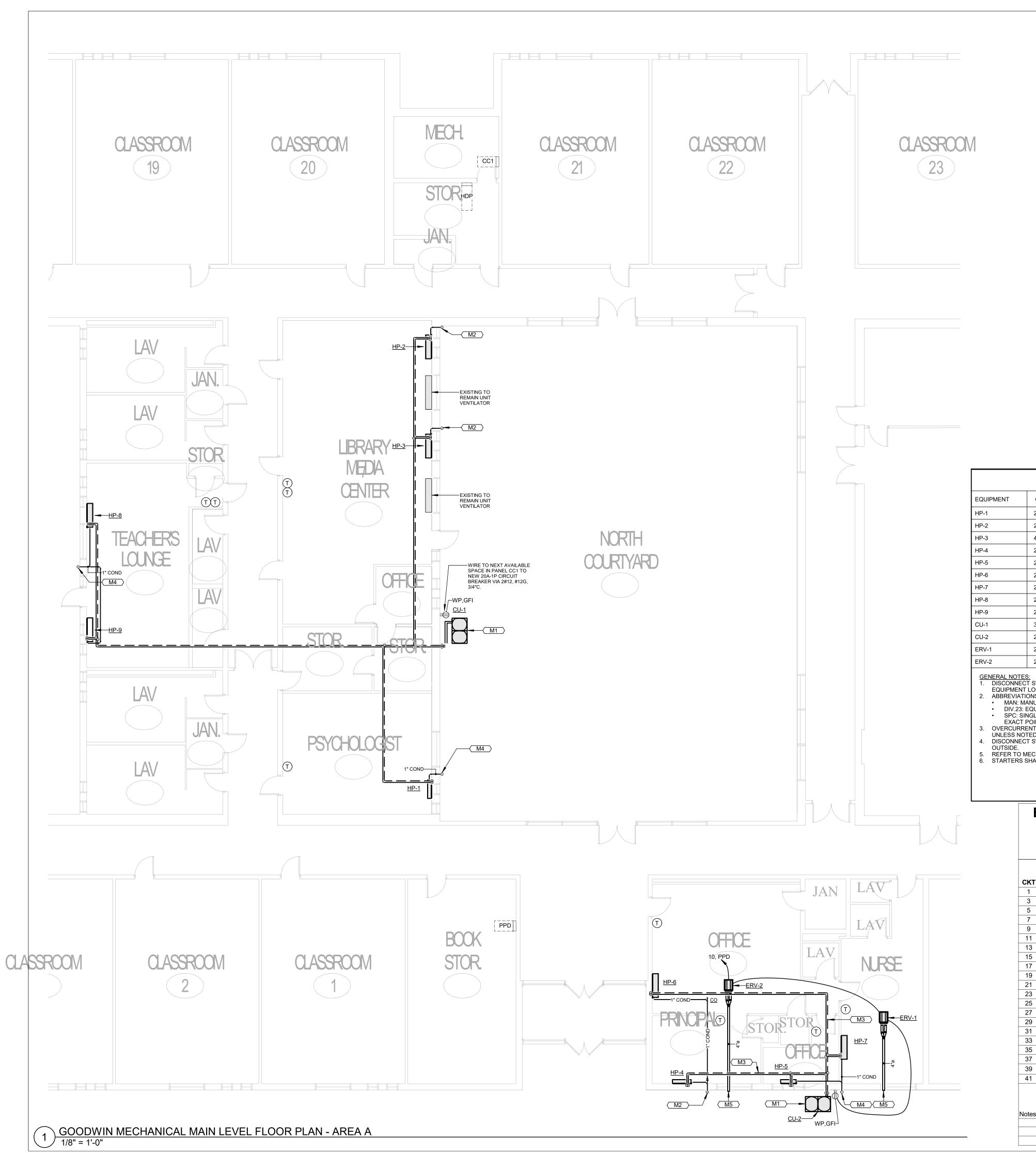
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DETAILS

as noted

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GENERAL NOTES - MECHANICAL

- REFER TO DRAWING M5.00 FOR EQUIPMENT SCHEDULE AND DRAWING M5.00 FOR EQUIPMENT SYMBOLS, LEGENDS, AND ABBREVIATIONS.
- PROVIDE FIRE STOPPING AND SMOKE BARRIER SEALING OF ALL PENETRATIONS THROUGH FIRE WALLS OR SMOKE BARRIERS AS REQUIRED. REFER TO ARCHITECTURAL FLOOR PLANS AND CODE SHEETS FOR WALLS.
- PROVIDE 1" CONDENSATE PIPE FROM EACH HEAT PUMP (HP). CONDENSATE SHALL SPILL TO GRADE AND BE TERMINATED 12" ABOVE GRADE.
- 4. SEE SCHEDULE ON M5.00 FOR REFRIGERANT PIPE SIZES.
- 5. FINAL THERMOSTAT LOCATIONS TO BE APPROVED BY OWNER PRIOR TO INSTALLATION.

	KEYNOTES - MECHANICAL
Key Value	Keynote Text
M1	GRADE MOUNTED CONDENSING UNIT, PROVIDE HOUSEKEEPING PAD AND SUPER STANDS TO ELEVATE UNIT MINIMUM 12" ABOVE GRADE. COORDINATE FINAL LOCATION WITH OWNER PRIOR TO INSTALLATION.
M2	1-1/4" CONDENSATE DRAIN TO SPILL TO GRADE. TERMINATE 12" ABOVE GRADE.
M3	REFRIGERANT LIQUID AND SUCTION LINE SET. SIZE PER MANUFACTURERS RECOMMENDATIONS. (TYP.)
M4	1" CONDENSATE DRAIN TO SPILL TO GRADE. TERMINATE 12" ABOVE GRADE.
M5	4" CONCENTRIC OUTDOOR AIR/ EXHAUST DUCT.

	ELECTRICAL SYMBOLS
SYMBOL	DESCRIPTION
	SURFACE MOUNTED PANELBOARD
	HOMERUN TO PANELBOARD
⊖ GFI	DUPLEX RECEPTACLE WITH GROUND FAULT CIRCUIT INTERRUPTION
\bigoplus_{WP}	DUPLEX RECEPTACLE WITH WEATHERPROOF COVER
⊢ ∑••	WALL MOUNTED EXIT SIGN

								MOTO)R / F	OUIPM	IENT CIE	RCUIT SCHEDULE	
					LOAD			LOCAL		MOTOR STAI			
EQUIPMENT	OCPD	PANEL	HP	MCA	KW	PH	VOLT	DISC. SW	SIZE	TYPE	LOCATION	WIRING	REMARKS
HP-1	20A-2P	CC1	1	0.24	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	1
HP-2	20A-2P	CC1	ı	0.63	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	1
HP-3	40A-2P	CC1	-	0.63	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	1
HP-4	20A-2P	PPD	-	0.24	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	2
HP-5	20A-2P	PPD	-	0.24	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	2
HP-6	20A-2P	PPD	-	0.63	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	2
HP-7	20A-2P	PPD	-	0.63	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	2
HP-8	20A-2P	CC1	-	0.2	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	1
HP-9	20A-2P	CC1	-	0.2	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	1
CU-1	30A-3P	HPD	-	19	-	3	480	30A-3P	-	SPC	-	3#10, #10G, 3/4"C	
CU-2	20A-3P	HPD	-	15	-	3	480	30A-3P	-	SPC	-	3#12, #12G, 3/4"C	
ERV-1	20A-1P	PPD	-	-	0.023	1	120	MAN	-	SPC	-	2#12, #12G, 3/4"C	3
ERV-2	20A-1P	PPD	-	-	0.023	1	120	MAN	-	SPC	-	2#12, #12G, 3/4"C	3

GENERAL NOTES:

1. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE AND SHALL BE LOCATED AT EQUIPMENT LOCATION UNLESS OTHERWISE NOTED.

2. ABBREVIATIONS:

• MAN: MANUAL STARTER (TOGGLE SWITCH WITH THERMAL OVERLOADS)

DIVISION 23: FOURMENT ELIBNISHED BY DIVISION 23 HVAC CONTRACTOR

- DIV.23: EQUIPMENT FURNISHED BY DIVISION 23 HVAC CONTRACTOR SPC: SINGLE POINT CONNECTION (STARTERS INTEGRAL TO EQUIPMENT). COORDINATE EXACT POINT OF CONNECTION IN FIELD.
- OVERCURRENT PROTECTION DEVICES (OCPD) SHALL BE MOLDED CASE CIRCUIT BREAKERS UNLESS NOTED WITH AN "F" FOR FUSE.
- DISCONNECT SWITCHES AND STARTERS SHALL BE NEMA 3R RATED WHEN LOCATED
- REFER TO MECHANICAL PLANS FOR EXACT LOCATIONS OF EQUIPMENT.
 STARTERS SHALL BE SQUARE D CLASS 8536 OR APPROVED EQUAL.
- REMARKS:
 1. ALL VRF FAN COILS REFERENCING THIS REMARK SHALL BE WIRED TOGETHER TO A 20A-2P CIRCUIT BREAKER IN PANEL INDICATED.
 2. ALL VRF FAN COILS REFERENCING THIS REMARK SHALL BE WIRED TOGETHER TO A 20A-2P CIRCUIT BREAKER IN PANEL INDICATED.
 2. CIRCUIT FACUED VAS SHOWN ON FLOOR PLANS.

Branch Panel: PPD Location: BOOK STORAGE A.I.C. Rating: 10KAIC Volts: 120/208 Wye **Supply From:** HDP VIA 15 KVA TX Bus Material: CU Phases: 3 Mounting: Surface Bus Rating: 225 A Wires: 4 Enclosure: Type 1 MCB Rating / MLO: 60A MCB

СКТ	Circuit Description	Trip	Poles		4	i	3	(•	Poles	Trip	Circuit Description	СКТ
1	EXISTING VRF	20 A	2	0.00	0.00					2		EXISTING VRF	2
3	EXISTING VRF			0.00	0.00	0.00	0.00			-		EXISTING VRF	4
	EVICTING VDE	 20. A				0.00	0.00	0.00	0.00			EVICTING LOAD	+ -
5	EXISTING VRF	20 A	2	0.00	0.00			0.00	0.00	1		EXISTING LOAD	6
7				0.00	0.00					1		EXISTING LOAD	8
9	HP-4/5/6/7	20 A	2			0.18	0.23			1		ERV-1,-2 & OUTDOOR RECEPTACLE	10
11								0.18		1		SPACE	12
13	SPACE		1							1		SPACE	14
15	SPACE		1							1		SPACE	16
17	SPACE		1							1		SPACE	18
19	SPACE		1							1		SPACE	20
21	SPACE		1							1		SPACE	22
23	SPACE		1							1		SPACE	24
25	SPACE		1							1		SPACE	26
27	SPACE		1							1		SPACE	28
29	SPACE		1							1		SPACE	30
31	SPACE	-	1							1		SPACE	32
33	SPACE		1							1		SPACE	34
35	SPACE		1							1		SPACE	36
37	SPACE		1							1		SPACE	38
39	SPACE		1							1		SPACE	40
41	SPACE		1							1		SPACE	42
	1	Phase	Load:	0.00	kVA	0.41	kVA	0.18	kVA				
		Phase			A		6 A	1.7		1			
			Load:		kVA			I.		J			
Notes:			Amps:		7 A	1							



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#\ DATE DESCRIPTION

MECHANICAL ELECTRICAL FLOOR PLAN

DRAWN BY: As indicated TPG

DRAWING NO.

ME1.01-G

REVIEWED BY:

JOB NUMBER: 22013 29 NOV. 2023

ELECTRICAL LIGHTING NOTES

EXIT SIGNS SHALL BE WIRED TO LINE SIDE OF LOCAL LIGHTING BRANCH CIRCUIT, AHEAD OF ALL SWITCHING DEVICES.



ARCHITECTURE & INTERIORS

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CERTIFICATION:

Fax: (203) 378-3002

DATE DESCRIPTION

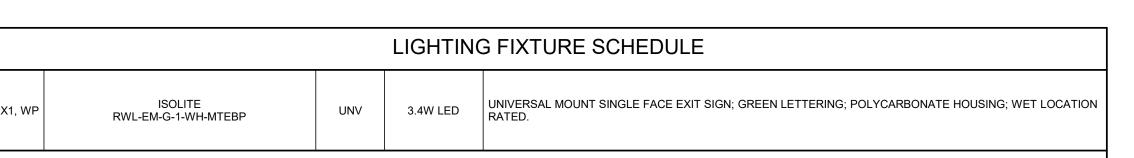
ELECTRICAL LIGHTING

29 NOV. 2023

FLOOR PLAN

EL1.01-G

JOB NUMBER: 22013

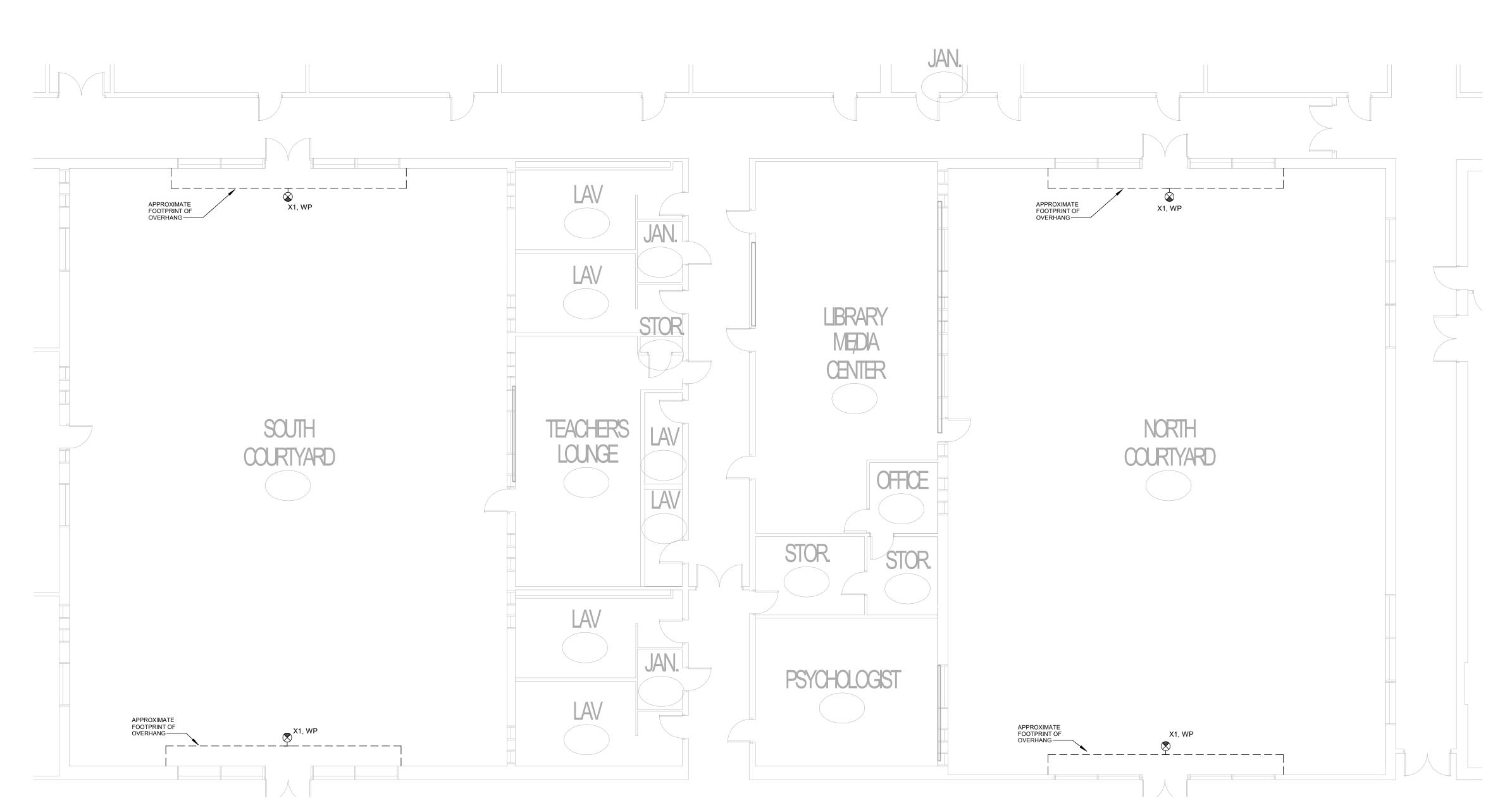


- NOTES:

 1. LIGHT FIXTURES IN THE SCHEDULE SHALL BE CONSIDERED BASIS OF DESIGN. EQUAL FIXTURE SUBSTITUTIONS ARE ACCEPTABLE FOR ALL FIXTURES IN THE LIGHTING FIXTURE SCHEDULE, UNLESS INDICATED OTHERWISE. EQUAL FIXTURE APPROVAL SHALL BE AS JUDGED BY THE ENGINEER AND THE ARCHITECT. IN ADDITION TO THE REQUIREMENTS LISTED IN THE LIGHTING FIXTURE SCHEDULE AND IN THE SPECIFICATIONS, THE PROPOSED EQUAL FIXTURES SHALL:
- A. BE THE SAME GENERAL SIZE, STYLE AND SHAPE, INCLUDING BUT NOT LIMITED TO LENS CONSTRUCTION AND SHADING. B. BE OF EQUAL QUALITY CONSTRUCTION AND FINISH.
- C. BE SUPPLIED WITH ALL REQUIRED ACCESSORIES TO MATCH THE SPECIFIED (BASIS OF DESIGN) FIXTURE.

 D. PROVIDE THE SAME DISTRIBUTION, EFFICACY AND SOURCE LUMEN OUTPUT.

 E. HAVE THE SAME LISTINGS AS THE BASIS OF DESIGN FIXTURE, INCLUDING DLC AND ENERGY STAR QUALIFICATIONS.
- ALL FIXTURES SHALL BE UL LISTED.
- 3. ALL NECESSARY MOUNTING HARDWARE, HANGERS, BRACKETS, RAILS, YOKES, CANOPIES, STEMS, CHAINS, ROW JOINERS, ETC. SHALL BE FURNISHED AND INSTALLED.
 4. FIXTURES SHALL BE SEISMICALLY SUPPORTED AS REQUIRED BY THE APPLICABLE BUILDING CODE. FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE AND SHALL BE
- INDEPENDENT OF DUCTS, PIPES, CEILINGS AND THEIR SUPPORTING MEMBERS. FIXTURES SHALL BE SUPPORTED WITH A MINIMUM OF 2 SUPPORTS.
- WIRE EMERGENCY FIXTURES AND EXIT SIGNS AHEAD OF SWITCHED LEGS.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. WHERE EXIT SIGNS ARE SHOWN AS WALL MOUNTED ABOVE A DOOR, MOUNT SUCH THAT THE BOTTOM OF THE SIGN IS NO MORE THAN 3" ABOVE THE DOOR FRAME, UNLESS INDICATED OTHERWISE ON PLANS.



1 GOODWIN ELECTRICAL LIGHTING MAIN LEVEL FLOOR PLAN
1/8" = 1'-0"

			PHYSICAL				PE	RFORMA	NCE				ELEC	CTRICAL			REMA	ARKS		
			COMPR	ESSORS				COOLING		HEA.	ΓING	COLIND								
TAG	MANUFACTURER	MODEL	INVERTER	CONSTANT SPEED	WEIGHT (LBS)	NOMINAL TONS	MBH	EER	SEER (IEER)		СОР	- SOUND PRESS. (dBA)	MCA	MOP	VOLTAGE	PHASE	TYPE	RATINGS	FEATURES	INSTALL
CU-1	MITSUBISHI	PUHY-P120YNU-A	1	-	640	10.00	120.0	13.3	(28.8)	135.0	4.05	62	19	30	460	3	1	1,2	1	-
CU-2	MITSUBISHI	PUHY-P96YNU-A	1	-	616	8.00	96.0	15.1	(26.7)	108.0	4.35	58.5	15	20	460	3	1	1,2	1	-
	REMARKS	1	RE	MARKS - RA	TINGS				REMA	RKS - FEATUR	RES				REMARK	(S - INSTALL				
REMARKS - TYPE 1. HEAT RECOVERY (SIMULTANEOUS HEATING AND COOLING) HEAT PUMP, SCROLL COMPRESSOR(S), R-410A				HEATING	RE G MBH AT 8 G MBH AT 70		 TINGS F EWB, 95°F F ODB, 43°F	ODB.		108.0	REMA	RKS - FEATUR		20	1	3	1 REMARK	(S - I		,

					VRI	FFAN	COIL S	CHED	ULE								
		GENERAL					PERFO	RMANCE				ELECTRICAL	-		REM	ARKS	
						NET	NET	F.	AN	SOUND							
TAG	MANUFACTURER	MODEL	LOCATION	COMP. UNIT	NOMINAL TONS	COOLING MBH	HEATING MBH	CFM	ESP (IN WG)	PRESS. (dBA)	MCA	VOLTAGE	PHASE	TYPE	RATINGS	FEATURES	INSTALL
HP-1	MITSUBISHI	PKFY-P18NLMU-E.TH	SEE FLOOR PLAN	CU-1	1.50	18.0	20.0	438	-	46	0.24	208	1	1	1	1,2	2
HP-2	MITSUBISHI	PKFY-P24NKMU- E2.TH	SEE FLOOR PLAN	CU-2	2.00	24.0	27.0	918	-	49	0.63	208	1	1	1	1,2	1
HP-3	MITSUBISHI	PKFY-P24NKMU- E2.TH	SEE FLOOR PLAN	CU-2	2.00	24.0	27.0	918	-	49	0.63	208	1	1	1	1,2	1
HP-4	MITSUBISHI	PKFY-P18NLMU-E.TH	SEE FLOOR PLAN	CU-3	1.50	18.0	20.0	438	-	46	0.24	208	1	1	1	1,2	2
HP-5	MITSUBISHI	PKFY-P12NLMU-E.TH	SEE FLOOR PLAN	CU-3	1.00	12.0	13.5	297	-	41	0.24	208	1	1	1	1,2	2
HP-6	MITSUBISHI	PKFY-P24NKMU- E2.TH	SEE FLOOR PLAN	CU-4	2.00	24.0	27.0	918	-	49	0.63	208	1	1	1	1,2	1
HP-7	MITSUBISHI	PKFY-P24NKMU- E2.TH	SEE FLOOR PLAN	CU-4	2.00	24.0	27.0	918	-	49	0.63	208	1	1	1	1,2	1
HP-8	MITSUBISHI	PKFY-P18NLMU-E.TH	SEE FLOOR PLAN	CU-5	1.50	18.0	20.0	438	-	46	0.2	208	1	1	1	1,2	1
HP-9	MITSUBISHI	PKFY-P18NLMU-E.TH	SEE FLOOR PLAN	CU-5	1.50	18.0	20.0	438	-	46	0.2	208	1	1	1	1,2	1
	REMARKS -	REMARKS	- RATINGS	•		•	REMARK	(S - FEATUR	ES			REN	/ARKS - INS	TALL			
1. WALL	. MOUNTED		1. COOLING MBH HEATING MBH				2.	CONDENSA PROVIDE W	ATE PUMP	KIT FOR MIC NSATE PUMI BLUE		то	REFRIGE HEAT RE 2. PROVIDE REFRIGE	ERANT GAS ECOVERY U E 1/4" REFRI	PIPING BET NIT IGERANT LIC PIPING BET	QUID AND 5/8 WEEN FAN (QUID AND 1/2 WEEN FAN (COIL AND 2"

--- DOUBLE THICKNESS

TURNING VANES

SQUARE ELBOW

SUPPLY AND RETURN DUCTS

TYPICAL TURNING VANE

SUPPLY AND RETURN DUCTS

AIRFLOW

TAKE-OFF

RETURN DUCTS ONLY

AIRFLOW

1-1/2W

LONG RADIUS TEE

RETURN DUCTS ONLY

1/4W, 4"MIN.

				ENER	GY REC	COVER	Y VEN	TILATION (JNIT SCH	IEDUL	E.					
						PEF	RFORMANCE	- GENERAL				E	LECTRICA	\L		
	UNIT	MANUFACTURER/ MODEL NUMBER	UNIT LOCATION	SUPP	LY AIR	EXHAL	JST AIR	SENSIBLE	TOTAL RECOVERY		MOTOR					
		WODEL NOWBER		CFM	APD (IN.WC)	CFM	APD (IN.WC)	EFFECTIVENESS (% AT 32°F)	EFFICIENCY (%)	SONES	RPM	AMPS	WATTS	VOLTS	PHASE	REMARKS
	ERV-1	PANASONIC WHISPER COMFORT FV-04VE1	SEE FLOORPLAN	30	0.1	40	0.1	66	36	0.8	1479	0.150	23	120	1	1-5
	ERV-2	PANASONIC WHISPER COMFORT FV-04VE1	SEE FLOORPLAN	30	0.1	40	0.1	66	36	0.8	1479	0.150	23	120	1	1-5
1	REMAR 1 CF	RKS:	RECOVERY VENTILAT	OR FAN			•			•	•			•	•	•

				DUCTWORK LEGEND
			SYMBOL	DESCRIPTION
			12 "ø 9	ROUND DUCTWORK
			$\otimes \square $	ROUND SUPPLY DUCTWORK TOWARDS (UP IN PLAN)
		1	V □⊗	ROUND SUPPLY DUCTWORK AWAY (DOWN IN PLAN)
CONTR	ROLS LEGEND		ØLY	ROUND EXHAUST DUCTWORK TOWARDS (UP IN PLAN)
PLAN ′MBOL	DESCRIPTION			ROUND EXHAUST DUCTWORK AWAY (DOWN IN PLAN)

Т		TEMPERATURE SENSOR		PIPING LEGEND			
				SYMBOL - SINGLE LINE	DESCRIPTION		
			_	\longrightarrow	ELBOW UP		
TAG SYMBOLS				ELBOW DOWN			
		1	├	TEE TOWARDS (UP IN PLAN)			
EQUIPMENT	<u>TAG-#</u>			} 	TEE AWAY (DOWN IN PLAN)		
				} →	DROP AND RUN		
					CLEANOUT		
FIRESTOPPING GENERAL NOTES			1	-			
				}	REFRIGERANT SUCTION		
PROVIDE FIRE STOPPING AND SMOKE BARRIER SEALING OF PENETRATIONS THROUGH FIRE OR SMOKE WALLS, BARRIERS AND PARTITIONS AS REQUIRED TO MAINTAIN RATING. REFER TO ARCHITECTURAL FLOOR PLANS AND CODE SHEETS FOR WALL RATINGS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.					REFRIGERANT LIQUID		
				}—— RG ——	REFRIGERANT GAS		
				} RF}	REFRIGERANT LINE SET PIPING FROM REFRIGERANT BRANCH CONTROLLER		



MANUFACTURER MUST BE CERTIFIED, LISTED, AND LABELED PER AHRI 1230.

- MANUFACTURER MUST MEET MINIMUM EFFICIENCIES AND PERFORMANCE EQUAL TO OR
- GREATER THAN THE BASIS OF DESIGN. SUBMITTED PERFORMANCE DATA MUST BE FULLY DE-RATED FOR ALL COMPONENTS AND ACCESSORIES, INCLUDING BUT NOT LIMITED TO LINE LENGTH, VERTICAL SEPARATION,
- PROVIDE ALL CONTROL WIRING NECESSARY FROM THE OUTDOOR UNIT, INDOOR UNIT, CONTROLLER/THERMOSTAT, AND CONTROLS ASSOCIATED WITH THE SYSTEM IN ORDER TO BE FULLY OPERATIONAL.

CONNECTION RATIO, DESIGN CONDITIONS (TEMPERATURE DB/WB), AND COIL COATINGS.

- SYSTEM SHALL BE PROVIDED WITH A MANUFACTURER-ASSISTED START-UP. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- INSTALLING CONTRACTORS MUST ATTEND THE REQUIRED VRF INSTALLATION TRAINING BY THE MANUFACTURER.
- PROVIDE BACNET COMMUNICATION TO INTEGRATE WITH THE BMS CONTROL SYSTEM
- VRF OUTDOOR UNITS NOTES:

 1. MANUFACTURER MUST PROVIDE HEATING DURING OIL EQUALIZATION AND DEFROST
- OPERATIONS.

LOCATE CONDENSING UNITS WITH 18-INCH SEPARATION BETWEEN CONDENSING UNIT

- MODULES FOR IMPROVED SERVICEABILITY. VRF INDOOR UNITS NOTES:

 1. VRF UNITS SHALL BE PROVIDED WITH FACTORY-INSTALLED, INTEGRATED CONDENSATE
- PUMPS. IF NOT POSSIBLE (I.E. WALL MOUNTED UNITS), CONTRACTOR SHALL PROVIDE REMOTE CONDENSATE PUMP FOR EACH UNIT NOT INCLUDING AN INTEGRAL CONDENSATE
- VRF UNITS SHALL HAVE AN INTEGRATED OVERFLOW SWITCH.
- VRF PIPING INSTALLATION NOTES (R410A):

 1. REFRIGERANT PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC; REFER TO THE VRF PIPING DIAGRAM FOR MORE INFORMATION.
- ALL PIPING SIZES SHOWN SHALL BE COORDINATED WITH VRF MANUFACTURER REGARDLESS OF THE SIZE INDICATED ON DRAWINGS.
- PROVIDE REFRIGERATION BALL VALVES WITH CHARGING PORTS DOWNSTREAM OF BRANCH SELECTOR BOX FOR SERVICE.
- FOR REFRIGERANT PIPE SIZES, CONSULT THE MANUFACTURER; REFRIGERANT PIPE RISERS INCLUDED IN DRAWINGS SHALL BE REVIEWED AND CONFIRMED BY THE MANUFACTURER
- PRIOR TO PURCHASING EQUIPMENT. CONTRACTOR SHALL TRIPLE EVACUATE SYSTEM PIPING THROUGH THE INDOOR UNITS.
- SEAL REFRIGERATION PIPING UNTIL READY TO BRAZE ONLY USE CLEAN PIPING FREE OF SCRATCHES OR DEFECTS.

BAS SPACE **TEMPERATURE** SENSOR UNIT MFRS. **THERMOSTAT**

KEYNOTES

UL LISTED **HVI CERTIFIED**

SYMBOL

T

THREE YEAR WARRANTY

THERMOSTAT - STAND ALONE

PROVIDE WALL CAP WITH COMBINED INTAKE AND EXHAUST.

- (1) PACKAGED INDOOR EVAPORATOR UNIT
- IN PRIMARY DRAIN PAN. SWITCH SHALL BE WIRED TO DE-ENERGIZE UNIT UPON DETECTION OF OF RISING WATER (BLOCKED DRAIN) AND GENERATE AN ALARM THROUGH THE BAS.
- (5) LOCAL WALL-MOUNTED THERMOSAT
- REFRIGERANT LIQUID AND SUCTION LINES SIZED PER
- (7) PROVIDE BAS SPACE TEMPERATURE SENSOR FOR MONITORING. CONNECT TO EXISTING BMS

SEQUENCE OF OPERATION

-STEEL PIPE SLEEVE. SEE

CP25 OR EQUIVALENT)

PACK VOID SPACE WITH FIRE

-REQUIRED CLEARANCE. SEE

-FIREPROOF CAULK (TYPICAL)

FIRE-RATED MASONRY OR FIRE-

RATED STUD PARTITION. SEE NOTES

STOPPING MATERIAL (3M CAULK

-ESCUTCHEON. SEE NOTES BELOW

NOTES BELOW

NOTES BELOW

- 1. PROVIDE AC UNIT WITH MANUFACTURER'S STANDARD STAND-ALONE CONTROLS AND THERMOSTAT.
- SAFETIES AND ALARMS
- 1. IF UL508 CONDENSATE OVERFLOW SWITCH SENSES RISING WATER
- 2. IF SPACE TEMPERATURE DROPS BELOW SETPOINT, THE UNIT'S

GENERAL ABBREVIATIONS APD BAS BMS BTU BOD BOP CAP COP CFM CUFT DDC DIA DN DX EA EAT EDB ELEC ESP ETR EWB

FLA

FPM

HSPF

HZ HVAC

IN WG

LDB

LWB MAX

MECH

MBH MCA

MIN NIC

NTS

OAT OD PH

PSIG QTY

RPM

SEER SP

TEMP

TSTAT

TYP

W/O

SPD SQFT / SF

SA

ACCESS DOOR

ACCESS PANEL

BTU / HOUR

CUBIC FEET DECIBELS

DIAMETER

EXHAUST AIR

ELECTRICAL

BOTTOM OF DUCT

BOTTOM OF PIPE

AIR PRESSURE DROP

BRITISH THERMAL UNIT

CUBIC FEET PER MINUTE

DRY BULB TEMPERATURE

DIRECT DIGITAL CONTROL

DIRECT EXPANSION

ENTERING DRY BULB

EXISTING TO REMAIN

ENTERING WET BULB

FULL LOAD AMPS

FEET PER MINUTE

HORSEPOWER

CONDITIONING

INCHES

KILOWATTS

MAXIMUM

MECHANICAL

DEGREES FAHRENHEIT

INCHES WATER GAUGE

LEAVING DRY BULB

LEAVING WET BULB

NOT IN CONTRACT

OUTER DIAMETER

STATIC PRESSURE

STATIC PRESSURE DROP

TOTAL STATIC PRESSURE

EQUIPMENT ABBREVIATIONS

NOT TO SCALE

QUANTITY

RETURN AIR

SUPPLY AIR

SQUARE FEET

TEMPERATURE

THERMOSTAT

WATER COLUMN

TYPICAL

WITHOUT

WET BULB

ENERGY EFFICIENCY RATIO

EXISTING TO BE RELOCATED

EXTERNAL STATIC PRESSURE

HEATING, VENTILATION AND AIR

LEAVING AIR TEMPERATURE

THOUSANDS OF BTU / HOUR

MINIMUM CIRCUIT AMPACITY

OUTSIDE AIR TEMPERATURE

REVOLUTIONS PER MINUTE

POUNDS PER SQUARE INCH GAUGE

SEASONAL ENERGY EFFICIENCY RATIO

ABOVE FINISHED FLOOR

AUTHORITY HAVING JURISDICTION

BUILDING AUTOMATION SYSTEM

BUILDING MANAGEMENT SYSTEM

COEFFICIENT OF PERFORMANCE

ENTERING AIR TEMPERATURE (DRY BULB)

HEATING SEASON PERFORMANCE FACTOR

- (2) OUTDOOR CONDENSING UNIT
- PROVIDE WIRING IN ACCORDANCE WITH UNIT MANUFACTURER'S INSTALLATION GUIDELINES
- (4) PLENUM RATED, UL508 CONDENSATE OVERFLOW SWITCH MOUNTED
- MANUFACTURER

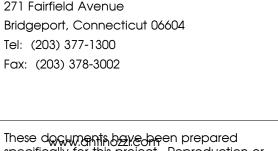
- 2. PROVIDE SPACE TEMPERATURE SENSOR FOR BAS MONITORING.
- (BLOCKED DRAIN), THE UNIT SHALL DEACTIVATE.
- 2. IF SPACE TEMPERATURE RISES ABOVE 80 DEG. F (ADJUSTABLE) AN ALARM SHALL BE GENERATED THROUGH THE BAS
- 1. IF SPACE TEMPERATURE RISES ABOVE SETPOINT, THE UNIT'S PACKAGED CONTROLS SHALL ACTIVATE UNIT IN COOLING TO MAINTAIN SETPOINT.
- PACKAGED CONTROLS SHALL ACTIVATE UNIT IN HEATING TO MAINTAIN

ENERGY RECOVERY VENTILATOR HEAT PUMP

GENERAL NOTES

- GENERAL NOTES, SYMBOLS AND DETAILS ARE APPLICABLE TO DRAWINGS WITHIN DIVISION
- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AND AS REQUIRED BY CODES.
- DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO INDICATE CAPACITY, SIZE, APPROXIMATE LOCATION AND GENERAL ARRANGEMENT. COORDINATE LOCATIONS OF SYSTEMS AND COMPONENTS.
- COORDINATE ROOF AND WALL PENETRATIONS WITH WORK OF OTHER SECTIONS AND WITH FLASHING REQUIREMENTS. COORDINATE SLAB PENETRATIONS WITH WORK OF OTHER
- RUN DUCTS AND PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE NOTED.
- INSTALL SENSORS (TEMPERATURE, CO2, THERMOSTATS) AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY ARCHITECT. MOUNTING HEIGHT AFF SHALL COMPLY WITH ADA AND SHALL BE MOUNTED LEVEL WITH ADJACENT SWITCHES (IE LIGHT SWITCHES).
- COORDINATE WORK OF THIS SECTION WITH THAT OF OTHER SECTIONS AND WITH ALL TRADES INVOLVED. PROVIDE OFFSETS IN PIPING AND DUCTS (INCLUDING DIVIDED DUCTS) AND TRANSITIONS AROUND OBSTRUCTIONS.
- NOT ALL ACCESS DOORS HAVE BEEN SHOWN ON THE PLANS. PROVIDE ACCESS PANELS THROUGH BUILDING ASSEMBLIES TO SERVICE AND MAINTAIN EQUIPMENT UNLESS SUCH EQUIPMENT IS INSTALLED IN EXPOSED LOCATIONS OR ABOVE LAY-IN CEILINGS. COORDINATE THE LOCATION OF ACCESS DOORS AND PANELS AND VERIFY THE QUANTITY, SIZE, AND LOCATIONS AFTER THE SYSTEMS AND EQUIPMENT REQUIRING ACCESS HAVE BEEN INSTALLED AND PRIOR TO THE CLOSURE OF THE AFFECTED CEILINGS AND BUILDING ASSEMBLIES. SUBMIT ACCESS PANEL LOCATIONS FOR REVIEW.
- AT SUBSTANTIAL COMPLETION, THE FOLLOWING ITEMS, NEW OR EXISTING, SHALL BE FULLY AND REASONABLY ACCESSIBLE: HVAC CONTROL BOXES, JUNCTION BOXES, VALVES, DDC CONTROL BOXES, ELECTRICAL PANELS, FILTERS, BELTS, WATER COILS, DISCONNECT SWITCHES AND ELEMENTS OF EQUIPMENT REQUIRING MAINTENANCE. "FULLY AND REASONABLY ACCESSIBLE" SHALL BE DEFINED AS NATIONAL ELECTRIC CODE REQUIRED CLEARANCE FOR POWERED EQUIPMENT AND CAPABLE OF BEING ACCESSED OR SERVICED WITHOUT REMOVING, MODIFYING OR DISTORTING OTHER COMPONENTS OF THE WORK. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCE FOR ALL EQUIPMENT.
- 0. SUPPORT EQUIPMENT, PIPING, AND DUCTWORK FROM BUILDING STRUCTURE OR WITH STEEL SUPPORTS AND PLATFORMS AS REQUIRED. PROVIDE VIBRATION ISOLATION FOR ROTATING EQUIPMENT, DUCTWORK, AND PIPING IN ACCORDANCE WITH THE SPECIFICATIONS.
- 11. CONTROL WIRING METHODS SHALL COMPLY WITH NEC, AND DIVISION 26 SPECIFICATIONS.
- 2. VERIFY EQUIPMENT CONNECTIONS WITH MANUFACTURER'S DRAWINGS. VERIFY AND PROVIDE FITTINGS TO TRANSITION TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE DIMENSIONS BEFORE FABRICATION.
- 13. PERFORM PRESSURE AND LEAKAGE TESTS BEFORE INSULATING DUCTWORK AND PIPING 14. COORDINATE AND PROVIDE HOUSEKEEPING PADS FOR FLOOR-MOUNTED MECHANICAL EQUIPMENT. HOUSEKEEPING PADS SHALL BE REINFORCED CONCRETE WITH 1" CHAMFERED EDGES, 6" THICK, WITH MINIMUM CLEARANCE OF 6" FROM EQUIPMENT BASE TO EDGE OF
- **15.** MAINTAIN 6'-8" CLEARANCE TO THE UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ROUTES IN MECHANICAL ROOMS. MAINTAIN 3'-0" WIDE MEANS OF EGRESS IN MECHANICAL ROOMS.
- MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND, AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT, SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR.
- AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET WITH P-TRAP, P TRAP ARRANGEMENT SHALL BE BASED ON THE UNIT (NEGATIVE OR POSITIVE PRESSURE).

18. INSTALL UNITS WITH CLEARANCE FOR SERVICE AS REQUIRED BY THE MANUFACTURER.



ANTINOZZI ASSOCIATES

ARCHITECTURE & INTERIORS

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#\ DATE DESCRIPTION

M

DRAWING TITLE: **MECHANICAL**

DRAWN BY: As indicated | TPG

DRAWING NO.

M5.00-G

REVIEWED BY:

JOB NUMBER: 22013 29 NOV. 2023

AIRFLOW

FULL RADIUS ELBOW

SUPPLY AND RETURN DUCTS

TAKE-OFF

SUPPLY DUCTS ONLY

TAKE-OFF

SUPPLY DUCTS ONLY

AIRFLOW

AIRFLOW

LONG RADIUS TEE

SUPPLY DUCTS ONLY

TYPICAL DUCT DETAILS

D1>4"

1/4W, 4"MIN.

2 PIPE PENETRATION OF FIRE-RATED WALL DETAIL NTS

EQUAL IN LENGTH TO DEPTH OF PARTITION.

STEEL OR CAST IRON.

PIPE SLEEVES THROUGH FIRE-RATED MASONRY PARTITIONS OR FOUNDATION WALLS SHALI

B. PIPE SLEEVES THROUGH FIRE-RATED STUD PARTITIONS SHALL BE #18 GAUGE GALVANIZED

A. ESCUTCHEONS IN FINISHED SPACES SHALL BE ANODIZED ALUMINUM OR CHROME-PLATED

B. ESCUTCHEONS IN UNFINISHED SPACES SHALL BE PLAIN BRASS, ALUMINUM, GALVANIZED

C. ESCUTCHEONS SHALL BE HELD IN PLACE BY INTERNAL SPRING TENSION OR SET SCREW.

STEEL WITH MAXIMUM OF 1" CLEARANCE BETWEEN SLEEVE AND PIPE. SLEEVE SHALL BE

PIPE. SLEEVE SHALL BE EQUAL IN LENGTH TO DEPTH OF PARTITION OR WALL.

BE SCHEDULE 40 BLACK STEEL WITH MAXIMUM OF 1/2" CLEARANCE BETWEEN SLEEVE AND

23 00 00 - GENERAL

A. THESE SPECIFICATIONS ARE APPLICABLE TO ALL PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS UNLESS NOTED OTHERWISE. REVIEW THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL PLUMBING DRAWINGS FOR NOTES DIMENSIONS FTC. AND COORDINATE WITH OTHER TRADES INVOLVED. THE WORK REQUIREMENTS DESCRIBED WITHIN DIVISION 20 SPECIFICATION SECTION "COMMON MECHANICAL / ELECTRICAL REQUIREMENTS" FORM

COMPLIMENTARY REQUIREMENTS TO THE SCOPE OF WORK CONTAINED WITHIN DIVISION 23.

- THIS PROJECT COMPRISES ALTERATIONS AND RENOVATIONS TO THE EXISTING BUILDING. THE EXISTING BUILDING IS CURRENTLY OCCUPIED AND THE PROJECT SHALL PROCEED IN A MANNER THAT MINIMIZES ANY INCONVENIENCE TO THE BUILDING OCCUPANTS.
- 2. SCOPE OF WORK CONSISTS OF INSTALLATION OF MATERIALS TO BE FURNISHED UNDER THE CONTRACT DOCUMENTS AND WITHOUT LIMITING GENERALITY THEREOF CONSISTS OF FURNISHING LABOR, MATERIALS, EQUIPMENT, HOISTING, TRANSPORTATION, RIGGING, STAGING, APPURTENANCES, AND SERVICES NECESSARY AND/OR INCIDENTAL TO PROPERLY COMPLETE ALL WORK AS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN.
- C. DEFINITIONS: THE FOLLOWING DEFINITIONS APPLY TO THIS CONTRACT
- 1. FURNISH: THE TERM "FURNISH" MEANS TO "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS"
- 2. INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS."
- 3. PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE."
- 4. REMOVE: THE TERM "REMOVE" MEANS TO DISCONNECT FROM ITS PRESENT POSITION, REMOVE FROM THE PREMISES AND TO DISPOSE OF IN A LEGAL MANNER."
- 5. SUBSTITUTIONS: "SUBSTITUTIONS" ARE REQUESTS FOR CHANGES IN PRODUCTS, MATERIALS L. CLEANING AND/OR METHODS OF CONSTRUCTION AS PROPOSED BY THE CONTRACTOR AFTER AWARD OF THE CONTRACT."

- DRAWINGS ARE DIAGRAMMATIC. THE FINAL PLACEMENT OF EQUIPMENT OR DEVICES IN THE FIELD MAY NOT DIRECTLY CORRESPOND TO THAT WHICH IS SHOWN ON THE DRAWINGS. THOUGH SOME OFFSETS & TRANSITIONS MAY BE SHOWN IN PIPING & SHEET METAL TO HELP INDICATE THE PHYSICAL RELATIONSHIP BETWEEN THEM. IT IS NOT THE INTENT OF THE DRAWINGS TO SHOW ALL PIPING & SHEET METAL OFFSETS & TRANSITIONS REQUIRED. THE CONTRACTOR SHALL FULLY COORDINATE THE WORK AND PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO COMPLETE THE WORK OUTLINED ON THESE CONTRACT DOCUMENTS. IF A CONFLICT IN POSITIONING OCCURS THE CONTRACTOR IS TO NOTIFY THE ENGINEER IMMEDIATELY TO ASCERTAIN WHAT THE INTENT WAS BY THE DESIGN
- E. CODES AND STANDARDS: WORK SHALL CONFORM TO THE CURRENT EDITIONS OF THE FOLLOWING:
- SHEET METAL SMACNA STANDARDS INTERNATIONAL MECHANICAL CODE
- INTERNATIONAL ENERGY CONSERVATION CODE
- . INTERNATIONAL EXISTING BUILDING CODE
- 5. ALL OTHER APPLICABLE STATE AND LOCAL CODES AND ORDINANCESOWNER STANDARDS AND BASE BUILDING SPECIFICATIONS AND STANDARDS.

F. PERMITS AND FEES:

- 1. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS; AND PAY ALL GOVERNMENT AND STATE SALES TAXES AND FEES WHERE APPLICABLE, AND OTHER COSTS, INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK, FILE ALL NECESSARY DRAWINGS, PREPARE ALL DOCUMENTS AND OBTAIN ALI NECESSARY APPROVALS OF ALL GOVERNMENTAL AND STATE DEPARTMENTS HAVING JURISDICTION, OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR HIS WORK, AND DELIVER A COPY TO THE OWNER AND ENGINEER BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.
- G. EXISTING SYSTEMS AND EQUIPMENT
- CONNECT WORK TO VARIOUS EXISTING SYSTEMS AS INDICATED ON THE DRAWINGS. WORK SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM CONDITIONS. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED AS WELL AS WITH EXISTING SYSTEMS, THE STRUCTURE, AND OTHER OBSTRUCTIONS.
- 2. PROVIDE THE FOLLOWING SERVICES ON ALL EXISTING HVAC EQUIPMENT INDICATED TO
- a. CALIBRATE CONTROLS

H. SURVEY AND MEASUREMENTS

- THIS PROJECT INVOLVES CONSTRUCTION INSIDE AN EXISTING STRUCTURE CONTRACTORS BY SUBMITTING A BID, SHALL BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITION OF THE BUILDING AS IT INFLUENCES THE WORK DESCRIBED. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY IDENTIFIED BY EXPERIENCED OBSERVERS.
- 2 DO NOT SCALE DRAWINGS SCALE INDICATED ON DRAWINGS IS FOR ESTABLISHING REFERENCE POINTS ONLY. ACTUAL FIELD CONDITIONS SHALL GIVERN ALL DIMENSIONS.
- 3. PRIOR TO ORDERING ANY MATERIALS AND EQUIPMENT, THOROUGHLY REVIEW THE SITE CONDITIONS TO DETERMINE IF ADEQUATE CLEARANCES AND ACCESS IS ALLOWED TO INSTALL THE COMPONENTS. ORDER EQUIPMENT BROKEN DOWN AS NECESSARY TO ALLOW FOR PROPER RIGGING THROUGH THE PROJECT AREA. PROVIDE ALL NECESSARY ALTERATIONS TO THE STRUCTURE OF THE BUILDING AS NECESSARY TO RIG THE EQUIPMENT
- 4. CONTRACTORS SHALL VERIFY, LAYOUT AND BE RESPONSIBLE FOR ALL MEASUREMENTS OF ALL EXISTING CONDITIONS BEFORE COMMENCING WORK AND SHALL NOTIFY ARCHITECT AND/OR ENGINEER IF A CONDITION EXISTS THAT PREVENTS THE CONTRACTOR FROM ACCOMPLISHING THE INTENT OF THE DRAWINGS.

I. SUBMITTALS AND SHOP DRAWINGS

- 1. SUBMIT FOR REVIEW, ELECTRONIC SHOP DRAWINGS IN SEARCHABLE PDF FORMAT FOR THE
- a. SUBMITTAL DATA FOR ALL MATERIAL AND EQUIPMENT. CLEARLY IDENTIFY DEVIATIONS OF THE SUBMITTED PRODUCTS FROM THE DESIGN.
- b. DUCTWORK AND PIPING SHOP DRAWINGS: DRAWN TO ACCURATE SCALE OF 1/4"=1'0". HIGHLIGHT, ENCIRCLE OR OTHERWISE INDICATE DEVIATIONS FROM THE CONTRACT DOCUMENTS. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD. INFORMATION AS THE BASIS OF SHOP DRAWINGS. STANDARD INFORMATION PREPARED WITHOUT SPECIFIC REFERENCE TO THE PROJECT IS NOT CONSIDERED SHOP DRAWINGS.
- c. CONTROLS SHOP DRAWINGS: INCLUDE EQUIPMENT AND SYSTEM CONTROL SCHEMATICS, SEQUENCES OF OPERATIONS, LOGIC DIAGRAMS AND SYSTEM COMPONENTS INCLUDING DETAILS OF TIE-IN TO EXISTING BUILDING CONTROL MANAGEMENT SYSTEM.
- 2. DO NOT USE SHOP DRAWINGS WITHOUT AN APPROPRIATE FINAL STAMP INDICATING ACTION TAKEN IN CONNECTION WITH CONSTRUCTION.
- 3. DO NOT ORDER ANY MATERIALS OR EQUIPMENT PRIOR TO RECEIVING FINAL APPROVED
- 4. SCHEDULE AT LEAST TEN WORKING DAYS EXCLUSIVE OF TRANSMITTAL TIME, FOR SUBMITTAL REVIEW

J. AS-BUILT DRAWINGS

MAINTAIN ONE SET OF PRINTS ON THE SITE AND NOTE ALL CHANGES OR DEVIATIONS FROM THE ORIGINAL DESIGN THEREON. AT THE COMPLETION OF THE PROJECT, INCORPORATE ALL CHANGES INTO RECORD AS-BUILT DRAWINGS IN ELECTRONIC FORMAT AND SUBMIT FOR

K. OPERATION AND MAINTENANCE

- 1. UPON COMPLETION OF ALL WORK AND TESTS, THE CONTRACTOR SHALL INSTRUCT THE OWNER OR THE OWNER'S REPRESENTATIVE IN THE OPERATION, ADJUSTMENT AND MAINTENANCE OF ALL EQUIPMENT FURNISHED. THE CONTRACTOR SHALL GIVE AT LEAST SEVEN (7) DAYS NOTICE TO THE OWNER AND THE ENGINEER IN ADVANCE OF THIS PERIOD
- THE CONTRACTOR SHALL PREPARE THREE (3) COPIES OF A COMPLETE OPERATION AND MAINTENANCE MANUAL, BOUND IN BOOKLET FORM. ORGANIZE OPERATING AND MAINTENANCE DATA INTO SUITABLE SETS OF MANAGEABLE SIZE. BIND PROPERLY INDEXED DATA IN INDIVIDUAL HEAVY-DUTY 3-RING VINYL-COVERED BINDERS, WITH POCKET FOLDERS FOR FOLDED SHEET INFORMATION AND DESIGNATION PARTITIONS WITH IDENTIFICATION TABS. MARK APPROPRIATE IDENTIFICATION ON FRONT AND SPINE OF EACH BINDER.
- 3. OPERATION AND MAINTENANCE MANUAL SHALL INCLUDE THE FOLLOWING:
- a. MANUFACTURER'S PRINTED OPERATING AND MAINTENANCE PROCEDURES.
- b. MAINTENANCE PROCEDURES FOR ROUTINE PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING.
- c. COPIES OF WARRANTIES.
- d. APPROVED SHOP DRAWINGS AND PRODUCT DATA.
- e. BALANCE REPORTS.
- f. INCLUDE IN THE MANUAL, A TABULATED EQUIPMENT SCHEDULE FOR ALL EQUIPMENT. SCHEDULE SHALL INCLUDE PERTINENT DATA SUCH AS: MAKE, MODEL NUMBER, SERIAL NUMBER, VOLTAGE, NORMAL OPERATING CURRENT, BELT SIZE, FILTER QUANTITIES AND SIZES, BEARING NUMBER, ETC. SCHEDULE SHALL INCLUDE MAINTENANCE TO BE DONE AND FREQUENCY.
- 4. MAINTENANCE AND INSTRUCTION MANUALS SHALL BE SUBMITTED TO THE OWNER AT THE SAME TIME AS THE SEVEN (7) DAY NOTICE IS GIVEN PRIOR TO THE INSTRUCTION PERIOD.

- ALL WORK AREAS SHALL BE LEFT AS CLEAN AS NEW. CLEAN INTERNALS OF ALL DUCTWORK AND AIR HANDLING UNITS AND REPLACE FILTERS AFTERWARDS
- 2. DUCTWORK: DUCTS SHALL BE THOROUGHLY CLEANED SO THAT NO DIRT OR DUST SHALL BE DISCHARGED FROM DIFFUSERS, REGISTERS, OR GRILLES, WHEN SYSTEM IS OPERATED.
- PIPING: AFTER CONDENSATE PIPING HAS BEEN PRESSURE TESTED AND APPROVED FOR TIGHTNESS, CLEAN AND FLUSH PIPING
- 4. EQUIPMENT: AFTER COMPLETION OF PROJECT, CLEAN THE EXTERIOR SURFACE OF EQUIPMENT INCLUDED IN THIS SECTION, INCLUDING REMOVAL OF CONCRETE RESIDUE.
- WORK AREA: AFTER COMPLETION OF PROJECT, REMOVE ALL CONSTRUCTION DEBRIS. TEMPORARY FACILITIES AND EQUIPMENT FROM WORK AREA. CLEAN WORK AREA TO PERMIT

M. GUARANTEE

- N. GUARANTEE WORK OF THESE CONTRACT DOCUMENTS IN WRITING FOR NOT LESS THAN ONE (1) YEAR FROM DATE OF FINAL NOTICE OF ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD, PROMPT AND TO OWNER'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE WITHIN CONTRACT PRICE.MEANS AND METHODS ALL TRADES
- 1. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S
- 2. DO NOT BURN WASTE MATERIALS. DO NOT BURY DEBRIS OR EXCESS MATERIALS ON THE OWNER'S PROPERTY. DO NOT DISCHARGE VOLATILE, HARMFUL OR DANGEROUS MATERIALS INTO DRAINAGE SYSTEMS. REMOVE AND DISPOSE OF ALL WASTE MATERIALS, PACKAGING MATERIAL. SKIDS ETC. FROM THE SITE AND DISPOSE OF IN A LAWFUL MANNER IN ACCORDANCE WITH MUNICIPAL, STATE AND FEDERAL REGULATIONS.
- 3. MATERIALS AND EQUIPMENT SHALL BE UL LISTED WHERE STANDARD HAS BEEN
- 4. CAREFULLY INSPECT ALL BUILDING ELEMENTS PRIOR TO CUTTING OR DRILLING INTO WALL, FLOORS OR CEILINGS. PATCH AND PAINT SURFACES DISTURBED BY WORK UNDER THIS CONTRACT AS REQUIRED TO RESTORE THEM TO THEIR ORIGINAL CONDITION.
- 5. SCAFFOLDING, RIGGING, HOISTING: THE CONTRACTOR SHALL FURNISH ALL SCAFFOLDING, RIGGING, HOISTING AND SERVICES NECESSARY FOR ERECTION AND DELIVERY INTO THE PREMISES ANY EQUIPMENT AND APPARATUS FURNISHED UNDER THIS DIVISION. REMOVE SAME FROM PREMISES WHEN NO LONGER REQUIRED.
- 6. EXCAVATION AND BACKFILLING: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE SIZES, DEPTHS, FILL AND BEDDING REQUIREMENTS AND ANY OTHER EXCAVATION WORK REQUIRED UNDER THESE SPECIFICATIONS
- CONCRETE, ROOFS, EXTERIOR WALL AND FLOORS IN WET AREAS, THE METHOD OF INSTALLATION SHALL BE REVIEWED BY THE ENGINEER BEFORE WORK IS DONE. THE CONTRACTOR SHALL FURNISH ALL NECESSARY SLEEVES, CAULKING AND FLASHING REQUIRED TO MAKE OPENINGS ABSOLUTELY WATERTIGHT.

7 WATERPROCEING: WHERE ANY WORK PIERCES WATERPROCEING, INCLUDING WATERPROCE

- 8. PROVIDE FIRESTOPPING AROUND ALL FIRE PROTECTION, PLUMBING, MECHANICAL AND ELECTRICAL PENETRATIONS THROUGH FIRE RATED PARTITIONS. PROVIDE ASBESTOS FREE FIRESTOPPING SYSTEM CAPABLE OF MAINTAINING AN EFFECTIVE BARRIER AGAINST FLAME AND GASES. SYSTEM SHALL BE UL LISTED AND COMPLY WITH ASTM E 814.
- PROVIDE ACCESS PANELS IN WALLS, FLOORS AND GYPSUM WALL BOARD CEILINGS TO ALLOW ACCESS TO: DAMPERS, HEATERS, VALVES, VARIABLE AIR VOLUME BOXES, FAN BOXES AND OTHER APPARATUS AND FQUIPMENT REQUIRING PERIODIC SERVICE AND INSPECTION NOT ALL ACCESS PANELS ARE INDICATED ON THE PLANS. REVIEW ARCHITECTURAL AND MECHANICAL PLANS TO DETERMINE THE LOCATION AND QUANTITY OF ACCESS PANELS REQUIRED. COORDINATE TYPE AND LOCATION WITH ARCHITECTURAL

23 05 05 - DEMOLITION

- A. REFER TO DRAWINGS FOR GENERAL DESCRIPTION OF AREAS REQUIRING DEMOLITION.
- B. ANY DEMOLITION SHALL BE COORDINATED WITH OWNER, ARCHITECT, G.C.. AND ENGINEER
- EQUIPMENT AND MATERIALS THAT SHALL REMAIN THE PROPERTY OF THE OWNER.

C. REFER TO GENERAL CONTRACTOR'S/CONSTRUCTION MANAGER'S INSTRUCTIONS FOR EXISTING

- D. WHERE IT IS NOTED THAT ITEMS OF VALUE ARE NOT TO BE RETURNED TO THE OWNER, THE ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. STORAGE OR SALE OF ITEMS ON THE PROJECT SITE IS PROHIBITED. ITEMS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF.
- PROTECTION: ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING/SITE DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGE TO THE CONDITION BEFORE BEING DAMAGED TO THE SATISFACTION OF THE ARCHITECT AND OWNER. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST
- F. UTILITIES:
- MAINTAIN UTILITIES EXCEPT THOSE REQUIRING REMOVAL OR RELOCATION. KEEP UTILITIES IN SERVICE AND PROTECT FROM DAMAGE. DO NOT INTERRUPT UTILITIES SERVING IN-USE AREAS WITHOUT FIRST OBTAINING PERMISSION FROM THE UTILITY COMPANY AND THE
- 2. COORDINATE ALL INTERRUPTIONS OF SERVICES AND LIMITATIONS OF ACCESS WITH THE OWNER NO LESS THAN 5 DAYS PRIOR TO THE INTERRUPTION
- 3. PROVIDE TEMPORARY SERVICES AS REQUIRED. SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTION OF NEW WORK SHALL BE COORDINATED IN ADVANCE WITH THE CONSTRUCTION MANAGER AND BUILDING OWNER.
- DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
- 1. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL
- 2. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT 3. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE. CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT,
- AND MAKE EQUIPMENT OPERATIONAL. 4. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND
- REMOVE EQUIPMENT AND DELIVER TO OWNER H. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY.

- G. DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
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- AND MAKE EQUIPMENT OPERATIONAL 4. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND
- REMOVE EQUIPMENT AND DELIVER TO OWNER. H. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW

23 05 13 - MOTORS, STARTERS AND WIRING

PRODUCTS OF EQUAL CAPACITY AND QUALITY.

- A. PROVIDE MOTORS AND CONTROLS, AND FURNISH STARTERS FOR HVAC EQUIPMENT, EXCEPT UNITS SERVED BY MCC PROVIDED UNDER ELECTRICAL SECTION. PROVIDE CONTROL AND OTHER RELATED WIRING INCLUDING INTERLOCKS. ALL MOTORS SHALL TO BE PREMIUM EFFICIENCY. ALL THREE PHASE MOTORS SHALL BE RATED FOR INVERTER DUTY SERVICE.
- B. STARTERS THAT REQUIRE INTERLOCKS OR REMOTE CONTROL SHALL BE MAGNETIC WITH HAND-OFF-AUTOMATIC SWITCH (FAST-SLOW-OFF-AUTO FOR TWO SPEED MOTORS) IN COVER. STARTERS SHALL BE BY SINGLE MANUFACTURER: CUTLER-HAMMER, CLARK, ARROW HART OR

23 05 17 - SLEEVES AND PENETRATIONS

A. GENERAL REQUIREMENTS

LAY OUT PENETRATION AND SLEEVE OPENINGS IN ADVANCE. COORDINATE WORK CAREFULLY WITH ARCHITECTURAL AND STRUCTURAL WORK. PROVIDE CORE DRILLING OF EXISTING CONSTRUCTION WHERE REQUIRED. SUBMIT PROPOSED LOCATIONS FOR REVIEW PRIOR TO CORE DRILLING

MAINTAIN FIRE RATING OF WALLS, PARTITIONS, CEILINGS, AND FLOORS AT PENETRATIONS.

- SEAL PENETRATIONS WITH APPROVED FIRESTOP MATERIALS.
- 3. SLEEVES FOR INSULATED PIPE AND DUCT IN NON-FIRE RATED CONSTRUCTION SHALL ACCOMMODATE CONTINUOUS INSULATION WITHOUT COMPRESSION.
- - PROVIDE HOT-DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS AND CONCRETE FLOOR AND ROOF SLABS.
- PROVIDE 26 GAUGE GALVANIZED STEEL SLEEVES THROUGH PARTITIONS AND NON-FIRE-RATED CONSTRUCTION.
- PROVIDE MECHANICAL SLEEVE SEALS CONSISTING OF INTERLOCKING MODULES AT EXTERIOR PIPE PENETRATIONS.
- PROVIDE ADJUSTABLE ESCUTCHEONS ON EXPOSED PIPING THAT PASSES THROUGH FINISHED FLOORS, WALLS AND CEILINGS. ESCUTCHEONS SHALL BE CHROMIUM-PLATED CAST BRASS, SIZED TO COVER SLEEVE OPENING AND TO ACCOMMODATE PIPE AND INSULATION.

23 05 29 - HANGERS AND SUPPORTS

- A. PROVIDE PIPE STANDS, SUPPORTS, HANGERS AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK REQUIRED BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES. STRUCTURAL STEEL SUPPORTS, HANGERS, ETC. SHALL BE ANGLE IRON, STEEL CHANNEL OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. ALL SUPPORTS, HANGERS, BRACKETS, ETC., SHALL BE AS APPROVED BY THE ENGINEER.
- B. ALL HANGERS SHALL BE GALVANIZED.
- C. ATTACH HANGERS AND SUPPORTS DIRECTLY ONTO THE STRUCTURE BY FIRST REMOVING FXISTING FIRE PROOFING AND AFTER SECURING THE ATTACHMENT, REPAIRING THE FIRE PROOFING TO ITS ORIGINAL CONDITION, CONTINUOUSLY OVER THE ATTACHMENT.
- FOR EXPANSION BOLTS/SHIELDS USE RED HEAD, HILTI OR WEJ-IT SELF DRILLING OR STEEI SHIELD, LOAD RATED. DO NOT USE DRILLED ANCHORS IN POST TENSION SLABS WITHOUT APPROVAL OF OWNER. DO NOT CUT REINFORCING STEEL WITH DRILLED INSERTS.
- SUPPORT ALL GALVANIZED DUCTWORK WITH GALVANIZED HANGERS AND MOUNTS AS REQUIRED BY SMACNA (8 FT SPACING). DO NOT SUPPORT RISERS FROM SLEEVES IN SLABS.

23 05 53 - PIPE AND DUCT IDENTIFICATION

- A. PIPING SHALL BE LABELED WITH PREPRINTED SELF-ADHESIVE. PREMIUM GRADE VINYL. COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.
- B. VALVES SHALL BE TAGGED WITH STAMPED OR ENGRAVED BRASS VALVE TAGS. INSTALL TAGS ON VALVES AND CONTROL DEVICES IN PIPING SYSTEMS. EXCEPT CHECK VALVES: VALVES WITHIN FACTORY-FABRICATED EQUIPMENT UNITS; SHUTOFF VALVES; FAUCETS; CONVENIENCE AND LAWN-WATERING HOSE CONNECTIONS; AND HVAC TERMINAL DEVICES AND SIMILAR ROUGHING-IN CONNECTIONS OF END-USE FIXTURES AND UNITS. LIST TAGGED VALVES IN A
- MACHINERY SUCH AS HP's, ETC., SHALL BE LABELED WITH PLASTIC LABELS WITH ENGRAVED EQUIPMENT NUMBER CORRESPONDING TO DRAWING SCHEDULE NUMBERS.

23 05 93 - TESTING ADJUSTING AND BALANCING

- A. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR START-UP. TESTING AND BALANCING OF MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN IN SCHEDULES, AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY INSPECTORS, OWNERS AND ARCHITECT
- PROVIDE THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING (TAB) AGENCY TO PROVIDE TAB SERVICES FOR THE MECHANICAL SYSTEMS. THE TAB AGENCY SHALL BE CERTIFIED BY NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) OR THE ASSOCIATED AIR BALANCE COUNCIL (AABC) IN THOSE TESTING AND BALANCING DISCIPLINES REQUIRED FOR THIS PROJECT. THE TAB AGENCY SHALL HAVE AT LEAST ONE PROFESSIONAL ENGINEER REGISTERED IN THE STATE IN WHICH THE SERVICES ARE TO BE PERFORMED AND CERTIFIED BY NEBB OR AABC AS A TEST AND BALANCE ENGINEER.
- PRIOR TO TESTING, ADJUSTING, AND BALANCING, THE MECHANICAL CONTRACTOR SHALL VERIFY THAT THE SYSTEMS HAVE BEEN INSTALLED AND ARE OPERATING AS SPECIFIED. APPROVED SHOP DRAWINGS, AS BUILT DRAWINGS, AND ALL OTHER DATA REQUIRED FOR EACH SYSTEM AND/OR COMPONENT TO BE TESTED SHALL BE MADE AVAILABLE AT THE JOB SITE DURING THE ENTIRE TAB EFFORT. THE OWNER SHALL BE NOTIFIED IN WRITING OF ALL EQUIPMENT, COMPONENTS, OR BALANCING DEVICES, THAT ARE DAMAGED, INCORRECTLY INSTALLED, OR MISSING. AS WELL AS ANY DESIGN DEFICIENCIES THAT WILL PREVENT PROPER TESTING. ADJUSTING, AND BALANCING. TESTING, ADJUSTING, AND BALANCING SHALL NOT COMMENCE UNTIL APPROVED BY THE OWNER.
- PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM IDENTIFIED, IN ACCORDANCE WITH THE DETAILED PROCEDURES OUTLINED IN EITHER NEBB: "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR AABC: "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE." THE TAB AGENCY SHALL TEST, ADJUST, AND BALANCE THE FOLLOWING MECHANICAL SYSTEMS:
 - ALL AIR HANDLING EQUIPMENT
 - VRF EQUIPMENT **ERV EQUIPMENT** VERIFY OPERATION OF ALL TEMPERATURE CONTROL SYSTEMS
- SUBMIT TESTING, ADJUSTING, AND BALANCING REPORTS BEARING THE SEAL AND SIGNATURE OF THE TAB PROFESSIONAL ENGINEER. PREPARE A REPORT OF RECOMMENDATIONS FOR CORRECTING UNSATISFACTORY MECHANICAL PERFORMANCES WHEN A SYSTEM CANNOT BE SUCCESSFULLY BALANCED.
- START UP ALL SYSTEMS, PRESSURE TEST DUCTWORK AND PIPING, AND BALANCE SYSTEMS INCLUDING, BUT NOT LIMITED TO, ALL NEW AND EXISTING REGISTERS, GRILLES, DIFFUSERS, TERMINAL UNITS, FANS, ETC. WITHIN THE AREA OF WORK TO PERFORMANCE DATA SHOWN ON PLANS, SCHEDULES, AND AS SPECIFIED.
- G. DO NOT COVER OR CONCEAL WORK BEFORE TESTING AND INSPECTION AND OBTAINING
- H. LEAKS, DAMAGE AND DEFECTS DISCOVERED OR RESULTING FROM STARTUP, TESTING, AND BALANCING SHALL BE REPAIRED OR REPLACED TO LIKE-NEW CONDITION WITH ACCEPTABLE MATERIALS. TEST SHALL BE CONTINUED UNTIL SYSTEM OPERATES WITHOUT ADJUSTMENT OR
- REPORT ON REPORTING FORMS, SUBMITTED TO ARCHITECT FOR APPROVAL IN ADVANCE.
- SUBMIT PROCEDURES, RECORDING FORMS, AND TEST EQUIPMENT FOR REVIEW PRIOR TO BALANCING, AS DESCRIBED IN SPECIFICATIONS. SUBMIT ELECTRONIC COPY OF TESTING AND BALANCING REPORTS TO ARCHITECT FOR APPROVAL.
- FURNISH ALL TEST MEDIUMS AND DISPOSE OF ALL TEST MEDIUMS AT AN APPROVED OFF-SITE LOCATION AFTER TESTING IS COMPLETE.
- L. NOTE REQUIREMENT ABOVE FOR CFM AND STATIC PRESSURE READINGS PRIOR TO DEMOLITION. M. THE BALANCING CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL DIRECTIONAL ADJUSTMENT OF ALL LINEAR DIFFUSERS AS INDICATED ON PLANS. IF NO DIRECTIONAL FLOW IS INDICATED INTERIOR LINEAR DIFFUSERS SHALL BE DIRECTED HORIZONTALLY AND PERIMETER LINEAR

DIFFUSER SHALL BE DIRECTED VERTICALLY, IF PERIMETER LINEAR DIFFUSERS HAVE MULTIPLE

SLOTS THE PERIMETER SLOT DIRECTED VERTICALLY, AND THE INTERIOR SLOT DIRECTED

HORIZONTALLY TOWARDS THE INTERIOR SPACE.

23 07 13 - HVAC INSULATION

A. GENERAL REQUIREMENTS

- INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVE AND SEALANT COUNCIL STANDARDS AND SMACNA. INSTALL INSULATION. MASTICS. ADHESIVES. COATINGS. COVERS. WEATHER-PROTECTION AND OTHER WORK IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ASTM E-84 FIRE HAZARD RATINGS SHALL BE 25 FLAME SPREAD, 50 SMOKE DEVELOPED.
- INSULATION AND VAPOR BARRIER SHALL BE CONTINUOUS AROUND ENTIRE PERIMETER OF DUCTS. DUCTS SUPPORTED BY METAL STRAPS SHALL HAVE INSULATION ENCOMPASSING STRAPS, WHERE STRAPS PENETRATE AT TOP OF DUCT TIGHTLY SEAL AROUND STRAP WITH INSULATING TAPE. DUCTS SUPPORTED BY TRAPEZE TYPE HANGERS UNDER DUCTS SHALL HAVE 6 LB. DENSITY RIGID INSULATION PROVIDED BETWEEN DUCT AND HANGER. INSULATION SHALL BE SAME THICKNESS AND VAPOR BARRIER AS SPECIFIED FOR SPECIFIC DUCT TYPE. RIGID INSULATION SECTION SHALL BE FULL WIDTH OF DUCT AND MINIMUM 12' LONG. TAPE AND SEAL ALL SEAMS WHERE RIGID INSULATION MEETS OTHER INSULATION.
- FITTINGS. VALVES AND FLANGES SHALL BE INSULATED WITH SAME MATERIAL AND TO SAME THICKNESS AS ADJOINING PIPE INSULATION. WITH PRESENT SECTIONS.
- 4. FOR STRAINERS AND OTHER VALVES OR FITTINGS WHICH NEED MAINTENANCE, PROVIDE PREFORMED REMOVABLE INSULATION SECTION.

PRODUCTS AND APPLICATIONS

- REFRIGERANT LINE AND CONDENSATE DRAIN LINE INSULATION SHALL BE 1 INCH THICK FLEXIBLE ELASTOMERIC. ACCEPTABLE MANUFACTURERS: ARMACELL OR K-FLEX.
- 2. CONDENSATE DRAIN LINE INSULATION SHALL BE 1 INCH THICK FLEXIBLE ELASTOMERIC. ACCEPTABLE MANUFACTURERS: ARMACELL OR K-FLEX.

23 09 00 - INSTRUMENTATION AND CONTROLS

- PROVIDE COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS (ATC). CONTROL SYSTEM SHALL BE CAPABLE OF PERFORMING ALL SEQUENCES OF OPERATION SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS. INDIVIDUAL CONTROL COMPONENTS MAY NOT BE SHOWN ON CONTRACT DOCUMENTS, BUT THE CONTRACTOR SHALL SUPPLY ALL COMPONENTS, AND CONTROL WIRING NECESSARY FOR A COMPLETE OPERABLE SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SYSTEM COMPONENTS, WHETHER THE ELECTRICAL OR OTHER WORK IS SUBCONTRACTED OR NOT.
- B. CONNECT ALL NEW FANS, ERV'S, AND VRF SYSTEMS TO EXISTING JOHNSON CONTROLS BMS
- INSTALL THERMOSTATS AT MOUNTING HEIGHTS ABOVE FINISHED FLOOR IN ACCORDANCE WITH "ADA" REQUIREMENTS, OR AS DIRECTED OTHERWISE BY ARCHITECT.
- ALL SAFETY SWITCHES AND CUT OUTS SHALL BE FIELD CALIBRATED AND SET PRIOR TO START-
- E. ALL CONTROL WIRING SHALL COMPLY WITH THE REQUIREMENTS OF THE ELECTRICAL
- F. SUBMIT TO ARCHITECT A POINT-TO-POINT WIRING DIAGRAM AND AIR PIPING LAYOUT SHOWING MANUFACTURERS AND MODEL NUMBERS OF ALL CONTROL COMPONENTS. INCLUDE WRITTEN DESCRIPTION OF SYSTEM OPERATION.
- WIRING BETWEEN FIRE ALARM SYSTEM AND TEMPERATURE CONTROL SYSTEM, EXCEPT FOR
- DUCT MOUNTED SMOKE DETECTORS, SHALL BE BY MECHANICAL CONTRACTOR. ROOM THERMOSTAT SENSORS AND TRANSMITTERS IN PUBLIC AREAS SHALL HAVE METAL COVER WITH TAMPER PROOF SCREWS AND CONCEALED ADJUSTMENT. THERMOSTATS FOR PRIVATE OFFICES SHALL HAVE EXPOSED DIAL FOR SETPOINT ADJUSTMENT. HEATING/COOLING THERMOSTATS SHALL HAVE AN ADJUSTABLE DEADBAND.
- LOCAL CONTROLLERS, RELAYS, SWITCHES, AND OTHER CONTROL COMPONENTS SHALL BE MOUNTED ON ENCLOSED CONTROL PANELS WITH HINGE-LOCK DOOR MOUNTED NEXT TO SYSTEM CONTROLLED. TEMPERATURE SETTINGS, ADJUSTMENTS AND CALIBRATIONS SHALL BE MADE AT SYSTEM CONTROL PANEL. PANEL SHALL HAVE CANOPY LIGHT AND ON-OFF SWITCH.

<u>23 21 00 - PIPING</u>

A. GENERAL REQUIREMENTS

PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS INDICATED IN SCHEDULE OF PIPE AND FITTING MATERIALS. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.

1. CONDENSATE DRAIN (INCLUDING PUMPED CONDENSATE): 125 PSI WORKING PRESSURE.

B. SCHEDULE OF PIPE AND FITTING MATERIALS

JENKINS. STOCKHOLM OR MILWAUKEE.

- TYPE L COPPER WITH SOLDERED COPPER JOINTS. 2. REFRIGERANT PIPING: TYPE ACR COPPER
- VALVES AND STRAINERS 1. VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. VALVES SHALL BE AS MANUFACTURED BY APOLLO, CRANE, HAMMOND.

23 31 00 - HVAC DUCTS

- A. GENERAL REQUIREMENTS FOR GALVANIZED DUCTWORK, SEAL AIR DUCT JOINTS AND JOINTS BETWEEN FITTINGS AND DUCTS WITH HARDCAST SEALANT OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- 2. DUCTWORK SHALL BE FREE FROM VIBRATION UNDER ALL CONDITIONS OF OPERATION.
- REFLECTED CEILING PLANS. 4. DIFFUSER SIZES SHOWN ARE NECK SIZES; REGISTER AND GRILLE SIZES ARE NOMINAL.

3. DIFFUSER & REGISTER LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL

- ALL DUCTS PENETRATING RATED FIRE WALLS SHALL BE PROVIDED WITH FIRE DAMPERS AND
- 6. DUCTWORK SHALL NOT RUN ALONG FULL HEIGHT PARTITIONS. 7. PATCH AND SEAL ALL EXISTING OPENINGS IN DUCTWORK NOT UTILIZED FOR NEW LAYOUT
- 8. THE INSIDE OF ALL UNLINED DUCTWORK VISIBLE THROUGH A GRILLE OR DIFFUSER SHALL BE PAINTED FLAT BLACK. 9. WHEN SECTION OF DUCTWORK IS NOT LABELED FOR SIZE, THE LARGER SIZE INDICATED ON
- THE CONNECTED DUCT SHALL PREVAIL. SIZE OF DUCT RUN-OUTS TO DIFFUSER SHALL EQUAL DIFFUSER NECK SIZE 10. DUCT BRANCH CONNECTIONS AND TAKE OFFS SHALL BE MADE WITH 45° CONNECTION,
- BELLMOUTH OR CONICAL ONLY. SPIN IN COLLARS AND STRAIGHT TAPS SHALL NOT BE USED. 11. ELBOWS AND BENDS FOR RECTANGULAR DUCTS SHALL HAVE CENTER LINE RADIUS OF 1.5 TIMES DUCT WIDTH WHEREVER POSSIBLE. WHERE CENTERLINE RADIUS IS LESS THAN 1.5 TIMES DUCT WITH, ELBOWS SHALL BE RADIUS THROAT WITH RADIUS HEEL AND FULL-
- LENGTH SPLITTER VANES. 12. NO PIPE, CONDUIT, HANGER, ARCHITECTURAL ELEMENT NOR STRUCTURAL MEMBER SHALL

PASS THROUGH DUCT WITHOUT ARCHITECT'S AND/OR ENGINEER'S WRITTEN APPROVAL. B. SHEETMETAL DUCTWORK

SHEET METAL DUCTS SHALL BE CONSTRUCTED OF HOT DIPPED G90 GALVANIZED SHEET METAL UNLESS OTHERWISE SPECIFIED. MATERIAL, CONSTRUCTION AND INSTALLATION SHALL MEET REQUIREMENTS OF MOST RECENT EDITIONS OF SMACNA STANDARDS (EXCEPT FOR MORE STRINGENT REQUIREMENTS SPECIFIED OR SHOWN ON DRAWINGS). ALL MEDIUM PRESSURE DUCTWORK BETWEEN MAIN SYSTEM FAN AND AIR TERMINAL DEVICE SHALL BE MINIMUM 4"(wg) PRESSURE CLASS, SEAL CLASS A, LEAKAGE CLASS 6. ALL LOW-PRESSURE DUCTWORK BÉTWEEN TERMINAL DEVICE AND AIR OUTLETS SHALL BE MINIMUM 2"(wg) PRESSURE CLASS. SEAL CLASS B, LEAKAGE CLASS 12

FLEXIBLE DUCTWORK

- 1. FLEXIBLE DUCTWORK, CONNECTING TO UNINSULATED OR UNLINED DUCT, SHALL BE VINYL COATED FIBERGLASS CLOTH 0.0057" MINIMUM THICKNESS, 25 STRANDS PER INCH MINIMUM THREAD COUNT WITH CORROSION-RESISTANT HELICAL WIRE REINFORCEMENT. FLEX DUCT SHALL BE UL RATED FOR 12" W.C. POSITIVE PRESSURE, 2" W.C. NEGATIVE PRESSURE WITH A MAXIMUM VELOCITY OF 4000 FPM FLEXDUCT MUST BE LISTED AS A CLASS 1 CONNECTOR ACCORDING TO UI 181 AND SHALL MEET THE REQUIREMENTS OF NFPA 90A - MAXIMUM ASTM E-84 FIRE HAZARD RATING SHALL BE 25 FLAME SPREAD, 50 FUEL CONTRIBUTED, AND 50 SMOKE DEVELOPED. UNINSULATED FLEXIBLE DUCT SHALL BE EQUIVALENT TO FLEXMASTER
- FLEXIBLE DUCT CONNECTED TO INSULATED OR LINED DUCT SHALL BE INSULATED WITH 1-1/2". 1/2 LB. DENSITY FIBERGLASS INSULATION AND FLAME RETARDANT (UL LISTED) VAPOR BARRIER. MEETING ASTM E-84 RATING AS REFERENCED ABOVE.
- 3. FLEXIBLE DUCTS SHALL NOT EXCEED 5 FEET LONG AND SHALL BE USED FOR STRAIGHT RUN ONLY, NO OFFSETS OR TURNS. MAXIMUM SAG OF 1/2" PER 1"-0".
- HANGER AND SADDLE IN CONTACT WITH FLEXIBLE DUCT SHALL BE WIDE ENOUGH TO PREVENT RESTRICTION OF INTERNAL DUCT DIAMETER WHEN WEIGHT OF SUPPORTED SECTION RESTS ON HANGER OR SADDLE MATERIAL

- 5. COLLARS TO WHICH FLEXIBLE DUCTS ARE ATTACHED SHALL BE AT LEAST 2" LONG. SLEEVES FOR JOINING SECTIONS OF FLEXIBLE DUCT SHALL BE AT LEAST 4" LONG.
- 6. APPLY SEALING COMPOUND TO METALLIC SURFACE AT CONNECTION OF FLEXIBLE DUCT WITH SHEET METAL DUCTS, COLLARS AND MIXING BOXES. SLIP FLEXIBLE DUCTWORK OVER SEALING COMPOUND. COMPLETE SEAL WITH 1/2" WIDE,

23 81 00 - DECENTRALIZED UNITARY HVAC EQUIPMENT

COMMERCIALLY-MADE METAL DRAW BANDS.

A. SPLIT SYSTEM AIR CONDITIONERS

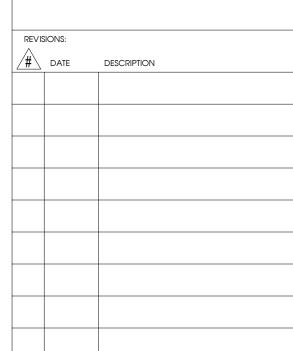
- PROVIDE COMPLETE DX SYSTEM OF TYPES. SIZES. AND CAPACITIES SHOWN ON SCHEDULES. SYSTEM SHALL CONSIST OF MATCHING AIR COOLED CONDENSING UNITS, COMPRESSORS, PIPING, CONTROLS, WIRING, AND OTHER ACCESSORIES AND APPURTENANCES NECESSARY TO PROVIDE FULLY AUTOMATICALLY FUNCTIONING SYSTEM. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK OR DAIKIN.
- DX AIR CONDITIONING SYSTEM SHALL BE CAPABLE OF STARTING AND OPERATING DOWN TO 0°F AMBIENT. LOW AMBIENT OPERATION SHALL BE ACCOMPLISHED BY VARYING THE SPEED OF CONDENSER FAN BASED ON SENSING OF HEAD PRESSURE II REFRIGERANT LIQUID LINE, BY MODULATING DAMPER IN CONDENSER FAN DISCHARGE BASED ON REFRIGERANT HEAD PRESSURE SENSING, OR BY FLOODING THE CONDENSER COIL WITH LIQUID REFRIGERANT TO MAINTAIN THE DESIRED CONDENSER PRESSURE. PROVIDE TIME DELAY RELAY FOR TIMED BYPASS OF THE LOW PRESSURE SWITCH OR OTHER MEANS TO START CONDENSING UNIT AT 0°F WITHOUT NUISANCE SAFETY TRIP UNITS. WHEN SPECIFIED, HOT GAS BYPASS IS TO BE PRE-PIPED INTEGRAL TO THE UNIT.
- PROVIDE REFRIGERANT PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND AC UNIT. PROVIDE ALL NECESSARY AUXILIARIES AND APPURTENANCES. REFRIGERANT PIPING SHALL BE ACR COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS. REFRIGERANTS SHALL BE R-410A.



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IFICATION:			



NTS

MECHANICAL

DRAWING NO.

DRAWN BY:

TPG

29 NOV. 2023

JOB NUMBER: 22013

REVIEWED BY:

SECTION 26 04 00 - GENERAL CONDITIONS FOR ELECTRICAL TRADES

A. DESCRIPTION

- THIS PROJECT COMPRISES ALTERATIONS AND RENOVATIONS TO THE EXISTING BUILDING THE EXISTING BUILDING IS CURRENTLY OCCUPIED AND THE PROJECT WILL PROCEED IN A
- MANNER WHICH WILL MINIMIZE ANY INCONVENIENCE TO THE BUILDING OCCUPANTS. 2. SCOPE OF WORK CONSISTS OF INSTALLATION OF MATERIALS TO BE FURNISHED UNDER THE CONTRACT DOCUMENTS AND WITHOUT LIMITING GENERALITY THEREOF CONSISTS OF FURNISHING LABOR, MATERIALS, EQUIPMENT, HOISTING, PLANT, TRANSPORTATION, RIGGING STAGING, APPURTENANCES, AND SERVICES NECESSARY AND/OR INCIDENTAL TO PROPERLY COMPLETE ALL WORK AS SHOWN ON THE DRAWINGS AND AS DESCRIBED HEREIN.

- FURNISH: THE TERM "FURNISH" MEANS TO "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS.
- INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING,
- CLEANING. AND SIMILAR OPERATIONS.' PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY
- FOR THE INTENDED USE. REMOVE: THE TERM REMOVE MEANS TO DISCONNECT FROM ITS PRESENT POSITION;
- REMOVE FROM THE PREMISES AND TO DISPOSE OF IN A LEGAL MANNER." SUBSTITUTIONS: "SUBSTITUTIONS" ARE REQUESTS FOR CHANGES IN PRODUCTS, MATERIALS AND METHODS OF CONSTRUCTION AS PROPOSED BY THE CONTRACTOR AFTER AWARD OF

C. EQUIPMENT EQUIVALENTS AND SUBSTITUTIONS:

- CERTAIN MANUFACTURERS OF MATERIAL, APPARATUS OR APPLIANCES ARE INDICATED IN THE DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. THESE ITEMS HAVE BEEN USED AS THE BASIS OF DESIGN. AND AS A CONVENIENCE IN FIXING THE MINIMUM STANDARD OF WORKMANSHIP, FINISH AND DESIGN THAT IS REQUIRED. IF THE CONTRACTORS USES AN "APPROVED EQUAL" ALTERNATIVE TO THE BASIS OF DESIGN, AND IF THE FEATURES OF THAT ALTERNATIVE HAVE AN IMPACT ON OTHER COMPONENTS OF THE PROJECT, THE CONTRACTOR SHALL INCLUDE THE NECESSARY ADJUSTMENTS IN THOSE COMPONENTS, WHETHER FOR ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, FIRE PROTECTION, OR ANY OTHER ELEMENTS, PLUS ANY ADJUSTMENTS FOR DIFFERENCE IN
- PERFORMANCE EQUIPMENT, MATERIAL OR DEVICES SUBMITTED FOR REVIEW AS AN "EQUIVALENT" SHALL MEET THE FOLLOWING REQUIREMENTS: A. THE EQUIVALENT SHALL HAVE THE SAME CONSTRUCTION FEATURES SUCH AS, BUT NOT
- a. MATERIAL THICKNESS, GAUGE, WEIGHT, DENSITY, ETC.
- WELDED, RIVETED, BOLTED, ETC., CONSTRUCTION
- FINISH, UNDERCOATING, CORROSION PROTECTION THE EQUIVALENT SHALL PERFORM WITH THE SAME OR BETTER OPERATING EFFICIENCY.
- THE EQUIVALENT SHALL BE LOCALLY REPRESENTED BY THE MANUFACTURER FOR SERVICE, PARTS AND TECHNICAL INFORMATION. THE EQUIVALENT SHALL BEAR THE SAME LABELS OF PERFORMANCE CERTIFICATION AS IS APPLICABLE TO THE SPECIFIED ITEM, SUCH AS UL OR NEMA LABELS OR DLC

- PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO COMPLETE THE WORK OUTLINED ON THESE CONTRACT DOCUMENTS. THE CONTRACTOR IS TO NOTE THAT THESE DOCUMENTS ARE DIAGRAMMATIC ONLY AND THAT FINAL PLACEMENT OF EQUIPMENT OR DEVICES IN THE FIELD MAY NOT DIRECTLY CORRESPOND TO THAT WHICH IS SHOWN ON THE DRAWINGS. IF A CONFLICT IN POSITIONING OCCURS THE CONTRACTOR IS TO NOTIFY THE ENGINEER IMMEDIATELY TO ASCERTAIN WHAT THE INTENT WAS BY THE DESIGN **PROFESSIONAL**
- WHERE VARIANCES OCCUR BETWEEN THE DRAWINGS AND SPECIFICATIONS OR WITHIN EITHER OF THE DOCUMENTS, THE ITEM OR ARRANGEMENT OF BETTER QUALITY, HIGHER ENGINEER SHALL DECIDE ON THE ITEM AND THE MANNER IN WHICH THE WORK SHALL BE

E. SURVEY AND MEASUREMENTS:

- PRIOR TO SUBMITTING BID. VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK TO BE PERFORMED. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY IDENTIFIED BY EXPERIENCED OBSERVERS. INCLUDE IN THE BID ALL **DEMOLITION WORK REQUIRED**
- DO NOT SCALE DRAWINGS. SCALE INDICATED ON DRAWINGS IS FOR ESTABLISHING REFERENCE POINTS ONLY. ACTUAL FIELD CONDITIONS SHALL GOVERN ALL DIMENSIONS. PRIOR TO ORDERING ANY MATERIALS AND EQUIPMENT. THOROUGHLY REVIEW THE SITE CONDITIONS TO DETERMINE IF ADEQUATE CLEARANCES AND ACCESS IS ALLOWED TO INSTALL THE COMPONENTS. ORDER EQUIPMENT BROKEN DOWN — AS NECESSARY TO
- ALLOW FOR PROPER RIGGING THROUGH THE PROJECT AREA. PROVIDE ALL NECESSARY ALTERATIONS TO THE STRUCTURE OF THE BUILDING AS NECESSARY TO RIG THE EQUIPMENT 4. ARRANGE INSTALLATION TO PROVIDE ACCESS TO EQUIPMENT FOR EASY MAINTENANCE AND
- CODES AND STANDARDS: ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE MOST RECENTLY ADOPTED EDITIONS OF THE FOLLOWING CODES AND STANDARDS, INCLUDING ALL JURISDICTIONAL REVISIONS:
- STATE BUILDING CODE INCLUDING ALL SUPPLEMENTS.
- STATE FIRE SAFETY CODE INCLUDING ALL SUPPLEMENTS. STATE FIRE PREVENTION CODE INCLUDING ALL SUPPLEMENTS.
- THE INTERNATIONAL BUILDING CODE THE INTERNATIONAL EXISTING BUILDING CODE
- THE INTERNATIONAL FIRE CODE THE INTERNATIONAL MECHANICAL CODE
- THE INTERNATIONAL PLUMBING CODE THE INTERNATIONAL ENERGY CONSERVATION CODE 0. NFPA 1: FIRE CODE
- 11. NFPA 70: NATIONAL ELECTRICAL CODE
- 12. NFPA 72: NATIONAL FIRE ALARM AND SIGNALING CODE
- 13. NECA 1: STANDARD FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION 14. NFTA ATS

G. PERMITS AND FEES:

THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS; AND PAY ALL GOVERNMENT AND STATE SALES TAXES AND FEES WHERE APPLICABLE, AND OTHER COSTS, FILE ALL NECESSARY DRAWINGS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL GOVERNMENTAL AND STATE DEPARTMENTS HAVING JURISDICTION, OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR HIS WORK, AND DELIVER A COPY TO THE OWNER AND ENGINEER BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.

H. AS-BUILT DRAWINGS:

- PREPARE AS-BUILT DRAWINGS TO A SCALE TO MATCH THE CONTRACT DOCUMENT FLOOR PLANS; DETAILING THE ACTUAL INSTALLATION OF MAJOR ELEMENTS, COMPONENTS, AND SYSTEMS OF MECHANICAL EQUIPMENT AND MATERIALS. WHERE SHOP DRAWINGS ARE USED, RECORD A CROSS-REFERENCE AT THE CORRESPONDING LOCATION ON THE AS-BUILT DRAWINGS. GIVE PARTICULAR ATTENTION TO CONCEALED ELEMENTS THAT WOULD BE
- DIFFICULT TO MEASURE AND RECORD AT A LATER DATE MARK NEW INFORMATION THAT IS IMPORTANT TO THE OWNER, BUT WAS NOT SHOWN ON CONTRACT DRAWINGS OR SHOP DRAWINGS. NOTE RELATED CHANGE ORDER NUMBERS WHERE APPLICABLE.
- FINAL RECORD DOCUMENTS SHALL BE PREPARED IN THE LATEST AUTOCAD VERSION AND DIGITAL MEDIA FOR ALL DRAWINGS AND A CLEAN SET OF REPRODUCIBLE PAPER COPIES SHALL BE TURNED OVER TO THE OWNER AT THE COMPLETION OF THE WORK.

K. OPERATIONS AND MAINTENANCE MANUALS

- THE CONTRACTOR SHALL PREPARE (1) PDF COPY AND (3) HARD COPIES OF A COMPLETE MAINTENANCE AND OPERATING INSTRUCTIONS MANUAL. BOUND IN BOOKLET FORM. ORGANIZE OPERATING AND MAINTENANCE DATA INTO SUITABLE SETS OF MANAGEABLE SIZE BIND PROPERLY INDEXED DATA IN INDIVIDUAL HEAVY-DUTY, 3-RING, VINYL-COVERED BINDERS, WITH POCKET FOLDERS FOR FOLDED SHEET INFORMATION. MARK APPROPRIATE IDENTIFICATION ON FRONT AND SPINE OF EACH BINDER.
- MANUAL SHALL INCLUDE THE FOLLOWING: A. DESCRIPTION OF FUNCTION, NORMAL OPERATING CHARACTERISTICS AND LIMITATIONS. PERFORMANCE CURVES, ENGINEERING DATA AND TESTS, AND COMPLETE NOMENCLATURE AND COMMERCIAL NUMBERS OF REPLACEMENT PARTS
- B. MANUFACTURER'S PRINTED OPERATING PROCEDURES TO INCLUDE START-UP, BREAK-IN, AND ROUTINE AND NORMAL OPERATING INSTRUCTIONS; REGULATION, CONTROL, STOPPING, SHUTDOWN, AND EMERGENCY INSTRUCTIONS; AND SUMMER AND WINTER
- MAINTENANCE PROCEDURES FOR ROUTINE PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING; DISASSEMBLY, REPAIR, AND REASSEMBLY; ALIGNING AND ADJUSTING INSTRUCTIONS.
- SERVICING INSTRUCTIONS AND LUBRICATION CHARTS AND SCHEDULES.
- EMERGENCY INSTRUCTIONS. SPARE PARTS LIST. COPIES OF WARRANTIES.
- WIRING DIAGRAMS RECOMMENDED "TURN AROUND" CYCLES.
- INSPECTION PROCEDURES. K. APPROVED SHOP DRAWINGS AND PRODUCT DATA.

L. EQUIPMENT START-UP REPORTS.

FOR NO LESS THAN ONE (1) YEAR FROM DATE OF BENEFICIAL USE - UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.

M. MISCELLANEOUS REQUIREMENTS:

THE CONTRACTOR SHALL COORDINATE ALL INTERRUPTIONS OF SERVICES AND LIMITATIONS OF ACCESS WITH THE OWNER NO LESS THAN (5) DAYS PRIOR TO THE INTERRUPTION. OBTAIN IN OWNER'S NAME WRITTEN EQUIPMENT AND MATERIAL WARRANTIES OFFERED IN MANUFACTURER'S PUBLISHED PRODUCT DATA WITHOUT EXCLUSION OR LIMITATION.

1. ALL EQUIPMENT PROVIDED IN THIS PROJECT SHALL CARRY A MANUFACTURER'S WARRANTY

3. GUARANTEE WORK OF THESE CONTRACT DOCUMENTS IN WRITING FOR NOT LESS THAN ONE (1) YEAR FROM DATE OF BENEFICIAL USE. REPAIR OR REPLACE DEFECTIVE MATERIALS. EQUIPMENT. WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD. PROMPT AND TO OWNER'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE WITHIN CONTRACT PRICE. 4. SUBMIT TO THE OWNER AN OFFICIAL CERTIFICATE OF INSURANCE FOR THEIR RECORDS.

SECTION 26 05 19 - ELECTRICAL POWER CONDUCTORS AND CABLES

- A. COORDINATE SIZES OF RACEWAYS, BOXES, AND EQUIPMENT ENCLOSURES INSTALLED UNDER OTHER SECTIONS WITH THE ACTUAL CONDUCTORS TO BE INSTALLED, INCLUDING ADJUSTMENTS FOR CONDUCTOR SIZES INCREASED FOR VOLTAGE DROP.
- B. COORDINATE WITH ELECTRICAL EQUIPMENT INSTALLED UNDER OTHER SECTIONS TO PROVIDE TERMINATIONS SUITABLE FOR USE WITH THE CONDUCTORS TO BE INSTALLED. PROVIDE SINGLE CONDUCTOR BUILDING WIRE INSTALLED IN SUITABLE RACEWAY UNLESS
- THERWISE INDICATED, PERMITTED OR REQUIRED.
- CONDUCTOR SIZES AND AMPACITIES SHOWN ARE BASED ON COPPER. MINIMUM CONDUCTOR SIZES: A. BRANCH CIRCUITS: 12 AWG
- a. 20A, 120V CIRCUITS LONGER THAN 150 FEET #10 AWG MINIMUM AND SIZED FOR VOLTAGE DROP. CONTROL CIRCUITS: 14 AWG E. CONDUCTORS NO. 10 AWG AND SMALLER DIAMETER SHALL BE SOLID ANNEALED COPPER.
- EXCEPT THAT CONDUCTORS FOR REMOTE CONTROL, ALARM, AND SIGNAL CIRCUITS, CLASSES 1, 2. AND 3. SHALL BE STRANDED UNLESS SPECIFICALLY INDICATED OTHERWISE RATING, OR HIGHER VALUE SHALL BE INCLUDED IN THE CONTRACT PRICE. THE OWNER AND F. CONDUCTORS NO. 8 AWG AND LARGER DIAMETER SHALL BE STRANDED ANNEALED COPPER. UNLESS SPECIFIED OR INDICATED OTHERWISE OR REQUIRED BY NFPA 70, POWER AND LIGHTING WIRES SHALL BE 600-VOLT, TYPE THWN/THHN OR THWN/THWN-2 ANNEALED COPPER, CONTROL AND SIGNAL CIRCUITS SHALL BE TYPE TW, THW, OR TF ANNEALED COPPER. UNDERGROUND
 - CONDUCTORS SHALL BE TYPE XHHW-2. H. MAKE ALL SPLICES IN ACCESSIBLE LOCATIONS. MAKE SPLICES IN CONDUCTORS NO. 10 AWG AND SMALLER DIAMETER WITH INSULATED, SPRING WIRE CONNECTORS WITH PLASTIC CAPS. MAKE SPLICES IN CONDUCTORS NO. 8 AWG AND LARGER DIAMETER WITH SOLDERLESS PRESSURE CONNECTORS WITH INSULATING COVERS. MAKE SPLICES IN CONDUCTORS NO. 6 AND LARGER WITH PRESSURE CONNECTORS OR SPLIT BOLT CONNECTORS
 - MAKE WIRE TERMINATIONS USING CRIMPED TERMINALS FOR CONDUCTORS NO. 10 AND SMALLER MAKE WIRE TERMINATIONS FOR CONDUCTORS NO. 8 AND LARGER USING MECHANICAL OR PRESSURE CONNECTORS. PROVIDE SUITABLE REDUCERS WHERE OVERSIZED CONDUCTORS ARE LARGER THAN THE EQUIPMENT TERMINATION PHASE CONDUCTORS SHALL BE IDENTIFIED BY COLOR CODING. THE COLOR OF THE INSULATION

ON PHASES A. B. AND C RESPECTIVELY (FOR THREE PHASE) OR PHASES A AND B RESPECTIVELY

- (FOR SINGLE PHASE) OF DIFFERENT VOLTAGE SYSTEMS SHALL BE AS FOLLOWS: 120/208 VOLT, THREE PHASE: BLACK, RED, AND BLUE K. UNLESS OTHERWISE INDICATED. THE WIRING METHOD SHALL CONSIST OF THE INSTALLATION OF INSULATED CONDUCTORS INSTALLED IN ELECTRICAL METALLIC AND/OR WIREMOLD RACEWAY.
- METALLIC-ARMORED TYPE MC CABLES, WHERE ALLOWED, SHALL INCLUDE 600V INSULATION RATING, TYPE THHN/THWN-2 COPPER CONDUCTORS, DEDICATED NEUTRAL CONDUCTOR AND STEEL INTERLOCKING ARMOR. USES PERMITTED
- A. WHERE CONCEALED IN HOLLOW STUD WALLS, ABOVE ACCESSIBLE CEILINGS, AND UNDER RAISED FLOOR FOR BRANCH CIRCUITS UP TO 20A. B. EXCEPTION: PROVIDE SINGLE CONDUCTOR BUILDING WIRING IN RACEWAY FOR CIRCUIT HOMERUN FROM FIRST DEVICE IN SPACE TO PANELBOARD.
- M. PROVIDE INSULATED, GREEN EQUIPMENT GROUNDING CONDUCTOR IN FEEDER AND BRANCH CIRCUITS, INSTALLED IN CONDUIT OR RACEWAYS, INCLUDING LIGHTING CIRCUITS. GROUNDING CONDUCTOR SHALL BE SEPARATE FROM ELECTRICAL SYSTEM NEUTRAL CONDUCTOR.

SECTION 26 05 26 - GROUNDING AND BONDING

- A GROUNDING SHALL BE COMPLETED IN ACCORDANCE WITH NEPA 70, GROUND EXPOSED, NON-CURRENT-CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT. METALLIC RACEWAY SYSTEMS. GROUNDING CONDUCTOR IN METALLIC AND NONMETALLIC RACEWAYS. AND NEUTRAL CONDUCTOR OF WIRING SYSTEMS. WHERE GROUND FAULT PROTECTION IS EMPLOYED, ENSURE THAT CONNECTION OF GROUND AND NEUTRAL DOES NOT INTERFERE WITH CORRECT OPERATION OF FAULT PROTECTION.
- B. WHERE CONDUCTOR SIZE IS NOT INDICATED. SIZE TO COMPLY WITH NFPA 70. USE INSULATED COPPER CONDUCTORS UNLESS OTHERWISE INDICATED. USE BARE COPPER CONDUCTORS WHERE INSTALLED UNDERGROUND OR ENCASED IN CONCRETE
- D. USE LISTED MECHANICAL CONNECTORS. COMPRESSION CONNECTORS OR EXOTHERMIC WEI DED CONNECTIONS FOR ACCESSIBLE CONNECTIONS. USE EXOTHERMIC WELDED CONNECTIONS FOR UNDERGROUND, CONCEALED OR OTHERWISE INACCESSIBLE CONNECTIONS.

SECTION 26 05 29 - HANGERS AND SUPPORTS

- PROVIDE ALL REQUIRED HANGERS, SUPPORTS, ANCHORS, FASTENERS, FITTINGS, ACCESSORIES AND HARDWARE NECESSARY FOR THE COMPLETE INSTALLATION OF THE FLECTRICAL WORK. B. HANGERS AND SUPPORTS SHALL MEET ASTM STANDARDS FOR COATINGS, NECA 1 STANDARDS FOR WORKMANSHIP NFPA 70 AND UL 5B FOR STRUT-TYPE CHANNEL RACEWAY AND FITTINGS.
- WHERE SUPPORT AND ATTACHMENT COMPONENT TYPES AND SIZES ARE NOT INDICATED, SELECT IN ACCORDANCE WITH MANUFACTURER'S APPLICATION CRITERIA AS REQUIRED FOR THE LOAD TO BE SUPPORTED D. STEEL COMPONENTS: USE CORROSION RESISTANT MATERIALS SUITABLE FOR THE
- ENVIRONMENT WHERE INSTALLED. USE ZINC-PLATED STEEL FOR INDOOR DRY LOCATIONS. USE GALVANIZED STEEL. STAINLESS STEEL, FIBERGLASS OR APPROVED EQUIVALENT FOR OUTDOOR, DAMP AND WET LOCATION INSTALLATIONS
- E. CONDUIT AND CABLE SUPPORTS: A. CONDUIT STRAPS: ONE-HOLE OR TWO-HOLE, ZINC PLATED.
- CONDUIT CLAMPS: BOLTED TYPE. METAL CHANNEL (STRUT) FRAMING SYSTEMS: FACTORY FABRICATED CONTINUOUS SLOTTED METAL CHANNEL AND ASSOCIATED FITTINGS, ACCESSORIES, AND HARDWARE FOR FIELD-ASSEMBLY OF SUPPORTS. ALL LOCATIONS: USE 12 GA. GALVANIZED STEEL. HANGER RODS: CONTINUOUS THREADING, ZINC-PLATED STEEL.
- H. USE OF POWER-ACTUATED FASTENERS REQUIRES APPROVAL OF ARCHITECT AND STRUCTURAL
- I. UNLESS SPECIFICALLY INDICATED, DO NOT SUPPORT ANY ELECTRICAL COMPONENT FROM THE
- J. PLASTIC AND LEAD ANCHORS ARE NOT PERMITTED.

SECTION 26 05 33 - RACEWAY AND BOXES

- PROVIDE A COMPLETE WIRING SYSTEM OF RACEWAYS AND BOXES LOCATED AS INDICATED ON DRAWINGS AND AT LOCATIONS AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND COMPLIANCE WITH REGULATORY REQUIREMENTS. LOCATIONS INDICATED ON
- DRAWINGS ARE APPROXIMATE UNLESS DIMENSIONED. STANDARDS: MATERIALS SHALL COMPLY WITH ANSI C80. NEMA AND UL REQUIREMENTS AS APPLICABLE FOR TYPE AND MATERIAL.
- MINIMUM CONDUIT SIZE, UNLESS OTHERWISE NOTED: INTERIOR 3/4", EXTERIOR EXPOSED 3/4". D. CONDUIT APPLICATIONS: A. EMBEDDED WITHIN SLAB: FLOOR BOX SLAB-ON-GRADE APPLICATIONS ONLY
- CONCEALED IN MASONRY WALLS: USE EMT WITH FLUSH MOUNTED MASONRY BOXES. C. CONCEALED IN HOLLOW STUD WALLS: USE EMT CONDUIT OR MC CABLE (WHERE ALLOWED). PROVIDE FLUSH SHEET-METAL BOXES.
- INTERIOR DAMP OR WET LOCATIONS: USE RIGID METAL CONDUIT, INTERMEDIATE METAL CONDUIT OR SCHEDULE 40 PVC CONDUIT. PROVIDE CAST METAL OR NONMETALLIC OUTLET, JUNCTION AND PULL BOXES.
- EXPOSED, INTERIOR DRY LOCATIONS: USE EMT CONDUIT F. EXPOSED FINISHED LOCATIONS: PROVIDE SURFACE METAL RACEWAY AND FITTINGS. UNLESS SPECIFIED ON DRAWINGS, REQUIRES DESIGN TEAM APPROVAL. COORDINATE ALL
- VERTICAL RUNS OF SURFACE RACEWAY WITH ARCHITECT PRIOR TO INSTALLATION. G. CONNECTIONS TO VIBRATING EQUIPMENT: DRY LOCATIONS - USE FLEXIBLE METAL CONDUIT OR MC CABLE; DAMP, WET OR CORROSIVE LOCATIONS - USE LIQUIDTIGHT FLEXIBLE METAL CONDUIT; MAXIMUM LENGTH 6 FEET.
- A. EMT COMPLY WITH NEMA FB 1 AND UL 514B. STEEL WITH COMPRESSION FITTINGS IN DAMP OR WET LOCATIONS, SET SCREW TYPE ELSEWHERE.
- MALLEABLE IRON. USE FITTING LISTED AND LABELED AS COMPLYING WITH UL 514B IN HAZARDOUS LOCATIONS C. FLEXIBLE METAL CONDUIT - COMPLY WITH NEMA FB 1 AND UL 514B. USE STEEL FITTINGS.

B. RIGID METAL CONDUIT - COMPLY WITH ANSI C80.1 AND UL 6. THREADED STEEL OR

- D. $\,$ LIQUIDTIGHT FLEXIBLE METAL CONDUIT COMPLY WITH NEMA FB 1 AND UL 514B. USE STEEL
- E. SURFACE METAL RACEWAY PROVIDE FITTINGS FROM SAME MANUFACTURER AS SURFACE RACEWAY. INCLUDE ALL REQUIRED ELBOWS, COUPLINGS MOUNTING CLIPS, COVERS, END FITTINGS AND DEVICE MOUNTING BRACKETS F. BOXES: WHERE A BOX SIZE IS NOT INDICATED, SIZE TO COMPLY WITH NFPA 70, BUT NOT LESS
- THAN APPLICABLE MINIMUM SIZE SPECIFIED. A. USE SHEET METAL STEEL BOXES IN DRY LOCATIONS. USE CAST IRON OR CAST ALUMINUM BOXES WITH THREADED HUBS WHERE EXPOSED RIGID METAL CONDUIT IS USED
- USE SUITABLE CONCRETE TYPE BOXES WHERE FLUSH-MOUNTED IN CONCRETE. USE SUITABLE MASONRY TYPE BOXES WHERE FLUSH-MOUNTED IN MASONRY WALLS.

USE NONMETALLIC BOXES WHERE EXPOSED RIGID PVC CONDUIT IS USED.

- USE RAISED COVERS SUITABLE FOR TYPE OF WALL CONSTRUCTION AND DEVICE CONFIGURATION WHERE REQUIRED.
- USE MULTI-GANG BOXES OF SINGLE-PIECE CONSTRUCTION, DO NOT USE FIELD CONNECTED
- H. MINIMUM BOX SIZE, UNLESS OTHERWISE INDICATED: WIRING DEVICE 4 INCH SQUARE BY 1-1/2" DEEP; COMMUNICATIONS SYSTEM OUTLET 4 INCH SQUARE BY 2-1/8" DEEP. G. CABINETS AND ENCLOSURES: COMPLY WITH NEMA 250, UL 50 AND UL 50E OR UL 508A.
- A. USE NEMA TYPE 1. PAINTED STEEL FOR INDOOR CLEAN, DRY LOCATIONS. USE NEMA TYPE 3R, PAINTED STEEL FOR OUTDOOR AND WET LOCATIONS
- PROVIDE SCREW COVER ENCLOSURES FOR PULL AND JUNCTION BOXES. H. MECHANICAL SLEEVE SEALS: MODULAR MECHANICAL TYPE, WITH INTERLOCKING RUBBER LINKS SHAPED TO CONTINUOUSLY FILL ANULAR SPACE BETWEEN OBJECTS AND SLEEVE, CONNECTED WITH BOLTS AND PRESSURE PLATES TO PROVIDE A WATERTIGHT SEAL AND ELECTRICAL

<u>SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS</u>

- A. PROVIDE LAMINATED ACRYLIC OR NON-CONDUCTIVE PHENOLIC WITH BEVELED EDGES. NAMEPLATES FOR EACH EQUIPMENT ENCLOSURE, RELAY, SWITCH, AND DEVICE. NAMEPLATES SHALL BE, 1/8" THICK, WHITE WITH BLACK CENTER CORE, MATTE FINISH SURFACE, BEVELED EDGES, SQUARE CORNERS. ACCURATELY ALIGN LETTERING AND ENGRAVE INTO THE CORE. MINIMUM SIZE OF NAMEPLATES SHALL BE 1" BY 2-1/2". LETTERING SHALL BE A MINIMUM OF 1/4"
- HIGH NORMAL BLOCK STYLE. PROVIDE WIRE AND CABLE MARKERS OR IDENTIFICATION LABELS TO IDENTIFY CIRCUIT NUMBER AT EACH SOURCE LOCATION: WITHIN BOXES WHERE MORE THAN ONE CIRCUIT IS PRESENT: WITHIN EQUIPMENT ENCLOSURES WHERE CONDUCTORS ENTER AND EXIT THE ENCLOSURE; AND IN CABLE TRAYS (MAXIMUM 20 FT. INTERVALS). PROVIDE WRAP-AROUND SELF-ADHESIVE VINYL CLOTH, WRAP-AROUND SELF-ADHESIVE VINYL SELF-LAMINATING, HEAT-SHRINK SLEEVE, PLASTIC SLEEVE, PLASTIC CLIP-ON, OR VINYL SPLIT SLEEVE TYPE MARKERS SUITABLE FOR THE CONDUCTOR OR CABLE TO BE IDENTIFIED.
- PROVIDE VOLTAGE MARKERS TO IDENTIFY HIGHEST VOLTAGE PRESENT FOR ACCESSIBLE CONDUITS (MAXIMUM 20 FT. INTERVALS). PROVIDE PRE-LABELED, SNAP AROUND PIPE MARKERS ON ALL CONDUITS. MARKERS SHALL COMPLY WITH ANSI A 13.1-1988 STANDARDS AND INDICATED VOLTAGE.
- WARNING LABELS: USE FACTORY PRE-PRINTED OR MACHINE-PRINTED SELF-ADHESIVE POLYESTER OR SELF-ADHESIVE VINYL LABELS; UV, CHEMICAL, WATER, HEAT AND ABRASION F. CLEAN SURFACES TO RECEIVE ADHESIVE PRODUCTS ACCORDING TO MANUFACTURERS
- G. INSTALL IDENTIFICATION PRODUCTS TO BE PLAINLY VISIBLE FOR EXAMINATION, ADJUSTMENT,
- SERVICING AND MAINTENANCE H. INSTALL IDENTIFICATION PRODUCTS CENTERED, LEVEL AND PARALLEL WITH LINES OF ITEM BEING IDENTIFIED.

SECTION 26 27 26 - WIRING DEVICES

INDICATED ON THE DRAWINGS

- A. RECEPTACLES: A. SELF-GROUNDING COMPLYING WITH NEMA WD 1 AND NEMA WD 6 AND LISTED COMPLYING WITH UI 498 B. SINGLE AND DUPLEX RECEPTACLES SHALL BE RATED 20 AMPERES, 125 VOLTS, TWO-POLE,
- THREE-WIRE, GROUNDING TYPE WITH POLARIZED PARALLEL SLOTS. COLOR OF BODIES SHALL BE SELECTED BY THE ARCHITECT.
- RECEPTACLE SHALL BE SIDE-WIRED OR BACK-WIRED WITH TWO SCREWS PER TERMINAL THE THIRD GROUNDING POLE SHALL BE CONNECTED TO THE METAL MOUNTING YOKE.
- RECEPTACLES WITH GROUND FAULT CIRCUIT INTERRUPTERS SHALL HAVE THE CURRENT RATING AS INDICATED, AND SHALL BE UL 943, CLASS A TYPE UNLESS OTHERWISE SHOWN. F. GROUND FAULT CIRCUIT PROTECTION SHALL BE PROVIDED AS REQUIRED BY NFPA 70 OR AS
- G. MOUNT RECEPTACLES AND DATA OUTLETS 18" ABOVE FINISHED FLOOR, AND OTHER DEVICES AS INDICATED. MEASURE MOUNTING HEIGHTS OF WIRING DEVICES AND OUTLETS TO TOP OF H. PROVIDE TAMPER RESISTANT RECEPTACLES WHERE INDICATED ON DRAWINGS.
- B. DEVICE PLATES DEVICE PLATES SHALL BE ONE-PIECE TYPE AND SHALL BE PROVIDED FOR RECEPTACLES, OUTLETS, SWITCHES AND FITTINGS PLATES ON UNFINISHED WALLS AND ON FITTINGS SHALL BE GALVANIZED SHEET STEEL
- FINISH SELECTION BY ARCHITECT PLATES SHALL BE INSTALLED WITH ALL FOUR EDGES IN CONTINUOUS CONTACT WITH FINISHED WALL SURFACES WITHOUT THE USE OF MATS OR SIMILAR DEVICES. PLASTER
- FILLINGS WILL NOT BE PERMITTE E. PLATES INSTALLED IN WET LOCATIONS SHALL BE GASKETED AND PROVIDED WITH A HINGED, GASKETED COVER, UNLESS OTHERWISE SPECIFIED.

SECTION 26 20 00 -ELECTRICAL DISTRIBUTION

- A. GENERAL REQUIREMENTS FOR EQUIPMENT UNDER THIS SECTION MANUFACTURERS:
 - SQUARE D SIEMENS EATON

CIRCUIT/ AIC RATING

- 2. ENCLOSURE (UNLESS OTHERWISE INDICATED ON PLANS OR SCHEDULES): A. TYPE 1 (INDOOR, DRY LOCATIONS). B. TYPE 3R (OUTDOOR, WET LOCATIONS).
- DISCONNECT SWITCHES
- PRODUCT DESCRIPTION: HEAVY-DUTY, NEMA KS 1, ENCLOSED LOAD INTERRUPTER KNIFE SWITCH. HANDLE LOCKABLE IN "OFF" POSITION
- 2. ENCLOSURE: NEMA KS 1, TO MEET CONDITIONS. FABRICATE ENCLOSURE FROM STEEL
- FINISHED WITH MANUFACTURER'S STANDARD GRAY
- PROVIDE WITH (2) SETS OF AUXILIARY CONTACTS FURNISH SWITCHES WITH ENTIRELY COPPER CURRENT CARRYING PARTS. SWITCH VOLTAGE. PHASE AND AMPERAGE RATINGS AS INDICATED ON DRAWINGS. WHERE SPECIFIED AS FUSED DISCONNECT SWITCHES, PROVIDE WITH DUAL-ELEMENT, TIME

DELAY, CLASS RK1 FUSES. FUSE RATINGS AND QUANTITIES AS INDICATED ON DRAWINGS.

- FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD SHAWMUT OR LITTELFUSE. FURNISH (3) SPARE FUSES OF EACH TYPE. C. PANELBOARD & DISCONNECT SWITCH INSTALLATION STANDARDS
- 1. MOUNT DISCONNECTING SWITCHES SO HEIGHT OF OPERATING HANDLE AT ITS HIGHEST POSITION IS MAXIMUM 78 INCHES ABOVE FLOOR. 2. ARRANGE EQUIPMENT TO PROVIDE MINIMUM CLEARANCES IN ACCORDANCE WITH
- MANUFACTURER'S INSTRUCTIONS AND NFPA 70. 3. INSTALL A PERMANENT LABEL INDICATING THE PANELBOARD OR TRANSFORMER WHERE THE
- POWER SUPPLY TO THE DEVICE ORIGINATES. 4. PROVIDE WITH MANUFACTURER'S STANDARD ARC FLASH LABEL D. NEW CIRCUIT BREAKERS IN EXISTING PANELBOARDS SHALL MATCH EXISTING STYLE AND SHORT

SECTION 26 50 00 - LIGHTING FIXTURES

- LUMINAIRE TYPES 1. FURNISH PRODUCTS AS INDICATED IN LIGHTING FIXTURE SCHEDULE INCLUDED ON THE DRAWINGS. REFER TO NOTES ON LIGHTING FIXTURE SCHEDULE FOR SUBSTITUTION
- LIMITATIONS B. EXTERIOR LUMINAIRES
 - A. MANUFACTURERS AS INDICATED ON LIGHTING FIXTURE SCHEDULE.
 - PROVIDE PRODUCTS THAT COMPLY WITH REQUIREMENTS OF NFPA 70. PROVIDE PRODUCTS THAT ARE LISTED AND LABELED AS COMPLYING WITH UL 1598, WHERE
 - UNLESS OTHERWISE INDICATED, PROVIDE COMPLETE LUMINAIRES INCLUDING LAMP(S) AND ALL SOCKETS, BALLASTS, DRIVERS, REFLECTORS, LENSES, HOUSINGS AND OTHER COMPONENTS REQUIRED TO POSITION, ENERGIZE AND PROTECT THE LAMP AND DISTRIBUTE
- UNLESS SPECIFICALLY INDICATED TO BE EXCLUDED, PROVIDE ALL REQUIRED CONDUIT, BOXES, WIRING, CONNECTORS, HARDWARE, SUPPORTS, TRIMS, ACCESSORIES, ETC. AS NECESSARY FOR A COMPLETE OPERATING SYSTEM. 6. PROVIDE WITH SEALED AND GASKETED LENS.
- C. EXIT SIGNS PRODUCT DESCRIPTION: INTERNALLY ILLUMINATED EXIT SIGNS WITH LEDS UNLESS OTHERWISE INDICATED; COMPLYING WITH NFPA 101 AND ALL APPLICABLE STATE AND LOCAL CODES, AND LISTED AND LABELED AS COMPLYING WITH UL 924. REFER TO LIGHTING FIXTURE SCHEDULE FOR FEATURES AND ADDITIONAL REQUIREMENTS.
 - SELF-POWERED EXIT SIGNS: A. PRODUCT DESCRIPTION: UL 924 SELF-CONTAINED EMERGENCY LIGHTING UNIT. B. BATTERY: SEALED MAINTENANCE-FREE NICKEL CADMIUM UNLESS OTHERWISE
 - SELF-DIAGNOSTICS: PROVIDE UNITS THAT SELF-MONITOR FUNCTIONALITY AND AUTOMATICALLY PERFORM TESTING REQUIRED BY NFPA 101 WHERE INDICATED; PROVIDE INDICATOR LIGHT(S) TO REPORT TEST AND DIAGNOSTIC STATUS.



ARCHITECTURE & INTERIORS

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#\ DATE DESCRIPTION

ELECTRICAL

NTS

DRAWING NO.

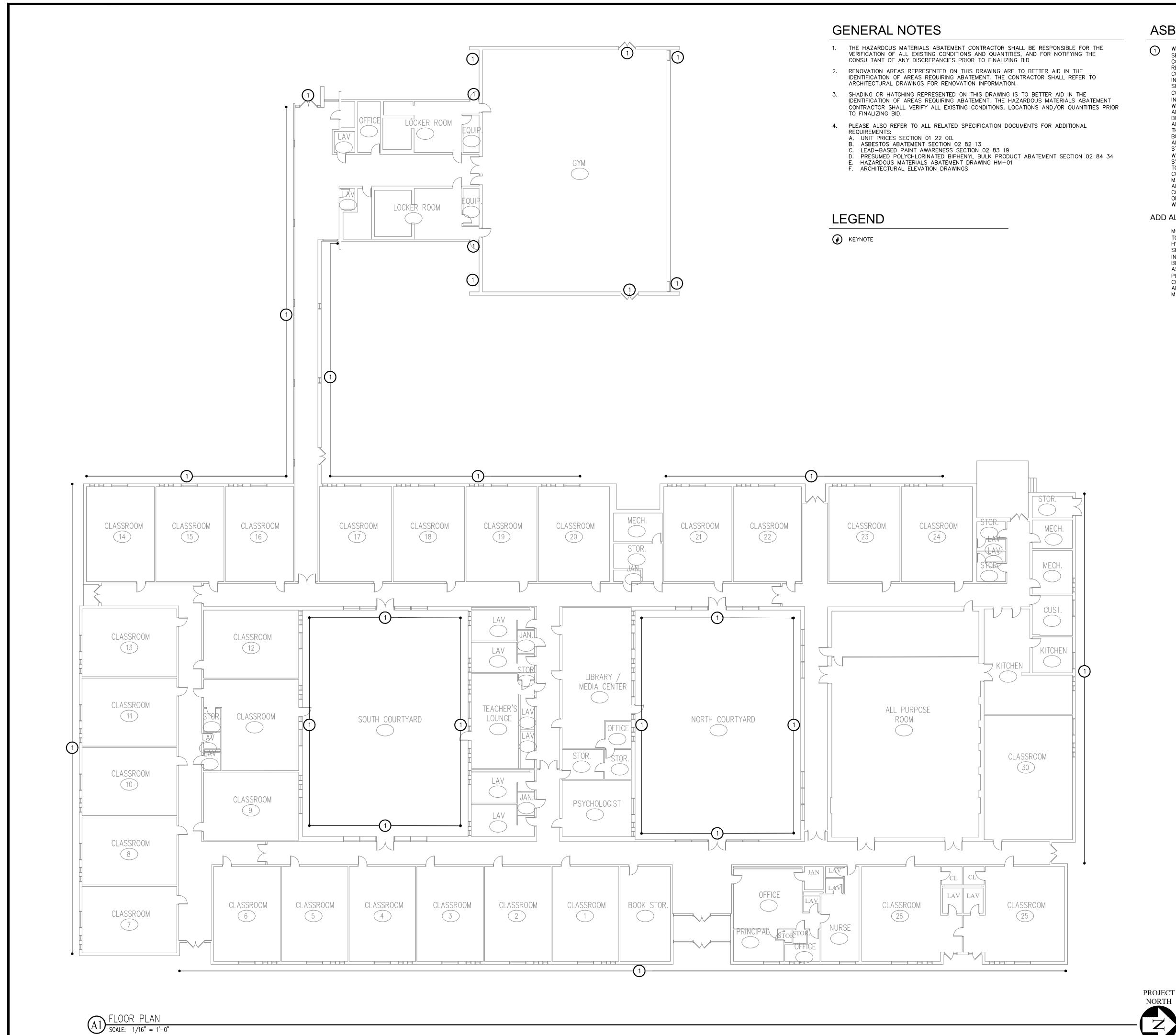
DRAWN BY:

MCW

REVIEWED BY:

29 NOV. 2023

JOB NUMBER: 22013



ASBESTOS ABATEMENT NOTES

WINDOWS/WINDOW WALLS AND DOORS/DOOR SYSTEMS OPENINGS SHALL BE SEALED ON THE INSIDE WITH CRITICAL BARRIERS AND WINDOW/DOOR COMPONENTS REMOVED FROM THE EXTERIOR WITHIN AN ASBESTOS AND PCB REGULATED WORK AREA. ANY WORK THAT WILL DISTURB THE LEAD PAINTED COMPONENTS AS IDENTIFIED IN THE HAZARDOUS BUILDING MATERIALS INSPECTION REPORT AND LEAD-BASED PAINT AWARENESS SECTION 02 83 19 SHALL ALSO BE CONDUCTED WITHIN A LEAD RRP REGULATED WORK AREA COMPLYING WITH THE EPA'S RRP RULE (40 CFR 745.80 THROUGH 92). WORK INCLUDES REMOVING OF THE WINDOW\DOOR FRAMES AND WINDOW SASH\DOOR WINDOWS FOR DISPOSAL AS ACM & PCB BULK PRODUCT WASTE. THE WINDOW AND DOOR OPENINGS SHALL BE REMOVED OF ALL SUSPECT ACM TO INCLUDE, BUT NOT LIMITED TO CAULK, ADHESIVES, SEALANTS VAPOR BARRIER ADHESIVES AND FLASHING MATERIALS TO A CLEAN UNDAMAGED SUBSTRATE. THE CAULKING AND GLAZING COMPOUND ARE ALSO PRESUMED > 50PPM PCB BULK PRODUCT WASTE. CAULK, GLAZING COMPOUND, SEALANTS, FLASHING AND ALL ADJACENT CONTAMINATED COMPONENTS SHALL BE PACKAGED, STORED, AND DISPOSED OF AS ASBESTOS AND > 50PPM PCB BULK PRODUCT WASTE. THE WASTE STREAM FROM AREAS OF LEAD COATED WINDOW/DOOR SYSTEMS REMOVAL SHALL ALSO BE CONSIDERED RCRA LEAD WASTE UNTIL TCLP SAMPLING PROVES OTHERWISE. WHERE FEASIBLE LEAD COATED METAL COMPONENTS SHOULD BE REMOVED OF ALL ASBESTOS AND PRESUMED PCB MATERIALS AND RECYCLED. WORK SHALL BE COORDINATED WITH THE CM TO ALLOW PROPER TIMING BETWEEN WINDOW REMOVAL AND REPLACEMENT. THE CONTRACTOR IS RESPONSIBLE FOR SECURING AND WEATHERPROOFING THE OPENINGS AT THE COMPLETION OF EACH SHIFT WHEN OPENINGS ARE MADE BY

WINDOW REMOVAL. ADD ALTERNATE WORK

MOISTURE/VAPOR BARRIER DAMP PROOFING BEHIND BRICK FACADE ASSUMED TO BE PRESENT & ACM. BEFORE WALLS ARE PENETRATED FOR UTILITIES / HVAC LINE SETS OR FOR ANY OTHER REASON, THE ABATEMENT CONTRACTOR SHALL OPEN THE WALL TO PROVIDE ACCESS FOR THE CONSULTANT TO INSPECT AND SAMPLE ANY VAPOR BARRIER / DAMP PROOFING MATERIALS BEHIND THE BRICK FACADE. IF ACM IS IDENTIFIED WITHIN THE WALL, OR IF ASBESTOS CEMENT SOFFITS OR WALL PANELS REQUIRE CORING, OR OTHER PENETRATIONS/DISTURBANCE OF <3 SQUARE FEET, SUCH WORK SHALL BE CONDUCTED BY THE ASBESTOS ABATEMENT CONTRACTOR WITHIN A REGULATED AREA FROM THE EXTERIOR, USING ENGINEERING CONTROLS TO PREVENT MAKING DUST.



ANTINOZZI ASSOCIATES

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FUSS & O'NEILI

146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040

REVISIONS:

DATE DESCRIPTION

DESCRIPTION

TARY SCHOOL REPLACEMENT

SCHOOLS

GOODWIN ELEMENTARY SC

UOSEPH O EXTERIOR

HAZARDOUS
MATERIALS
ABATEMENT DRAWING

AS NOTED

DRAWING NO.

HM-01

DATE: JOB NUMBER: SEPTEMBER 2023 22014

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
- B.
- 1. Work covered by Contract Documents.
- 2. Contractor use of premises.
- 3. Coordination with occupants.
- 4. Work restrictions.
- 5. Specification and drawing conventions.

C. Related Section:

1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Governor William Pitkin Elementary School Exterior Door & Window Replacement and HVAC Upgrades
 - 1. Project Location: 303 Hills Street, East Hartford, Connecticut.
- B. Owner: City of East Hartford, East Hartford Public Schools, 734 Tolland Street, East Hartford, Connecticut.
- C. Architect: Antinozzi Associates, P.C.
- D. The Work consists of the following:
 - 1. The Base Bid Work includes: the removal of existing windows and exterior doors and installation of new windows and exterior doors; including hazardous materials abatement and associated work as indicated in the drawings and technical specifications; the installation of new split system HVAC at designated locations as indicated in the drawings and technical specifications.

1.4 CONTRACTOR USE OF PREMISES

- A. General: Contractor shall have limited use of Project site for construction operations during construction period. Contractor's use of Project site is limited to the areas where work is taking place at any particular time and to common areas required for access to work areas. All other areas shall be restricted. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to work areas within elevator lobby and machine room.
 - 2. Limits: Limit site disturbance. All areas disturb by the general contractors, subcontractors, vendors, deliveries, etc. shall be repaired by the contractor.
 - 3. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, Tenants and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in an acceptable condition throughout construction period. Repair damage caused by construction operations.
- C. The Contractor shall conduct his operations under this Contract in such a manner as to allow, at all times during the performance of the work ingress and egress for the tenants and the public with the Owner's representative to coordinate his work to meet this condition.
- D. The Contractor shall provide all necessary safety equipment, material, and personnel to protect the public walks, entrance to buildings and grounds within the work areas of this Contract in order that pedestrians, tenants and the public be protected at all times.
- E. Contractor must preserve as much of existing parking as possible for owner use during construction.
- F. At all times, the occupants must have safe and full access to all parts of the facility including all the exit stairs and corridors.

1.5 COORDINATION WITH OCCUPANTS

A. Full Occupancy: Owner will occupy site and portions of the existing building during entire construction period. Cooperate with Owner and occupants during construction operations to minimize conflicts and facilitate Owner and occupant's usage. Perform the Work so as not to interfere with Owner's and occupant's day-to-day operations. Maintain existing exits unless otherwise indicated.

- 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
- 2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's and occupant's operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 3:00 p.m., Monday through Friday, except as otherwise indicated. No Off Hour, Holiday, or Weekend work allowed unless authorized in advance, given 3 business days' notice of request to the Assistant Facilities Director. All payroll costs, associated with staffing a Facilities worker at the site, will be charged to the contractor.
 - 1. Hours for Utility Shutdowns: 48 hours notice and approval from owner.
- C. Excessive Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to the occupants with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances within the existing building or on the Project site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements regarding screening of Contractor personnel working on the Project site.
 - 1. Maintain list of approved screened personnel with Owner's Representative.
 - I. Security: The Owner will not provide security guard service, watchman or escorts for this project. The employment of a security guard service to guard the contractor's employees, equipment or materials shall be at the discretion of the Contractor. However, the Contractor shall be solely responsible for theft, vandalism or similar acts at no extra cost to the Owner.

1.7 SCHEDULING OF WORK

- A. The window replacement work will be carried on while the existing facility is partially occupied.
- B. The Contractor shall be given reasonable latitude in scheduling of the work. The East Hartford School District officials will cooperate mutually with the general contractor in adjusting to situations, which may arise during the construction. The East Hartford School District Officials will make every effort to allow access to areas requested by the Contractor in advance. In no case will the existing building be entirely vacated.
- C. The Contractor shall include in his base bid any overtime work that may be required to perform work that can not be completed during regular working hours. If overtime work is required the contractor must pay for all payroll costs associated with staffing a Facilities worker at the building when overtime is in force. No overtime work can take place without the permission of the East Hartford School District Assistant Director of Facilities or designee.
- D. It is the intent of the Contractor to prosecute the work as rapidly as possible. The final construction schedule will be subject to the approval of the Owner and Architect.

1.8 SPECIFICATIONS AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary A. Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 **SUMMARY**

This Section includes administrative and procedural requirements for alternates. A.

1.3 **DEFINITIONS**

- Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined A. in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 **PROCEDURES**

- Coordination: Modify or adjust affected adjacent work as necessary to completely integrate A. work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- В. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

ALTERNATES

012300 - 1

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Refer to Bid Form for complete list of Alternates.

END OF SECTION 012300

ALTERNATES 012300 - 2

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

- 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
- 2. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. Certificates and qualification data, where applicable or requested.
- g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - i. If a comparable product or substitution is proposed, the Contractor shall be solely responsible for verifying that the substitution does not impact the structural design, HVAC, electrical, plumbing or utility requirements, clearances, dimensions or layouts, building or fire code requirements or any other change in the original design. If the substitution does require a change in any of the items noted above or similar design change or physical changes, the contractor shall be responsible for the cost of any redesign and for the additional construction costs associated with the changes due to the substitution.

- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - k. If a comparable product or substitution is proposed, the Contractor shall be solely responsible for verifying that the substitution does not impact the structural design, HVAC, electrical, plumbing or utility requirements, clearances, dimensions or layouts, building or fire code requirements or any other change in the original design. If the substitution does require a change in any of the items noted above or similar design change or physical changes, the contractor shall be responsible for the cost of any redesign and for the additional construction costs associated with the changes due to the substitution.
 - 1. If a Contractor does propose a substitution for convenience within 60 days of notice to proceed, the Architect shall be compensated directly by the Contractor for the Architect's time reviewing such a request.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, within this specification.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 5 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Recommended form is AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 (or similar format).

1.6 ALLOWANCE FOR OVERHEAD AND PROFIT ON CHANGE ORDERS

- A. The allowance for overhead and profit is compensation for administration, superintendence, materials for temporary structures, additional premiums on bonds and the use of small tools.
- B. For additions, deletions or other approved changes in the Work performed by the prime contractor, the maximum allowable Overhead & profit markup is 10% over the direct labor/material costs, unless the contractor is offering a lower Overhead & Profit markup.
- C. The maximum allowable Overhead & Profit markup on any change order for work performed by a Sub-Contractor of Prime Contractor is 10% over direct labor/material costs of the Sub-Contractor, plus 5% of the total costs for the Prime Contractor (pass thru). Unless the contractor is offering a lower Overhead & Profit markup.

- D. The General Contractor's allowance of up to 5 percent on changes involving more than one subcontractor shall be applied only to the combined net of cost additions and deductions of all subcontractors.
- E. There shall be no allowance for overhead and profit for the Contractor or any subcontractor on changes resulting in a net deduction.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 (or similar format). Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
- b. Name of Architect.
- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.
- 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
- 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
- 6. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- C. Retainage: Owner shall retain 10% of each progress payment until proof of the project's substantial completion. Upon substantial completion, Owner shall retain 5% of the remaining project completion cost. Upon final project completion and closeout, the Owner will then proceed to release the remaining retainage amount and make final payment to the Contractor.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. When an application shows completion of an item, submit final or full waivers.
 - 2. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 3. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of Values.
 - 3. Contractor's Construction Schedule (preliminary if not final).
 - 4. Products list.
 - 5. Schedule of unit prices.
 - 6. Submittals Schedule (preliminary if not final).
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of building permits.
 - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 11. Înitial progress report.
 - 12. Report of preconstruction conference.

- 13. Certificates of insurance and insurance policies.
- 14. Performance and payment bonds.
- 15. Data needed to acquire Owner's insurance.
- 16. Initial settlement survey and damage report if required.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
 - 4. Requests for Interpretation (RFIs).
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

- 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
- 3. Make adequate provisions to accommodate items scheduled for later installation.
- 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.5 SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
- B. Coordination Drawings: Prepare Coordination Drawings where space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Indicate relationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Minutes: Architect will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Contractor, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.
 - 1. Use of the premises.
 - m. Work restrictions.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.
 - w. Working hours.
 - 3. Minutes: Architect will record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at regular intervals not exceeding every 2 weeks. Coordinate dates of meetings with preparation of payment requests.

- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) RFIs.
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
- 3. Minutes: Architect will record and distribute the meeting minutes to the Project team.
- 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Architect.
 - 5. RFI number, numbered sequentially.
 - 6. Specification Section number and title and related paragraphs, as appropriate.
 - 7. Drawing number and detail references, as appropriate.
 - 8. Field dimensions and conditions, as appropriate.
 - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 10. Contractor's signature.
 - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
 - 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
 - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow five working days for Architect's response for each RFI. RFIs received after 3:00 p.m. will be considered as received the following working day.
 - 1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

- c. Requests for coordination information already indicated in the Contract Documents.
- d. Requests for adjustments in the Contract Time or the Contract Sum.
- e. Requests for interpretation of Architect's actions on submittals.
- f. Incomplete RFIs or RFIs with numerous errors.
- 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
- 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each progress meeting. Include the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- C. Special Reports: Submit two copies at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for completion and startup procedures.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. Review submittal requirements and procedures.
 - 11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than **20** days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Use of premises restrictions.
 - b. Work Sequence.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action. Submittals may be rejected for not complying with requirements.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect for Contractor or sub-contractor use in preparing submittals. Fees and disclaimers will be requested.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's and Architect's Consultants receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 10 working days for review of each resubmittal.
 - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 working days for initial review of each submittal.
 - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - 6. Submittals requiring color selections will be reviewed for compliance only. Colors will be released all at the same time once approved by the Client.
- D. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect or Architect's Consultant.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name and Architect's Project number.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - Submittal numbers must be coordinated with the Architect's submittal
 procedures. Standard transmittal and memorandum to Contractors regarding
 submittal procedure will be provided by Architect, if necessary, upon award
 of Contract.
 - i. Number and title of appropriate Specification Section.

- j. Drawing number and detail references, as appropriate.
- k. Location(s) where product is to be installed, as appropriate.
- 1. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - 1. Submit one original and (2) copies of submittal to Architect in addition to specified number of copies to concurrent reviewer.
 - 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect and Architect's Consultants will return submittals, without review, received from sources other than General Contractor or Construction Manager.
 - 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - 1. Remarks.
 - m. Typed name and signature of transmitter.
 - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Architect's Consultant on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect or Architect's Consultant.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. Review, approval and signing of disclaimer form regarding use of drawings.
 - 2. Fees will be requested as deemed appropriate per drawing sheet or file.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - 1. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.

- 5. Number of Copies: Submit four (4) copies of Product Data, unless otherwise indicated. Architect will return three (3) copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Construction Documents, unless submittals of Architect's CAD Drawings are otherwise permitted.
 - 1. Preparation: Fully illustrate requirements as shown in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - 1. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 - 3. Number of Copies: Submit four (4) copies of each submittal, where copies are not required for operation and maintenance manuals. Submit five (5) copies where copies are required for operation and maintenance manuals. Architect and Consultant will retain one copy each; remainder will be returned to Contractor.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. Color photos or digital images are not accepted.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.

- 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of samples: Submit two (2) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- 6. Paint samples:
 - a. General Contractor to provide one 2'x2' color sample for each color painted in finish as specified.
 - b. All colors to be submitted at once.
 - c. Five (5) day notice required prior to submitting paint samples.
 - d. Architect reserves the right to change color.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product.

- 2. Number and name of room or space.
- 3. Location within room or space.
- 4. Number of Copies: Submit three (3) copies of product schedule or list, unless otherwise indicated. Architect will return two (2) copies.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a

product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

- 1. Preparation of substrates.
- 2. Required substrate tolerances.
- 3. Sequence of installation or erection.
- 4. Required installation tolerances.
- 5. Required adjustments.
- 6. Recommendations for cleaning and protection.
- R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND ARCHITECT'S CONSULTANT ACTION

A. General: Architect and Architect's Consultant will NOT review submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Action Submittals: Architect and Architect's Consultant will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect or Architect's Consultant will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- C. Informational Submittals: Architect and Architect's Consultant will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 – QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Mockups
- D. Manufacturers' Instructions.
- E. Manufacturers' Certificates.
- F. Testing Laboratory Services.

1.02 QUALITY CONTROL - GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Submit to the owner safety data sheets for all materials delivered to the site.

1.03 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Employ persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.04 MOCKUPS

- A. Mockups: Before installing portions of the Work, build mockups for each item listed below and for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of the following prior to proceeding with any further work:
 - a. Windows

OUALITY CONTROL 014000-1

- 2. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
- 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
- 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
- 5. Demonstrate the proposed range of aesthetic effects and workmanship.
- 6. Obtain Architect's approval of mockups before starting work, fabrication, or final construction.
 - a. Allow two days for initial review and each re-review of each mockup.
- 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 8. Mockups can become part of the completed work.

1.05 MANUFACTURERS' INSTRUCTIONS

- A. When required by individual specification sections, submit manufacturer's printed instructions in the number of copies the Contractor requires plus three (3) which will be retained by Architect.
- B. Comply with instructions in full detail and include each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.06 MANUFACTURERS' CERTIFICATES

A. When required by individual Specification Sections, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

1.07 TESTING LABORATORY SERVICES

- A. Employ and pay for services of an independent testing laboratory to perform inspections and tests, when so specified in individual Specification Sections.
- B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports shall be submitted to Architect giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.
- D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.
 - 1. Notify Architect and testing laboratory 24 hours prior to expected time for operations requiring testing services.
 - 2. Make arrangements with testing laboratory and pay for additional samples and tests ordered for Contractor's convenience.

OUALITY CONTROL 014000-2

E. When reports indicate non-compliance, take appropriate corrective measures and request for inspection or retesting. The costs of corrective work, reinspections, and retesting shall be paid by the Contractor at no extra cost to the Owner.

PART 2 - PRODUCTS Not used

PART 3 - EXECUTION Not used

END OF SECTION 01 40 00

QUALITY CONTROL 014000-3

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Electric power service.
 - 2. Lighting.
 - 3. Telephone service.
 - 4. Water Service
 - 5. Sanitary Facilities.
 - 6. Protection Facilities.

1.3 USE CHARGES

A. Temporary Utilities Service: With the exception of toilet facilities and telephone service, the owner will pay for service use charges for usage of temporary utilities, by all parties engaged in construction, at Project site for construction operations for this project.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Provide materials suitable for use intended.
- B. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- B. Sanitary Facilities: Contractor shall provide temporary toilets, wash facilities and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- C. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Lighting: If required, provide temporary lighting that provides adequate illumination to allow for safe working conditions during normal working hours.

3.2 TEMPORARY FACILITIES INSTALLATION

- A. Lighting: If required, provide temporary lighting that provides adequate illumination for construction operations and traffic conditions.
- B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with procedures approved by the architect.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas as required.
 - b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 3. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

- i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
- j. Cost information, including a proposal of change, if any, in the Contract Sum.
- k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- 1. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Coordinate delivery with Owner.
- 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

- 1. Store products to allow for inspection and measurement of quantity or counting of units.
- 2. Store materials in a manner that will not endanger Project structure.
- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Store cementitious products and materials on elevated platforms.
- 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 7. Protect stored products from damage and liquids from freezing.
- 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

- 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 - 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

- 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
- 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

- 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
- 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
- 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
- 8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
- 9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
- 10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2. Requested substitution does not require extensive revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. General installation of products.
 - 3. Progress cleaning.
 - 4. Protection of installed construction.
 - Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 4. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

- 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- 2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

- A. General: Project work area is located in an occupied functioning building. Contractor shall use the utmost care to eliminate, when possible, or diminish all noise, water, dust, odors, etc. from the Project work area. Clean Project work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- C. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Washing waste materials down drains will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Primary operational systems and equipment.
 - 2. Mechanical systems piping and ducts.
 - 3. Control systems.
 - 4. Communication systems.
 - 5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 - 1. Equipment supports.
 - 2. Piping, ductwork, vessels, and equipment.

- 3. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut. Provide temporary dams to contain water and moisture.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Protect fixtures and personal property on other occupied floors in building from moisture, dust and impact damage.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

- 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete / Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 013100 "Project Management and Coordination."

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 REQUIREMENTS FOR CONSTRUCTION WASTE MANAGEMENT

- A. Overview: Prepare and submit a Construction Waste Management Plan (CWM) to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project. The end-of-project recycling rate shall equal, at minimum, 75% (by weight) of the total waste from construction, demolition, and land clearing activities.
- B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Specification. Further Construction Waste Management requirements are as follows.
- C. Construction Waste Management Plan: The Construction Waste Management Plan shall include, but not be limited to, the following components:
 - 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging
 - b. Clean dimensional wood, palette wood
 - c. Beverage containers
 - d. Concrete
 - e. Bricks
 - f. Concrete Masonry Units (CMU)
 - Asphalt
 - h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Drywall
 - j. Carpet and pad
 - k. Paint
 - 1. Asphalt roofing shingles if applicable for any existing building demolition
 - m. Rigid Foam
 - n. Glass
 - o. Plastics
 - 2. Landfill Information: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).
 - 3. *Sorting Method*: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
 - 4. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
 - 5. Field Conditions: Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

- 6. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
- 7. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.
- D. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

1.6 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.
- B. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:
 - 1. The number of dumpsters or other containers of recycled or salvaged materials for that month;
 - 2. The volume (in cubic yards) of each dumpster or container of recycled or salvaged materials for that month;
 - 3. The type of recycled or salvaged material contained in each dumpster or container; and
 - 4. The weight of the recycled or salvaged material in each dumpster or container. If the weight of the material is not directly measured for each dumpster or container, the Solid Waste Conversion Factors listed for landfill waste (see above) shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above (e.g. glass), propose a conversion factor for review by the Owner and Architect.
- C. In addition, provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.
- D. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Owner's and Architect's review and approval.
- E. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and landfilled waste also in tons), and multiplying by 100.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.8 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Refrigerant Recovery Technician Qualifications: Universal certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.9 WASTE MANAGEMENT PLAN

- A. General: Prepare and submit a Construction Waste Management Plan (CWM) to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project. The end-of-project recycling rate shall equal, at minimum, 75% (by weight) of the total waste from construction, demolition, and land clearing activities.
- B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Specification. Further Construction Waste Management requirements are as follows.
- C. Construction Waste Management Plan: The Construction Waste Management Plan shall include, but not be limited to, the following components:

- 1. Listing of Targeted Materials: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):
 - a. Cardboard, paper, packaging
 - b. Clean dimensional wood, palette wood
 - c. Beverage containers
 - d. Concrete
 - e. Bricks
 - f. Concrete Masonry Units (CMU)
 - g. Asphalt
 - h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Drywall
 - j. Carpet and pad
 - k. Paint
 - 1. Asphalt roofing shingles if applicable for any existing building demolition
 - m. Rigid Foam
 - n. Glass
 - o. Plastics
- D. Landfill Information: Provide the name of the landfill(s) where trash will be dis-posed of and the applicable landfill tipping fee(s).
- F. Sorting Method: Provide a description of the proposed means of sorting and trans-porting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).
- G. Packaging Waste: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.
- H. Field Conditions: Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, in-cluding provisions to implement a stop work order, or to rectify non-compliant con-ditions.
- I. Recycling facilities: Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).
- J. Additional Information: Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.
- K. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor's contracts.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Construction Manager's requirements for controlling dust and dirt, environmental protection, and noise control.

3.2 WASTE MANAGEMENT MEETINGS

- A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.

3.3 MONTLY WASTE MANAGEMENT REPORTING FORMS

A. Monthly Waste Management Reporting Forms shall be submitted to the Owner and Architect for review throughout the duration of the project.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 3. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 4. Advise Owner of changeover in heat and other utilities.
 - 5. Complete final cleaning requirements, including touchup painting.
 - 6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection

or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

- 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 - Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. Expenses incurred by the Architect for more than one reinspection will be the responsibility of the Contractor and will be invoiced directly.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding into the building in order of the room numbers indicated on the Drawings.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - b. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
 - c. Sweep concrete floors broom clean in unoccupied spaces.
 - d. Remove labels that are not permanent.
 - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
- C. Comply with safety standards for cleaning. Do not dump debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for systems, subsystems, and equipment.
 - 2. Maintenance manuals for the care and maintenance of systems and equipment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 8 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Final Submittal: Submit one of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-

- reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
- 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
- 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
- 4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
- 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Operating standards.
 - 3. Operating procedures.
 - 4. Operating logs.
 - 5. Wiring diagrams.
 - 6. Control diagrams.
 - 7. Piped system diagrams.
 - 8. Precautions against improper use.
 - 9. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.

- C. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Instructions on stopping.
 - 6. Normal shutdown instructions.
 - 7. Seasonal and weekend operating instructions.
 - 8. Required sequences for electric or electronic systems.
 - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.

- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and

flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

- 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
- 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- D. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.

B. Related Sections:

- 1. Division 01 Section "Execution" for final property survey.
- 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
- 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 4. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit three (3) sets of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal: Submit one paper copy set, and one PDF electronic files of marked-up record prints and one sets of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal: Submit three paper copies sets, and one PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit three paper copies and one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and one annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.

- i. Locations of concealed internal utilities.
- j. Changes made by Change Order or Construction Work Change Directive.
- k. Changes made following Architect's written orders.
- 1. Details not on the original Contract Drawings.
- m. Field records for variable and concealed conditions.
- n. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - 1. Upon issuance of a Notice to Proceed or similar authorization by the Owner, the Architect will transfer a copy of the current version of the digital model of the project to the Construction Manager's website for use by all trade contractors in preparing submittals, coordination drawings and record drawings. The model was prepared using Revit 2013 software.
 - 2. All contractors using or accessing the digital Model shall first be required to execute a data licensing agreement in the form of AIA Document C106 Agreement form acceptable to the Owner and Architect. A fee of \$5,000 will be requested to gain access to the digital model.
 - 3. Over the course of the multi-year construction project, all contractors using or accessing the model shall be required to update their version of Revit to the latest available version of the software in general use at that time.
 - 4. File Preparation Format: RVT operating in Microsoft Windows operating system.
 - 5. File Submittal Format: Submit or post coordination drawing files using the same format as the file preparation or PDF format.
 - 6. The Architect or his consultants make no representation as to the accuracy or completeness of the digital model as it relates to the drawings.
 - 7. The Architect and his consultants shall be granted access to the coordination model on the Construction Manager's website for their use in conducting their construction administration responsibilities.

- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.
 - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file.
 - 1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of a building or structure.
 - 2. Repair procedures for selective demolition operations.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 2. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.5 SUBMITTALS

- A. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Stamped shoring layout drawings (if required) prepared by the General Contractor's Professional Engineer, indicating location, method and design loads for the temporary shoring system utilized.

1.6 OUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Predemolition Conference: Conduct conference a project site to review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.7 PROJECT CONDITIONS

- A. All areas of the building will be fully occupied immediately adjacent to selective demolition areas. Conduct selective demolition so Owner's and occupant's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's or occupant's operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

- C. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: Hazardous materials are present in portions of the building to be selectively demolished. A report on the presence of hazardous materials is included with the bid package. Examine report to become aware of locations where hazardous materials are present.
 - 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified in Sections 020800, 020850, 020860 and 022220.
 - 2. The contractor shall provide the owner within 30 days of removal a copy of the hazardous waste disposal manifest in accordance with State of Connecticut Department of Environment Protection Regulations.
- E. Storage or sale of removed items or materials on-site will not be permitted.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Architect.
- D. If required, engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations. Professional Engineer shall develop shoring layout plan for all temporary shoring and supervise the General Contractor's implementation of that plan.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- B. Temporary Facilities: Provide temporary barricades and other protection if required to prevent injury to people and damage to adjacent areas to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furnishings and equipment that have not been removed.
- C. Temporary Partitions: If required, erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- D. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.3 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

- 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding and pollution.
- 2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows.
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
 - 10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

- B. Existing Facilities: Protect existing stairs, walkways, building entries, and other building facilities during selective demolition operations.
- C. Removed and Reinstalled Items: Comply with the following:
 - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- E. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- F. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

3.5 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Scope of Selective Demolition is indicated on the Drawings.

END OF SECTION 024119

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions, shall apply to this Section.
- B. Fuss & O'Neill, Inc. (Fuss & O'Neill) Limited Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Lead Paint Awareness Section 02 83 19.
- E. Presumed Polychlorinated Biphenyl Removal & Disposal Section 02 84 34.
- F. Abatement Plan HM-01.
 - 1. Abatement areas represented on the Plans are to better aid in the identification of areas requiring abatement. The Contractor shall refer to the architectural drawings for demolition and Site work information.
 - Shading, hatching, and/or numbering represented on the Plans are to better aid in the identification of areas requiring abatement. The Contractor shall verify all existing conditions, locations and/or quantities prior to finalizing the bid. Both these specifications and Plans are to be used to help identify material and may not both address all items but are to both be considered.

1.02 CONSULTANT

- A. The Owner and/or Architect shall retain a Consultant for the purposes of project management and monitoring during Asbestos Removal activities. At the discretion of the Owner, the Consultant will represent the Owner during the abatement project. The Asbestos Abatement Contractor (the "Contractor") will regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
 - 1. Approval of work areas
 - 2. Review of monitoring results
 - 3. Completion of the various segments of work
 - 4. Final completion of the abatement
 - 5. Submission of data
 - 6. Daily field punch list items
- B. The State of Connecticut-licensed Asbestos Consultant Project Designer for this project is Eric W. Cooley (License No.000305).

1.03 SCOPE OF WORK

A. Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of asbestos-containing materials (ACM) and asbestos impacted materials during

the renovations (the "Work") at Governor William Pitkin School located at 330 Hills Street, East Hartford, Connecticut (the "Site"). This Work under this Contract includes but is not limited to asbestos abatement in the areas of window/door removal, demolition, and replacement throughout the school.

B. This scope of work includes necessary selective demolition to remove windows scheduled for replacement and access/remove all ACM that would potentially be disturbed during the course of the project.

1.04 USE OF THE CONTRACT DOCUMENTS

- A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.
- B. All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.
- C. It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all material and labor necessary for the completion of the Work in accordance with the intent of these Specifications.
- D. In case of ambiguity among the Contract documents, the more stringent requirement as determined by the Consultant shall prevail.
- E. The Work of this Contract includes making modifications as necessary, subject to approval by the Owner in consultation with the Consultant to correct any conflicts.
- F. All items not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

1.05 SITE EXAMINATION

- A. It is understood that the Contractor has examined the Site and made their own estimates of the facilities and difficulties attending the execution of the Work and has based their price thereon.
- B. Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional cost due to the existing conditions at the Site.

1.06 CONTRACTOR QUALIFICATIONS

- A. All bidders shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year, with all projects of similar size and scope. The Contractor shall list the experience and training of the project foremen and all on-site personnel. The information that should be included is as follows:
 - 1. Project Name and Address
 - 2. Owner's Name and Address
 - Architect/Consultant

- 4. Contract Amount
- 5. Date of Completion
- 6. Extras and Changes
- B. The Contractor selected must appear on the approved list of Asbestos Abatement Contractors on file at the State of Connecticut Department of Public Health (CTDPH) and hold a valid license for asbestos abatement within the State of Connecticut.
- C. Submit a written statement regarding whether the Contractor has ever been cited for non-compliance with federal, state, or local asbestos and/or lead and/or polychlorinated biphenyl (PCB) regulations pertaining to worker protection, removal, transport, or disposal.

1.07 TESTING LABORATORY SERVICES

A. The Contractor shall submit to the Consultant the name; address and qualifications of proposed laboratories intended to be utilized for sample analysis as required by this Section.

1.08 ADDITIONAL GENERAL REQUIREMENTS

- A. The Contractor shall employ a competent CTDPH-licensed Asbestos Abatement Supervisor with at least three years of experience on projects of similar scope and magnitude who shall be responsible for all work involving asbestos abatement as described in the specifications and defined in applicable regulations and have full-time daily supervision of the same. The Supervisor shall be the competent person as defined by Occupational Safety and Health Administration (OSHA) regulations.
- B. If required by federal, state, local, and any other authorities having jurisdiction over such work, the Contractor shall allow the work of this contract to be inspected. The Contractor shall immediately notify the Owner and Consultant and shall maintain written evidence of such inspection for review by the Owner and Consultant.
- C. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.
- D. The Contractor shall immediately notify the Owner and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the Owner and Consultant for verification and recording.

1.09 PROJECT DESCRIPTION

- A. The base bid includes the removal, packaging, transporting, and disposing of all asbestos-containing materials (ACM) as identified herein conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class 1 and 2 work. This shall include all necessary demolition to access the identified and assumed ACM for abatement.
- B. Materials discovered outside of those listed (either above or below) will be measured and paid or credited by unit prices. The quantities are estimates only and should be verified by the Contractor.

C. The base bid includes the following ACM:

BASE BID - ACM

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
All Windows/Window Openings Throughout School	All Caulks, Adhesives, Sealants, Flashings, Damp Proofing & Glazing Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 84 34 Polychlorinated Biphenyl Bulk Product Abatement	19 @ 40 LF EA 6 @ 30 LF EA 1 @ 12 LF EA 19 @ 100 LF EA 6 @ 60 LF EA 1 @ 12 LF EA	1,2,3
Exterior Door System Windows	Door system Window Glazing Compounds Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 84 34 Polychlorinated Biphenyl Bulk Product Abatement	11 Door Systems: 1 @ 126 LF 6 @ 46 LF EA 2 @ 14 LF EA 1 @ 26 LF EA 1 Door @ 8 LF	1,2,3
Door Openings Behind Door System Frames and under Sills	All Caulks, Adhesives & Sealants Associated with Doors, Sills, Frames & Door Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 84 34 Polychlorinated Biphenyl Bulk Product Abatement	12 Door Systems: 8 @ ~30 LF EA 2 @ 24 LF EA 1 @ 54 LF EA 1 @ 26 LF EA	1,2,3
Multi-Purpose Room Window & Transom above Exterior Storage Room Door	Asbestos Cement Panel Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM	1 @ 15 SF 1 @ 30 SF	
Above Doors and Windows *If Necessary to Facilitate Window Removal & Installation	Asbestos Cement Panels Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM	*300 SF	1,2,3

ADD ALTERNATES - ACM

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Within Masonry Wall Cavities on CMU behind Brick Facade	Flashing/Vapor Barrier/Dampproofing (Assumed to be Present & ACM) Inspect/Sample Before Disturbing Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM	< 3 SF	1,2,4
Building perimeter soffits over windows and door entryways and wall panels above windows in gymnasium	Asbestos Cement Soffits and/or wall paneling Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM	< 3 SF	1,2,4

SF=Square Feet, LF=Linear Feet

Notes:

- 1. All Material Quantities shall be verified by the Contractor during the time of the walk-through. Discrepancies of amounts and/or locations of asbestos-containing materials shall be addressed prior to bidding the work to the Owner and Consultant.
- 2. Please also refer to all related specification documents for additional requirements:
 - Unit Prices Section 01 22 00.
 - b. Asbestos Abatement Section 02 82 13
 - Lead-Based Paint Awareness Section 02 83 19
 - d. Presumed Polychlorinated Biphenyl Bulk Product Abatement Section 02 84 34
 - e. Hazardous Materials Abatement Drawing HM-01
 - f. Architectural Elevation Drawings
- 3. Window and door openings shall be sealed on the inside with critical barriers and windows/doors removed from the exterior within an asbestos and PCB regulated work area. Cafeteria windows and any work that will disturb the painted steel beam above windows shall also be conducted within a lead RRP regulated work area complying with the EPA's RRP Rule (40 CFR 745.80 through 92). Work includes removing of the window\door frames and window sash\door windows for disposal as ACM & PCB Bulk Product Waste. The window and door openings shall be removed of all suspected ACM to include, but not limited to caulk, adhesives, sealants vapor barrier adhesives and flashing materials to a clean undamaged substrate. The caulking and glazing compound are also presumed > 50ppm PCB Bulk Product Waste. Caulk, glazing compound. sealants, flashing and all adjacent contaminated components shall be packaged, stored, and disposed of as asbestos and > 50ppm PCB Bulk Product Waste. The waste stream from the cafeteria window removal shall also be considered RCRA lead waste until TCLP sampling proves otherwise. Work shall be coordinated with the CM to allow proper timing between window removal and replacement. The contractor is responsible for securing and weatherproofing the openings at the completion of each shift when openings are made by window removal. Materials also contain presumed >50 ppm PCB's, refer to PCB Specification Section 028434 as well as architectural Elevation Drawings. The scope of work includes removal and disposal as ACM the two transom windows covered with asbestos cement panels and the asbestos cement panel over windows and doors if the windows cannot be removed and replaced without disturbing or damaging the panels.

Add Alternate Work:

4. Moisture/vapor barrier damp proofing behind brick facade assumed to be Present & ACM. Before walls are penetrated for utilities / HVAC line sets or for any other reason, the abatement contractor shall open the wall to provide access for the consultant to inspect and sample any vapor barrier / damp proofing materials behind the brick facade.

If ACM is identified within the wall, or if asbestos cement soffits or wall panels require coring, or other penetrations/disturbance of <3 square feet, such work shall be conducted by the asbestos abatement contractor within a regulated area from the exterior, using engineering controls to prevent making dust. All debris and waste removed shall be disposed of as ACM.

- D. Some of the Work will be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).
- E. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to site delivery.
- F. Encapsulants applied to any surface that will receive a new finish that requires an adhesive must be compatible with the application of the new finish.
- G. The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site to perform the work required. All temporary electrical power and lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels installed by a State of Connecticut-licensed electrician, permitted as required, and located outside of the work areas.

1.10 DEFINITIONS

- A. The following definitions relative to asbestos abatement apply:
 - 1. <u>Abatement</u>: Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.
 - 2. <u>Air Monitoring</u>: The process of measuring the total airborne fiber concentration of an area, or a person.
 - 3. Amended Water: Water to which a surfactant (wetting agent) has been added.
 - 4. <u>Architect</u>: a person or firm professionally engaged in the design of certain large constructions other than buildings and the like.
 - 5. <u>Asbestos</u>: The name given to a number of naturally occurring fibrous silicates. This includes the serpentine forms and the amphiboles, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically altered.
 - 6. <u>Asbestos-Containing Materials</u>: For the purpose of this project design, an asbestos containing material is any building material categorized by EPA as a surfacing material, thermal system insulation, or miscellaneous that contains any amount of asbestos (as defined above) based on the analytical methodology adopted by the project designer for application to subject building materials at the Site.
 - 7. <u>Asbestos Felt</u>: A product made by saturating felted asbestos with asphalt, or other suitable bindery, such as a synthetic elastomer.
 - 8. <u>Asbestos Fibers</u>: Those particles with a length greater than five (5) microns and a length to diameter ratio of 3:1 or greater.
 - 9. <u>Asbestos Work Area</u>: A regulated area as defined by OSHA Title 29 CFR, Part 1926.1101 where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated area for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
 - 10. <u>Caulking</u>: Resilient mastic compound often having a silicone bituminous or rubber base; used to seal cracks, fill joints, and prevent leakage. Typical applications: around windows, and doors. Caulking is at joints between two dissimilar materials. (i.e., masonry to wood, masonry to steel).

- 11. <u>Clean Room:</u> An uncontaminated area or room, which is a part of the worker decontamination enclosure with provisions for storage of worker street clothes and protective equipment.
- 12. <u>Clearance Sampling</u>: Final air sampling performed aggressively after the completion of the abatement project in a regulated area. Air samples collected by the air sampling professional having a total airborne fiber concentration of less than 0.010 fibers per cubic centimeter of air (fibers/cc) in each of five (5) samples collected inside the containment will denote acceptable clearance sampling by Phase Contrast Microscopy (PCM), or five air samples collected inside the containment by the air sampling professional having an average asbestos concentration of less than 70 structures per square millimeter (s/mm²) of air will denote acceptable clearance sampling for Transmission Electron Microscopy (TEM).
- 13. <u>Competent Person</u>: As defined by OSHA Title 29 CFR, Part 1926.1101, a representative of the Abatement Contractor who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. The Competent Person has authority to take prompt corrective measures, and to eliminate such hazards during asbestos removal. The Competent Person shall be properly trained in accordance with EPA's Model Accreditation Plan (MAP).
- 14. <u>Consultant</u>: Fuss & O'Neill, Inc.: A company retained by the Owner with State of Connecticut-licensed asbestos designer and asbestos project monitors to provide services enumerated in this section during asbestos abatement.
- 15. <u>Containment</u>: An enclosure within the building which establishes a contaminated area and surrounds the location where ACM and/or other toxic or hazardous substance removal is conducted and establishes a Control Work Area.
- 16. <u>Curtained Doorway</u>: A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of six feet apart can form an airlock.
- 17. <u>Damp Proofing</u>: Application of a water impervious material to surface (such as a wall) to prevent penetration of moisture, typically at foundation or below grade surface.
- 18. <u>Decontamination Enclosure System</u>: A series of connected areas, with curtained doorways between any two adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.
- 19. <u>Encapsulant</u>: A liquid material which can be applied to ACM, which controls the possible release of asbestos fibers from the materials either by creating a membrane over the surface (bridging encapsulant) or penetrating the material and binding its components together (penetrating encapsulant).
- 20. <u>Equipment Room</u>: Any contaminated area or a room that is part of the worker decontamination enclosure with provisions for storage of contaminated clothing and equipment.
- 21. <u>Fixed Object</u>: Unit of equipment or furniture in the work areas that cannot be removed from the work area.
- 22. <u>Friable Asbestos Materials</u>: Any material that contains more than 1% asbestos by weight, that can be crumbled, pulverized, or reduced to powder by hand pressure.
- 23. <u>Glazing Compound</u>: Any compound used to hold window glass in place, also referred to as putty, or glazier's putty. Is not field applied, usually installed during manufacture of windows.
- 24. <u>HEPA Filter</u>: High Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.
- 25. <u>HEPA Vacuum Equipment</u>: Vacuum equipment fitted with a HEPA filter system for filtering the effluent air from the unit.
- 26. <u>Movable Object</u>: Unit of equipment of furniture in the work area that can be removed from the work area.
- 27. <u>Negative Air Pressure Equipment</u>: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to

- adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 28. <u>NESHAP</u>: National Emission Standards for Hazardous Air Pollutants regulations enforced by the EPA.
- 29. Owner: East Hartford Public Schools: An employee or executive who has the principle responsibility for a process, program, or project.
- 30. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The new limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers per cubic centimeter (fibers/cc) as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc averaged over a sampling period of 30 minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.
- 31. Project Monitor: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring and worker protection equipment and procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- 32. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 265).
- 33. Regulated Area: An area established by the employer to demarcate where Class I, II, and III asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate, and a work area within which total airborne fiber concentrations exceed, or there is a reasonable possibility that they may exceed the PEL.
- 34. <u>Shower Room</u>: A room between the clean room and the equipment room in the work decontamination enclosure with hot and cold running water and suitably arranged for employee showering during decontamination. The shower room is located in an airlock between the contaminated area and the clean area.
- 35. <u>Totally Enclosed Manner</u>: A manner that will ensure no exposure of human beings or the environment to a concentration of asbestos.
- 36. <u>Transport Vehicle</u>: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.
- 37. <u>Waterproofing</u>: Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities); sometimes combined with felts.

1.11 SUBMITTALS

- A. The Contractor shall submit the following to the Consultant in one complete package prior to the pre-construction meeting and no later than 10 business days prior to the anticipated start of the Work:
 - 1. Submit copies of all notifications, permits, applications, licenses, and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
 - 2. Submit a schedule to the Owner and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).
 - 3. Submit the current valid State of Connecticut Asbestos Abatement Contractor license and certificate of insurance.
 - 4. Submit the name and address of the hauling contractor and landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
 - 5. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.

- 6. Submit the CTDPH license, training, medical, and respirator fit test records of each employee who may be on the Site.
- 7. If the Contractor's CTDPH-licensed Asbestos Abatement Supervisor is not conducting OSHA required employee exposure monitoring, submit the qualifications of the air sampling professional that the Contractor proposes to use for this project for this task.
- 8. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project. This includes Safety Data Sheets (SDS) on all products and chemicals that may be used on the project.
- 9. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
- 10. Submit a chain-of-command for the project.
- 11. Submit a site-specific Emergency Action Plan for the project. The Plan may include emergency procedures to be followed by Contractor personnel to evacuate the building, hospital name, phone number, and most direct transportation route from the Site, emergency telephone numbers, etc.
- 12. Submit a written site-specific Respiratory Protection Program for employees for the Work, including make, model and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable). Proposed electrical safeguards to be implemented by a qualified Electrical Contractor, including but not limited to location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the project, including a description of electrical hazards and a safety plan for common practices in the work area. This may also include safety plan for temporary lighting, extension cord and other powered equipment used in the work area (locations, daily inspections, etc.).
 - Submit the proposed worker orientation plan that at a minimum includes a description of asbestos hazards and abatement methodologies, a review of worker protection requirements, and the outline of safety procedures.
- B. No work on the Site will be allowed to begin until the Owner/Architect and the Consultant as listed herein approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.
- C. The Contractor shall submit the following to the Consultant during the Work:
 - Copies of personal air sampling results (Consultant will not review or provide any direction or advice regarding results). The Contractor shall be responsible for proper sample analytical review and personal protective equipment (PPE) selection and use. Records are retained solely for project record.
 - 2. Copies of training, CTDPH certifications, fit test records, and medical records for new employees to start work (24 hours in advance) and prior to the new employee arriving at the Site.
 - 3. Carbon copies from waste shipment record, waste manifest records, bill of lading or other waste tracking record for all specified materials.
 - 4. Copies of daily log sheets, daily sign-in sheets, and containment sign-in sheets.
- D. The Contractor shall submit the following to the Consultant at the completion of the Work. The Owner reserves right to retain payment(s) until all items are received in completion:
 - 1. Original final completed copies of the waste shipment records, signed by all transporters and the designated disposal site owner/operator.
 - 2. Original final completed copies of bill of laden, weight tickets, recycling tickets, and manifests for all specified materials.
 - 3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, CTDPH certifications, medical records, and respirator fit test records.

4. Copies of all OSHA personal monitoring results.

1.12 REGULATIONS AND STANDARDS

- A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:
 - 1. EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M);
 - 2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E);
 - 3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101);
 - 4. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 180);
 - 5. Connecticut Department of Energy and Environmental Protection (CTDEEP) Regulations (Section 22a-209-8(i) and Section 22a-220 of the Connecticut General Statutes);
 - 6. CTDPH Standards for Asbestos Abatement (Sections 19a-332a-1 to 19a-332a-16);
 - 7. CTDPH Licensing and Training Requirements for Persons Engaged in Asbestos Abatement and Asbestos Consultant Services (Sections 20-440-1 to 20-440-9 and Section 20-441);
 - 8. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, 2016, and 2018 amendments;
 - 9. Life Safety Code, National Fire Protection Association (NFPA); and
 - Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society of Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

1.13 EXEMPTIONS

- A. Any deviations from these specifications require written approval and authorization from the Owner and Consultant. Any deviations that may impact the bid cost shall be delineated with the bid for the Architect/Owner to review.
- B. Any modifications from the standard work practices identified in the CTDPH Standards for Asbestos Abatement, Sections 19a-332a-1 to 19a-332a-16 must be requested in writing and approved in writing by the CTDPH. The Consultant shall develop the Alternative Work Practice (AWP) application on behalf of the Owner. If the Contractor intends to request an AWP for this project, the nature of the AWP shall be disclosed in the bid documents and the cost savings associated with said AWP shall be provided for the Owner's consideration. An AWP shall not be filed without prior Owner's and Consultant's approval.

1.14 FINAL RE-OCCUPANCY AIR CLEARANCE (IF REQUIRED)

A. Following the completion of the encapsulation phase of the work, the Consultant shall collect final re-occupancy clearance air samples inside the work area per CTDPH Standards for Asbestos Abatement (19a-332-1 to 19a-332-16).

- B. The Owner shall be responsible for payment of the sampling and analysis of the initial final air clearance samples only. The Contractor shall be responsible for payment of all costs associated with the collection and analysis of additional final clearance air samples if the first set of samples fail to satisfy the clearance criteria.
- C. Contractor shall not conduct demolition or other removal activities during final re-occupancy air clearance sampling.

1.15 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS (IF REQUIRED)

- A. The Contractor shall make the following notifications and provide the submittals to the following agency prior to the start of work. The CTDPH notification is required 10 calendar days prior to start of the abatement project and the EPA notification is required 10 business days prior to the start of the abatement project.
 - Connecticut Department of Public Health 410 Capitol Avenue MS #12 AIR P.O. Box 340308
 - Hartford, CT 06134-0308
 - United States Environmental Protection Agency (USEPA)
 Jordan Alves (alves.jordan@epa.gov)
 Region 1- New England (OEP05-2)
 5 Post Office Square, Suite 100
 Boston, MA 02109-3912
- B. The minimum information included in the notification to these agencies includes:
 - 1. Name and address of building Owner/Operator
 - 2. Building location
 - 3. Building size, age, and use
 - 4. Amount of asbestos to be removed
 - 5. Work schedule, including proposed start and completion date
 - 6. Asbestos removal procedures to be used
 - 7. Name and location of disposal site for generated asbestos waste, residue, and debris

1.16 WORK SITE SAFETY PLAN

- A. The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:
 - 1. Evacuation of injured workers.
 - 2. Emergency and fire exit routes from all work areas.
 - 3. Emergency first aid treatment.
 - 4. Local telephone numbers for emergency services including ambulance, fire, and police.
 - 5. A method to notify occupants of the building in the event of a fire or other emergency requiring evacuation of the building.
- B. The Contractor shall be responsible for training all workers in these procedures.

1.17 INDEPENDENT AIR SAMPLING AND ASBESTOS ABATEMENT MONITORING

- A. This Section describes independent air sampling work being performed on behalf of the Owner. This work is not in the Contract Sum. This Section describes air monitoring conducted by the Consultant to verify that the building beyond the work area and the outside environment remains uncontaminated. (Personal air monitoring required by OSHA is work to be performed by the Contractor and is within the Contract Sum). Negative exposure assessments will not be reviewed and/or approved by the Consultant. It shall be the Contractor's responsibility to determine its validity.
- B. The purpose of the Consultant's air monitoring is to verify proper engineering controls in the work area:
 - 1. Contamination of the building outside of the work area by airborne fibers.
 - 2. Failure of filtration or rupture in the differential pressure system.
 - 3. Contamination of air outside the building envelope by airborne fibers.
- C. Should any of the above occur, the Contractor shall immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the Consultant.
- D. The Consultant may monitor total airborne fiber concentrations in the work area. The purpose of this air monitoring will be to detect total airborne fiber concentrations, which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- E. To determine if the elevated total airborne fiber concentrations encountered during abatement operations have been reduced to an acceptable level, the Consultant will sample and analyze air in accordance with clearance air sampling requirements.
- F. The Consultant may perform on-site monitoring throughout the project, as follows:
 - 1. All work procedures shall be continuously monitored by the Consultant to assure that areas outside the designated work locations in the buildings will not be contaminated.
 - 2. Prior to work on any given day, the Contractor's designated "competent person" shall discuss the day's work schedule with the Consultant to evaluate job tasks with respect to safety procedures and requirements specified to prevent contamination of the building or the employees. This includes a visual work area inspection and the building or the employee decontamination.

1.18 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

- A. The Contractor shall independently retain an air sampling professional, or the CTDPH-licensed Asbestos Abatement Supervisor shall monitor total airborne fiber concentrations in the worker breathing zones, and to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- B. The Contractor's air sampling professional shall document all air sampling results and provide a report to the Consultant within 48-hours after sample collection.
- C. All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

1.19 PROPER WORKER PROTECTION

- A. This Section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.
- B. All workers are to be accredited as Abatement Workers as required by the EPA AHERA Title 40 CFR, Parts 763 Appendix C to Subpart E, February 3, 1994.
- C. The Contractor is required to be certified and accredited as required by CTDPH.
- D. In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:
 - 1. Methods of recognizing asbestos
 - 2. Health effects associated with asbestos
 - 3. Relationship between smoking and asbestos in producing lung cancer
 - 4. Nature of operations that could result in exposure to asbestos
 - 5. Importance of and instruction in the use of necessary protective controls, practices, and procedures to minimize exposure including:
 - a. Engineering controls
 - b. Work Practices
 - c. Respirators
 - d. Housekeeping procedures
 - e. Hygiene facilities
 - f. Protective clothing
 - g. Decontamination procedures
 - h. Emergency procedures
 - i. Waste disposal procedures
 - Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
 - 7. Appropriate work practices for the work
 - 8. Requirements of medical surveillance program
 - 9. Review of OSHA Title 29 CFR, Part 1926
 - 10. Pressure Differential Systems
 - 11. Work practices including hands on or on job training
 - 12. Personal Decontamination procedures
 - 13. Air monitoring, personal and area
- E. The Contractor shall provide medical examinations for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the work area for any reason. Examination shall, at a minimum, meet OSHA requirements as set forth in Title 29 CFR, Part 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.
- F. Submit the following to the Consultant for review. The Contractor shall not start work until these submittals are returned with Consultant indicating that they are approved.
 - 1. Submit copies of certificates from an EPA approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the AHERA Regulation Title 40 CFR, Part 763 Appendix C to Subpart E, February 3, 1994.

- Submit evidence that the Contractor is certified to perform asbestos abatement work by the CTDPH.
- 3. Submit documents verifying that each worker has had a medical examination within the last 12 months as part of compliance with OSHA medical surveillance requirements. Submit, at a minimum, for each worker the following:
 - a. Name and Social Security Number (optional minimum last 4 digits)
 - b. Physician's written opinion from examining physician including at a minimum the following:
 - 1) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.
 - 2) Any recommended limitations on the worker or on the use of PPE such as respirators.
 - Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
 - c. Copy of information that was provided to physician in compliance with OSHA Title 29 CFR, Part 1926.
- 4. Statement that worker is able to wear and use the type of respiratory protection proposed for the project and is able to work safely in an environment capable of producing heat stress in the worker.
- 5. Submit copies of certificates for the site supervisor and the workers issued by CTDPH.
- G. Submit certification signed by an officer of the abatement-contracting firm and notarized that exposure measurement, medical surveillance, and worker training records are being kept in conformance with OSHA Title 29 CFR. Part 1926.
- H. The Contractor shall maintain control of and be responsible for access to all work areas to ensure the following requirements:
 - 1. Non-essential personnel are prohibited from entering the area.
 - 2. All authorized personnel entering the work area shall read the "Worker Protection Procedures" that are posted at the entry points to the enclosure system and shall be equipped with properly fitted respirators and protective clothing.
 - 3. All personnel who are exiting from the decontamination enclosure system shall be properly decontaminated.
 - 4. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with these Specifications. The surface of the bags shall be decontaminated. Asbestos waste removed from the NPE must be immediately transported off-site or immediately placed in locked, posted temporary storage on-site, and removed within 24 hours of the project conclusion.
 - 5. Any material, equipment, or supplies that are removed from the decontamination enclosure system shall be thoroughly cleaned and decontaminated by wet cleaning and/or HEPA vacuuming of all surfaces.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.

- B. Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as asbestos waste.
- C. Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- D. Poly disposable bags shall be 6-mil with OSHA required pre-printed label (29 CFR, Part 1926.1101(k)(8)(iii)). Tie wraps for bags shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- E. Tape or adhesive spray will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.
- F. Surfactant (wetting agent) shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of one ounce surfactant to five gallons of water or as directed by manufacturer.
- G. Removal encapsulant shall be non-flammable factory prepared penetrating chemical encapsulant deemed acceptable to Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- H. The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with asbestos.
- I. Impermeable containers are to be used to received and retain any asbestos-containing or asbestos contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii) [June 1, 2015 requirements]. Containers must be both air and watertight.
- J. Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used.
- K. Encapsulant shall be bridging or penetrating type which has been deemed acceptable to the Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- L. HEPA filtered local exhaust ventilation shall be utilized during the installation of enclosures and supports where ACM may be disturbed.

2.02 TOOLS AND EQUIPMENT

- A. The Contractor shall provide all clean tools and equipment necessary for asbestos removal, encapsulation, and enclosure.
- B. The Contractor's air monitoring professional or Abatement Supervisor shall have air monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly, and air samples shall be calibrated with a recently calibrated (within 6 calendar months and then annually as required) rotometer.

- C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the job including protective clothing, respirators, filter cartridges, poly sheeting of proper size and thickness, tape, and air filters.
- D. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticut-licensed electrician.
- E. The Contractor shall be responsible for coordinating electrical and water services and shall pay for these services for the duration of the project, if applicable.
- F. The Contractor shall assist the Consultant by providing necessary tools and equipment (e.g., coveralls, ladders, extension cords, lighting, etc.) for the Consultant to conduct inspections, final visual inspections, and final air clearance monitoring. The Consultant reserves the right to reject such items that are deemed unsafe and/or do not function properly and request items be replaced with adequate replacements. The work areas shall be safe to enter/occupy by the Consultant.
- G. The Contractor shall have available shower stalls and plumbing to support same to include sufficient hose length and drain system or an acceptable alternate.
- H. When applicable exhaust air filtration system units shall contain HEPA filter(s) capable of sufficient air exhaust to create negative air pressure of at a minimum -0.02 inches of water column within enclosure with respect to outside area. Digital monometers shall be supplied for Class 1 work or Class II work if wet removal is not occurring, or removal is not intact. Equipment shall be checked for proper operation by smoke tubes or differential pressure gauge before the start of each shift and at least twice during the shift. Adequate exhaust air shall be provided for a minimum of four (4) air changes per hour within the NPE. All exhaust tubes shall be routed outside through secured openings to prevent people from access into the building. The exhaust shall be away from any air intakes or openings to the building or where people may come in contact with exhausted air. No air movement system or air filtering equipment shall discharge unfiltered air. The Contractor will have reserve units so that the station system will operate continuously.
- I. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- A. At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.
- B. The Contractor shall present a detailed project schedule and project submittals at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.

C. Following the Pre-Construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORK AREA PREPARATION FOR INTERIOR OR EXTERIOR FRIABLE ABATEMENT (Not all anticipated for this exterior removal project)

- A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during the decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician, permitted as required, and located outside the work areas.
- B. Temporary power shall be continuous power. Portable generators for use during asbestos abatement are not authorized.
- C. Deactivate and/or isolate heating, ventilation, and air conditioning (HVAC) air systems or zones to prevent contamination and fiber dispersal to other areas of the building or structure. During the work, vents within the work area shall be covered with two layers of 6-mil poly, and completely sealed with duct tape.
- D. The Contractor shall be responsible for removing furniture, equipment, and any other materials to be salvaged from the work areas. Contractor shall be responsible for removing all solid waste within the work areas (if applicable). The Contractor shall pre-clean moveable objects within the proposed work areas using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate and remove such objects from work areas. Non-porous materials (i.e., metal) shall be cleaned, visually inspected by a project monitor prior to removal from the work areas and recycling/disposal as solid waste.
- E. Completely seal all openings, including, but not limited to, windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetration of the work areas, with poly sheeting a minimum of 6-mil thick, and sealed with duct tape. This includes doorways and corridors that will not be used for passage during work areas and occupied areas.
- F. Pre-clean fixed objects within the work areas, using HEPA vacuum equipment and/or wet cleaning methods as appropriate, and enclose with a minimum 6-mil poly sheeting completely sealed with duct tape.
- G. Clean the proposed work areas using HEPA vacuum equipment or wet cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.
- H. After HEPA vacuum cleaning, cover fixed walls and floors with polyethylene sheeting. All seams and joints of sheeting shall be sealed with tape or equivalent. Floor covering shall consist of at least two layers of 6 mil polyethylene and must cover at least the bottom 12 inches of adjoining wall. Wall covering shall consist of a minimum of two layers of 4 mil polyethylene sheet which shall overlap the floor covering to prevent leaks. There shall be no seams in the polyethylene sheet at the wall-to-floor joints. Where ceilings are not being removed, a ceiling covering shall be installed to consist of at least one layer of 4-mil polyethylene sheeting.
- I. Maintain emergency and fire exits from the work areas or establish alternate exits satisfactory to fire officials.

- J. Clean and remove ceiling mounted objects, such as lights and other items not sealed-off, which interfere with asbestos abatement. Use hand-held amended water spraying or HEPA vacuuming equipment during fixture removal to reduce settled fiber dispersal.
- K. Create pressure differential between work areas and uncontaminated areas by the use of acceptable negative air pressure equipment sufficient to provide four air changes per hour and create negative air pressure of at a minimum -0.02 inches of water column within enclosure with respect to outside area as measured on a water gauge.

3.03 DECONTAMINATION SYSTEM

- A. The Contractor shall establish contiguous to the work area, a decontamination system consisting of equipment room, shower room, and clean room, in series. The only access between contaminated and uncontaminated areas shall be through this decontamination enclosure. If it is not feasible to erect a contiguous decontamination system, the Contractor shall establish a remote decontamination unit in as close proximity to the work area as is feasible. For exterior work, the Contractor shall establish a remote decontamination system at the perimeter of the regulated work area.
- B. Access between rooms in the decontamination system shall be through double-flap curtained openings. The clean room, shower, and equipment room within the decontamination enclosure, shall be completely sealed ensuring that the sole source of airflow through this area originates from uncontaminated areas outside the work area.
- C. The Contractor shall establish contiguous with the work area an equipment decontamination enclosure consisting of two totally enclosed chambers divided by a double-flapped curtained opening. This enclosure must be constructed so as to ensure no personnel enter or exit through this unit.
- D. Occupied areas and/or building space not within the work areas shall be separated from asbestos abatement work areas by means of airtight barriers.
- E. Construct the decontamination enclosure system with wood or metal framing, cover both sides with a double layer of 6-mil poly sheeting, completely sealed with spray adhesive, and taped at the joints.
- F. If a Consultant is retained for pre-abatement services, the Contractor and the Consultant shall visually inspect the barriers several times daily to assure effective seal and the Contractor shall repair defects immediately.

3.04 ASBESTOS REMOVAL PROCEDURE - GENERAL

- A. The Contractor shall have a designated "competent person" on the Site at all times to ensure establishment of a proper enclosure system and proper work practices throughout project.
- B. Abatement work will not commence until authorized by the Consultant.
- C. The Contractor shall properly coordinate abatement work with other trades, new construction, and Site use. The Contractor shall be responsible for addressing any concerns by the Owner and/or Consultant.

- D. With a fine mist, spray ACM with amended water using airless spray equipment or apply approved removal wetting agent to reduce the release of fibers during removal operation.
- E. To maintain indoor asbestos concentrations to the minimum, the wet asbestos must be removed in manageable sections. Material drop shall not exceed eight feet. For heights up to 15 feet, provide inclined chutes or scaffolding to intercept drop.
- F. Remove ACM as appropriate by standard methods. Fill disposal containers as removal proceeds; seal filled containers and clean containers before removal to equipment decontamination enclosure system. Wet clean each container thoroughly, double bag and apply caution label. Ensure that workers do not exit the work area thorough the equipment decontamination enclosure.
- G. After completion of stripping work, all surfaces from which asbestos has been removed shall be wet brushed, using a nylon brush, wet wiped, and sponged or cleaned by an equivalent method to remove all visible material (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept wet.
- H. Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. During cleanup, utilize brooms, rubber dustpan, and rubber squeegees to minimize damage to floor covering.
- I. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup, and shall be removed from work areas via the equipment decontamination enclosure at an appropriate time in the cleaning sequence. All asbestos waste in 6-mil poly disposal bags shall be double bagged in the equipment decontamination enclosure before removal from the Site.
- J. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas, and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections certify decontamination.
- K. After completion of the initial final cleaning procedure including removal of the inner layers of poly sheeting, but prior to encapsulation, a pre-sealant inspection shall be conducted by the Consultant. The pre-sealant inspection shall verify that ACM and residual dust has been removed from the work area.

3.05 ASBESTOS REMOVAL PROCEDURE FOR EXTERIOR NON-FRIABLE MATERIALS

- A. Exterior non-friable materials which are not RACM as defined by the EPA and CTDPH are not required to be removed within a contained negative pressure enclosed work area in the State of Connecticut. This applies as long as the proposed methods of removal will not render the nonfriable materials RACM during proposed removal operations.
- B. The Contractor shall have a designated "competent person" on the job at all times to ensure proper work practices throughout the project.
- C. The Contractor shall regulate the work area as required for compliance with OSHA regulation Title 29 CFR, Part 1926.1101 to prohibit non-trained workers from entering areas where ACM are to be removed.

- D. The Contractor shall establish worker decontamination unit adjacent to the regulated work area.
- E. The Contractor shall spray ACM with amended water using airless spray equipment or apply approved removal wetting agent to ensure no visible emissions during removal of non-friable materials.
- F. After completion of stripping/removal work, all surfaces from which ACM has been removed shall be wet cleaned or cleaned by an equivalent method to remove all visible suspect ACM (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept adequately wet, without causing a safety hazard or creating puddles or runoff.
- G. Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. Waste shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5 inches long (minimum), pointed and looped to secure filled waste bags.
- H. At any time during asbestos removal should the Consultant suspect contamination of areas outside the work area(s), they shall issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections indicate acceptable decontamination.
- I. The Consultant shall conduct a final visual inspection of the work area. If residual suspect ACM debris is identified during the course of the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all residual ACM.

3.06 ASBESTOS REMOVAL PROCEDURE – GLOVE BAG

- A. Removal or intentional disturbance of asbestos-containing materials should only be conducted be certified and trained employees. Personal protective equipment (PPE) is always required when removing and/or disturbing asbestos-containing materials. PPE must be work in accordance with applicable OSHA regulations.
- B. The following steps should be taken when glove-bagging asbestos-containing materials. Current regulations require two employees to conduct glove-bagging. Employees should always isolate the area in case of accidental spills or bag failure:
 - 1. Isolate the area and place appropriate signs and critical barriers. Only trained and protected employees are allowed in the area during the removal process.
 - 2. Employees shall don personal protective equipment.
 - 3. HEPA vacuum all debris located beneath the area of the glove bag operation. Then place polyethylene sheeting.
 - 4. Custom cut sides of glove bag to fit pipe.
 - 5. Place tools inside bag pouch (Nylon Brush, Razor, Wire Snips, Scraper, and Bone Saw, etc.)
 - 6. Place duct tape around pipe and seal edges of glove bag with duct tape (tape bottom of glove bag for extra protection)
 - 7. Cut opening near the insulation to be removed for the HEPA Vacuum nozzle and amended water wand.
 - 8. Test the bag for leaks. (A smoke tube is recommended)
 - 9. Insert tube and fill bag with smoke and squeeze bag.
 - 10. Insert spray wand in bag and spray insulation with amended water.
 - 11. Sprays amended water onto the glove bag while conducting removal.

- 12. Remove ACM and spray inside of bag with lockdown encapsulant.
- 13. Rinse tools in pouch and while holding tools in gloved hands, pull hands out. Twist and tape glove arms and cut tape in the middle. (Tools can be kept in gloves or submersed in water and cleaned)
- 14. Turn on HEPA vacuum and deflate bag totally. Tape import holes.
- 15. Twist bag as close to the top of bag as possible, tape and cut.
- 16. Remove glove bag and cut away remaining bag material. (Be careful to not disturb remaining ACM)
- 17. Use proper decontamination procedures and remove personal protective equipment.
- 18. Dispose of asbestos contaminated materials and remove signs and barriers.

3.07 CONSULTANT'S RESPONSIBILITIES

- A. Air sampling may be conducted by the Consultant to ascertain the integrity of the controls that protect the building from asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees, and to comply with OSHA regulations.
- B. The Consultant's project monitor may collect and analyze air samples during the following period:
 - 1. <u>Abatement Period</u>. If required, or retained for this service, the Consultant shall collect samples on a daily basis during the work period. A sufficient number of area samples shall be collected outside of the work area, at the exhaust of the negative pressure system, and outside of the building to evaluate the degree of cleanliness or contamination of the building during removal. At the discretion of the Consultant, additional air samples may be collected inside the work area and decontamination enclosure system.
 - a. If the Consultant determines that the building air quality has become contaminated from the abatement project, they shall immediately inform the Contractor to cease all removal operations and implement a work stoppage clean-up procedure. The Contractor shall conduct a thorough clean-up of the building areas designated by the Consultant. No further removal work may occur until the Consultant has determined through air sample collection and analysis that the airborne fiber concentrations are at or below the CTDPH re-occupancy standard.
- C. The Consultant shall collect and analyze air samples during the following period (Not anticipated for this exterior removal project):
 - Post-Abatement Period. The Consultant shall conduct air sampling following the final clean-up phase of the project, once the "no visible residue" criterion, as established by the Consultant, has been met and the work area has been encapsulated by the Contractor. Five air samples shall be collected inside the work area utilizing aggressive methods to comply with the CTDPH Standards for Asbestos Abatement Section 19a-332a-12 (if required).
 - a. Final re-occupancy air clearance sampling, if necessary, shall be conducted by the Consultant in accordance with the CTDPH requirements using one of the following methods:
 - 1) Transmission Electron Microscopy (TEM) method with an average limit of less than 70 s/mm² of filter surface.
 - 2) Phase Contrast Microscopy (PCM) with a total airborne fiber concentration limit of less than or equal to 0.010 fibers/cc.

- D. The Owner shall be responsible for payment for the initial final clearance air sampling performance only. If the first set of samples fail to satisfy the re-occupancy criteria, the Contractor shall be responsible for payment of all costs associated with the additional final clearance air sampling and analysis.
- E. The Consultant shall provide continual evaluation of the air quality of the building during removal, using their best professional judgment in respect to the CTDPH guideline of 0.010 fibers/cc, and the background air quality established during the pre-abatement period.
- F. Pre-abatement and abatement air samples shall be collected as required to obtain a volume of 1,200 liters. Samples shall be analyzed by PCM NIOSH 7400 Method.

3.08 CONSULTANT'S INSPECTION RESPONSIBILITIES

- A. The Consultant shall conduct inspections throughout the progress of the asbestos removal project. Inspections shall be conducted to document the abatement work progress, as well as the procedures and practices employed by the Contractor.
- B. The Consultant may perform the following inspections during the removal activities:
 - 1. <u>Pre-commencement Inspection</u>. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall make the necessary adjustments to obtain compliance.
 - 2. <u>Work Area Inspections</u>. Work area inspections shall be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant shall observe the Contractor's removal procedures, verify barrier integrity, monitor negative air filtration devices, assess project progress, and if deficiencies are noted, inform the abatement Contractor of specific remedial activities.
- C. The Consultant shall perform the following inspections during the removal/abatement activities:
 - 1. <u>Pre-sealant Inspection</u>. Upon the request of the Contractor, the Consultant shall conduct a pre-sealant inspection. The Consultant shall be informed 24 hours prior the time that the inspection is needed. The pre-sealant inspection shall be conducted after completion of the initial cleaning procedures, but prior to encapsulation. The pre-sealant inspection shall verify that all ACM and residual debris have been removed from the work area. If the Consultant identifies residual dust or debris during the pre-sealant inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".
 - 2. <u>Final Visual Inspection</u>. Upon request of the abatement Contractor, the Consultant shall conduct a final visual inspection. Following the removal of the inner layer of poly sheeting, but prior to final air clearance, the Consultant shall conduct a final visual inspection inside the work area. If residual dust or debris is identified during the final inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".
- **3.09 RE-OCCUPANCY AIR CLEARANCE AIR TESTING** (Not anticipated for this exterior removal project)
 - A. After the visual inspection is completed and all surfaces in the abatement area have dried, the Consultant shall conduct final re-occupancy air clearance sampling. Aggressive air monitoring will be used. Selection of location and of samples shall be the responsibility of the Consultant.

- Air monitoring volumes shall be sufficient to provide a detection limit of 0.010 fibers/cc using PCM NIOSH Method 7400, or a detection limit of 70 s/mm2 utilizing TEM analysis as required.
- B. Areas that do not comply with the Standard for Cleaning for Initial Clearance (no visible dust or debris) shall continue to be cleaned by, and at, the Contractor's expense until the specified Standard of Cleaning is achieved, as evidenced by results of air testing results, as previously specified. This shall include all Consultant-based costs.
- C. The Contractor shall properly schedule abatement work and other site activities at appropriate times and locations to prevent cross contamination and/or dust in areas where the Consultant will conduct air sampling.

3.10 ASBESTOS DISPOSAL

- A. Asbestos-containing and/or asbestos-contaminated material disposal must be in compliance with requirements of, and authorized by the EPA, CTDEEP, and the State of Connecticut.
- B. Disposal approvals shall be obtained before commencing asbestos removal.
- C. A copy of the approved disposal authorization shall be provided to the Owner and the Consultant, and any required federal, state, or local agencies.
- D. Copies of all fully executed Waste Shipment Records (WSR) will be retained by the Consultant as part of the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator will sign the WSR, and the quantity of asbestos debris leaving the Site, and arriving at the landfill is documented for the Owner.
- E. All asbestos debris shall be transported in covered, sealed vans, boxes, or dumpsters, which are physically isolated from the driver by an airtight barrier. All vehicles must be properly licensed to meet DOT requirements.
- F. Any vehicles used to store or transport ACM will either be removed from the Site at night, or securely locked and posted to prevent disturbance.
- G. Any incident and/or accident that may result in spilling or exposure of asbestos waste outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

END OF SECTION 02 82 13

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- B. Fuss & O'Neill, Inc. (Fuss & O'Neill Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Presumed Polychlorinated Biphenyl Removal & Disposal Section 02 84 34.
- F. Abatement Plan HM-01.

1.02 SUMMARY OF WORK

- A. Work of this Section includes requirements for worker protection and waste disposal related to window/door removal and replacement activities involving lead-based paint (LBP)-coated building components and surfaces (the "Work) impacted during the Governor William Pitkin Elementary School renovation project at 330 Hills Street, East Hartford, Connecticut (the "Site").
- B. Required training of all workers involved in surface preparations and repair operations involving the disturbance of lead paint shall have completed a minimum of 8 hours of training (Lead Safe Renovator) training in accordance with the Environmental Protection Agency (EPA). The Contractor shall be an EPA Certified Lead Safe Renovator or shall be a licensed Lead Abatement Contractor in accordance with the Connecticut Department of Public Health (CTDPH).
- C. The EPA Renovation, Repair, and Painting (RRP) requirements apply to buildings that are target housing or child-occupied facilities with children under the age of six. The Site is currently utilized as an elementary school and is considered a child occupied facility.
- D. The removal of the painted surfaces may result in dust and debris exposing workers to levels of lead above the Occupational Safety and Health Administration (OSHA) "Action Level". Worker protection, training, and engineering controls referenced herein shall be strictly adhered to, until completion of exposure assessment with results indicating exposures below the "Action Level".
- E. The procedures referenced herein shall be utilized during required work specified elsewhere that may impact building components coated with LBP. The following components were determined to be coated with LBP:
 - 1. Exterior Metal Window Components at the Cafeteria Windows; and
 - 2. Steel Beams above Windows.

- F. If disturbed and managed off-site, non-porous LBP-coated building materials (i.e., metals) may be segregated and recycled as scrap metal. Metal LBP-coated building components cannot be subject to grinding, sawing, drilling, sanding, or torch cutting.
- G. Construction activities disturbing surfaces with lead-containing paint that are likely to be employed, such as demolition, sanding, grinding, welding, cutting, and burning, have been known to expose workers to levels of lead in excess of the OSHA Permissible Exposure Limit (PEL). All work specified in the technical sections of the Contract Documents shall also be in conformance with this Technical Specification Section 02 83 19 for Lead Paint Awareness.

1.03 DEFINITIONS

- A. The following definitions relative to lead containing paint/materials and LBP shall apply:
 - 1. <u>Action Level (AL)</u> The allowable employee exposure, without regard to use of respiratory protection, to an airborne concentration of lead over an eight-hour time-weighted average (TWA) as defined by OSHA. The current action level is thirty micrograms per cubic meter of air (30 µg/m³).
 - 2. <u>Area Monitoring</u> The sampling of lead concentrations, which is representative of the airborne lead concentrations that may reach the breathing zone of personnel potentially exposed to lead.
 - 3. <u>Biological Monitoring</u> The analysis of a person's blood and/or urine, to determine the level of lead concentration in the body.
 - 4. CDC The Center for Disease Control.
 - 5. <u>Change Room</u> An area provided with separate facilities for clean protective work clothing and equipment and for street clothes, which prevents cross-contamination.
 - 6. <u>Component Person</u> A person employed by the Contractor who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them as defined by OSHA.
 - 7. Consultant Fuss & O'Neill, Inc.
 - 8. USEPA United States Environmental Protection Agency.
 - 9. <u>Exposure Assessment</u> An assessment conducted by an employer to determine if any employee may be exposed to lead at or above the action level.
 - 10. <u>High Efficiency Particulate Air (HEPA)</u> A type of filtering system capable of filtering out particles of 0.3 microns diameter from a body of air at 99.97% efficiency or greater.
 - 11. HUD United States Housing and Urban Development.
 - 12. <u>Lead</u> Refers to metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.
 - 13. <u>Lead Work Area</u> An area enclosed in a manner to prevent the spread of lead dust, paint chips, or debris resulting from lead containing paint disturbance.
 - 14. <u>Lead Paint</u> Refers to paints, glazes, and other surface coverings containing a toxic level of lead.
 - 15. MSHA Mine Safety and Health Administration.
 - 16. NARI National Association of The Remodeling Industry.
 - 17. NIOSH National Institute of Occupational Safety and Health.
 - 18. OSHA Occupational Safety and Health Administration.
 - 19. Owner An employee or executive who has the principle responsibility for a process, program, or project.
 - 20. <u>Permissible Exposure Limit (PEL)</u> The maximum allowable limit of exposure to an airborne concentration of lead over an eight (8)-hour TWA, as defined by OSHA. The current PEL is fifty micrograms per cubic meter of air (50 μg/m³). Extended workdays lower the PEL by the formula: PEL equals 400 divided by the number of hours of work.

- 21. Personal Monitoring Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with OSHA Title 29 CFR, Parts 1910.1025 and 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a sphere with a radius of 18-inches and centered at the nose or mouth of an employee.
- 22. Resource Conservation and Recovery Act (RCRA) RCRA establishes regulatory levels of hazardous chemicals. There are eight (8) heavy metals of concern for disposal: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Six (6) of the metals are typically in paints, excluding selenium and silver.
- 23. SDS Safety Data Sheets.
- 24. TWA Time Weighted Average.
- 25. Toxic Level of Lead A level of lead, when present in dried paint or plaster, contains equal to or more than 0.50% lead by dry weight as measured by atomic absorption spectrophotometry (AAS) or 1.0 milligram per square centimeter (mg/cm²) as measured by on site testing utilizing an x ray fluorescence analyzer. (Term is specific to State of CT regulations and HUD guidelines only.)
- 26. <u>Toxicity Characteristic Leaching Procedure (TCLP)</u> The United States Environmental Protection Agency (EPA) required sample preparation and analysis for determining the hazard characteristics of a waste material.

1.04 REGULATIONS AND STANDARDS

- A. The following regulations, standards, and ordinances of federal, state, and local agencies are applicable and made a part of this specification by reference:
 - 1. American National Standards Institute (ANSI)
 - a. ANSI 288.2 1980 Respiratory Protection
 - 2. Code of Federal Regulation (CFR)
 - a. Title 29 CFR, Part 1910.134 Respiratory Protection
 - b. Title 29 CFR, Part 1910.1025 Lead
 - c. Title 29 CFR, Part 1910.1200 Hazard Communication
 - d. Title 29 CFR, Part 1926.55 Gases, Vapors, Fumes, Dusts, and Mists
 - e. Title 29 CFR, Part 1926.57 Ventilation
 - f. Title 29 CFR. Part 1926.59 Hazard Communication in Construction
 - g. Title 29 CFR, Part 1926.62 Lead in Construction Interim Final Rule
 - h. Title 40 CFR, Parts 124 and 270 Hazardous Waste Permits
 - i. Title 40 CFR, Part 172 Hazardous Materials Tables and Communication Regulations
 - j. Title 40 CFR, Part 178 Shipping Container Specifications
 - k. Title 40 CFR, Part 260 Hazardous Waste Management Systems: General
 - I. Title 40 CFR, Part 261 Identification and Listing of Hazardous Waste
 - m. Title 40 CFR, Part 262 Generators of Hazardous Waste
 - n. Title 40 CFR, Part 263 Transporters of Hazardous Waste
 - o. Title 40 CFR, Part 264 Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - p. Title 40 CFR, Part 265 Interim Statutes for Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 - q. Title 40 CFR, Part 268 Lead Disposal Restrictions
 - r. Title 49 CFR, Parts 170 180
 - 3. Underwriters Laboratories, Inc. (UL)
 - a. UL586 1990 High Efficiency Particulate Air Filter Units

1.05 QUALITY ASSURANCE

A. Hazard Communication Program

1. The Contractor shall establish and implement a Hazard Communication Program as required by OSHA Title 29 CFR, Part 1926.59.

B. Compliance Plan (Site-Specific)

- 1. The Contractor shall establish a written compliance plan, which is specific to the project site, to include the following:
 - a. A description of work activity involving lead including equipment used, material included controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices.
 - b. Methods of engineering controls to be used to control lead exposure.
 - c. The proposed technology the Contractor will implement in meeting the PEL.
 - d. Air monitoring data documenting the source of lead emissions.
 - e. A detailed schedule for implementing the program, including documentation of appropriate supply of equipment, etc.
 - f. Proposed work practice which establishes proper protective work clothing, housekeeping methods, hygiene facilities, and practices.
 - g. Worker rotation schedule, if proposed, to reduce TWA.
 - h. A description of methods for informing workers of potential lead exposure.

C. Hazardous Waste Management

- 1. The Contractor shall establish a Hazardous Waste Management Plan, which shall comply with applicable regulations and address the following:
 - a. Identification of hazardous wastes
 - b. Estimated quantity of waste to be disposed
 - c. Names and qualifications of each subcontractor who will be transporting, storing, treating, and disposing of wastes
 - d. Disposal facility location and 24-hour point of contact
 - e. Establish EPA state hazardous waste and identification numbers if applicable
 - f. Names and qualifications (experience and training) of personnel who will be working on site with hazardous wastes
 - g. List of waste handling equipment to be used in performing the work to include cleaning, volume reduction, if applicable, and transport equipment
 - h. Qualifications of laboratory to be utilized for TCLP sampling and analysis
 - i. Spill prevention, containment, and countermeasure plan (SPCC)
 - j. Work plan and schedule for waste containment, removal, treatment, and disposal

D. Medical Examinations

- 1. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by OSHA Title 29 CFR, Parts 1910.1025 and 1926.62.
- 2. The examination shall not be required if adequate records show that employees have been examined as required by OSHA Title 29 CFR, Part 1926.62 within the last year.
- 3. Medical examination shall include, at a minimum, approval to wear respiratory protection and biological monitoring.

E. Training

 The Contractor shall ensure that workers are trained to perform lead paint disturbing activities and disposal operations prior to the start of work, in accordance with OSHA Title 29 CFR, Part 1926.62. The supervisor at a minimum must have EPA "Lead Safe Work Practices" RRP Training (8-hours) and have trained the crew on RRP practices for this specific project.

F. Respiratory Protection Program

- 1. The Contractor shall furnish each employee required to wear a negative pressure respirator with a respirator fit test at the time of initial fitting and at least once every six months thereafter, as required by OSHA Title 29 CFR, Part 1926.62.
- 2. The Contractor shall establish a Respiratory Protection Program in accordance with ANSI Z88.2, OSHA Title 29 CFR, Parts 1910.134 and 1926.62.

1.06 SUBMITTALS

- A. The Contractor shall submit the following to the Consultant in one complete package prior to the pre-construction meeting and at least 10 business days before the start of the Work:
 - 1. Submit a schedule to the Owner and the Consultant, which defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, and decontamination.
 - 2. Submit a current valid certificate of insurance.
 - 3. Submit the name and address of the hauling contractor and location of the landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
 - 4. Submit video documentation showing the existing building conditions prior to the start of work. The Contractor shall be responsible for all costs associated with damage to the building and its contents that are not shown on the video documentation.
 - 5. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
 - 6. Submit copies of medical records for each employee to be used on the project, including results of biological monitoring and a notarized statement by the examining physician that such an examination occurred.
 - 7. Submit workers' valid training certificates.
 - 8. Submit record of successful respirator fit testing performed by a qualified individual within the previous six months, for each employee to be used on this project with the employee's name and social security number with each record.
 - 9. Submit the name and address of Contractor's blood lead testing lab, OSHA CDC listing, and certification in the State of Connecticut.
 - 10. Submit detailed product information on all materials and equipment proposed for demolition work on this project.
 - 11. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
 - 12. Submit a chain-of-command for the project.
 - 13. Submit a site-specific Emergency Action Plan for the project.
 - 14. Submit a written site-specific written Respiratory Protection Program for employees for the Work, including make, model and NIOSH approval numbers of respirators to be used at the Site (if applicable).

- 15. No work on the Site will be allowed to begin until the Owner and the Consultant as listed herein accept the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation accurately, completely, and in a timely manner does not constitute a cause for change order or a time extension.
- B. The following shall be submitted to the Consultant during the Work:
 - 1. Results of personal air sampling
 - 2. Training and medical records for new employees to start Site work (24-hours in advance)
- C. The following shall be submitted to the Consultant at the completion of the Work:
 - 1. Copies of all air sampling results.
 - Contractor logs.
 - 3. Copies of manifests and receipts acknowledging disposal of all waste material from the project showing delivery date, quantity, and appropriate signature of landfill's authorized representative.

1.07 PERSONAL PROTECTION

- A. Exposure Assessment
 - 1. The Contractor shall determine if any worker will be exposed to lead at or above the action level
 - 2. The exposure assessment shall identify the level of exposure a worker would be subjected to without respiratory protection.
 - 3. The exposure assessment shall be achieved by obtaining personal air monitoring samples representative of a full shift at least (8-hour TWA).
 - 4. During the period of the exposure assessment, the Contractor shall institute the following procedures for protection of workers:
 - a. Protective clothing shall be utilized
 - b. Respiratory protection
 - c. Change areas shall be provided
 - d. Hand washing facilities and shower
 - e. Biological monitoring
 - f. Training of workers

B. Respiratory Protection

- 1. The Contractor shall furnish appropriate respirators approved by the National Institute of Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) for use in atmospheres containing lead dust.
- 2. Respirators shall comply with the requirements of OSHA Title 29 CFR, Part 1926.62.
- 3. Workers shall be instructed in all aspects of respiratory protection.
- 4. The Contractor shall have an adequate supply of HEPA filter elements and spare parts onsite for all types of respirators in use.
- 5. The following minimum respirator protection for use during paint removal or demolition of components and surfaces with lead paint shall be the half-face air purifying respirator with a minimum of dual P100 filter cartridges for exposures (not in excess of 500 μg/m³ or 10 x PEL).

C. Protective Clothing

- 1. Personal protective clothing shall be provided for all workers, supervisors, and authorized visitors entering the work area.
- 2. Each worker shall be provided daily with a minimum of two complete disposable coverall suits.
- 3. Removal workers shall not be limited to two (2) coveralls, and the Contractor shall supply additional coveralls as necessary.
- 4. Under no circumstances shall anyone entering the abatement area be allowed to re-use a contaminated disposable suit.
- 5. Disposable suits (TYVEKTM or equivalent), and other personal protective equipment (PPE) shall be donned prior to entering a lead control area. A change room shall be provided for workers to don suits and other PPE with separate areas to store street clothes and personal belongings.
- 6. Eye protection for personnel engaged in lead operations shall be furnished when the use of a full-face respirator is not required.
- 7. Goggles with side shields shall be worn when working with power tools or a material that may splash or fragment, or if protective eye wear is specified on the SDS for a particular product to be used on the project.

1.08 PERSONAL MONITORING

A. General.

1. The Contractor shall be required to perform the personal air sampling activities during lead paint disturbing work. The results of such air sampling shall be posted, provided to individual workers, and submitted to the Client as described herein.

B. Air Sampling.

- Air samples shall be collected for the duration of the work shift or for 8-hours, whichever is less. Personal air samples need not be collected every day after the first day, if working conditions remain unchanged, but must be collected each time there is a change in removal operations, either in terms of the location or in the type of work. Sampling will be used to determine 8-hour TWA. The Contractor shall be responsible for personal air sampling as outlined in OSHA Title 29 CFR, Parts 1910.1025 & 1926.62.
- 2. Air sampling results shall be reported to individual workers in written form no more than 48-hours after the completion of a sampling cycle. The reporting document shall list each sample's result, sampling time and date, personnel monitored and their social security numbers, flow rate, sample duration, sample yield, cassette size, and analysts' name and company, and shall include an interpretation of the results. Air sample analysis results will be reported in μg/m³.

C. Testing Laboratory.

1. The Contractor's testing lab shall be currently participating in the American Industrial Hygiene Association's (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP). The Contractor shall submit to the Engineer for review and acceptance, the name and address of the laboratory, certification(s) of AIHA participation, a listing of relevant experience in air lead analysis, and presentation of a documented Quality Assurance and Quality Control Program.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Any substitution in materials, equipment, or methods to those specified shall be approved by the Owner and Consultant prior to use. Any requests for substitution shall be provided in writing to the Owner and Consultant. The request shall clearly state the rationale for the substitution.
- B. Submit to the Owner and Consultant product data of all materials and equipment and samples of all materials to be considered as an alternate.
- C. Product data shall consist of manufacturer; catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, SDS, and other standard descriptive data. Submittal data shall be clearly marked to identify pertinent materials, products or equipment and show performance characteristics and capacities.
- D. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product or material with integrally related parts and attachment devices.

2.02 MATERIALS AND PRODUCTS

- A. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- B. Damaged or deteriorating materials shall not be used and shall be removed from the premises.
- C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the project including protective clothing, respirators, filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, and air filters.

D. Materials

- 1. Poly sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- 2. Poly disposable bags shall be 6-mil. Tie wraps for bags shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- 3. Tape or spray adhesive will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheeting to finished or unfinished surfaces of dissimilar materials and capable of adhering onto both dry and wet conditions, including use of amended water.
- 4. Impermeable containers are to be used to receive and retain any lead-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with EPA and DOT standards.
- 5. HEPA filtered exhaust systems shall be used during powered dust-generating abatement operations. The use of powered equipment without HEPA exhausts on this Site shall be prohibited.

2.03 TOOLS AND EQUIPMENT

A. Provide suitable tools for all lead disturbing operations.

- B. The Contractor shall have available power cables or sources such as generators (where required).
- C. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- A. At least one week prior to the start of work, a Pre-Construction Meeting will be scheduled and must be attended by the Contractor and any Subcontractors. The assigned Contractor Site Supervisor must attend this meeting.
- B. The Contractor shall present a detailed project schedule and project submittal package at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and Consultant will inform the Contractor of any scheduling adjustments for this project.
- C. Following the Pre-Construction Meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORKER PROTECTION/TRAINING

- A. The Contractor shall provide appropriate training, respiratory and other PPE, and biological monitoring for each worker and ensure proper usage during potential lead exposure and the initial exposure assessment.
- B. Workers who will perform procedures must have completed one of the following training courses for LBP:
 - 1. EPA Lead Abatement Supervisor (40-hours)
 - 2. EPA Lead Abatement Worker (32-hours)
 - 3. EPA "Lead Safe Work Practices" Renovation Repair and Painting (RRP) Training (8-hours) (required for the on-site supervisor)

The following is only for lead containing paint/materials, not LBP:

 Lead Awareness training in accordance with the OSHA Lead-in-Construction Standard (29 CFR 1926.62)

3.03 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall be responsible for establishing and maintaining controls referenced herein to prevent dispersal of lead contamination from the lead work area.
- B. The Contractor shall also be responsible for conducting work with applicable federal, state, and local regulations as referenced herein.

3.04 WORKER HYGIENE PRACTICES (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

- A. Work Area Entry.
 - 1. Workers shall don PPE prior to entering work area, including respiratory protection, disposable coveralls, gloves, headgear, and footwear.
- B. Work Area Departure.
 - 1. While leaving respirators on, workers shall remove all gross contamination, debris, and dust from disposable coveralls and proceed to change room and remove coveralls and footwear and place in hazardous waste disposal container.
- C. Hand washing Facilities.
 - 1. All workers must wash their hands and faces upon leaving the work area.
- D. Equipment.
 - All equipment used by workers inside the work area shall be wet-wiped or bagged for later decontamination before removal from the work area.
- E. Prohibited Activities.
 - 1. Under no circumstances shall workers eat, drink, smoke, chew gum or tobacco, apply cosmetics, or remove their respirators in the work area.
- F. Shock Hazards.
 - 1. The Contractor shall be responsible for using safe procedures to avoid electrical hazards. All temporary electrical wiring will be protected by a ground fault circuit interrupter (GFCI).

3.05 LEAD WORK AREA (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

A. The Contractor shall place lead warning signs at all entrances and exits from the work area. Signage shall be a minimum of 20" x 14" and shall state the following:

DANGER LEAD WORK AREA MAY DAMAGE FERTILITY OR THE UNBORN CHILD CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM DO NOT EAT, DRINK OR SMOKE IN THIS AREA

- B. The Contractor shall designate a change room as specified in this Section. The change room shall consist of two layers of 6-mil thickness poly sheeting on the floor surface adjacent to the lead work area. The change room shall have separate storage facilities for street clothes to avoid cross-contamination.
- C. The Contractor shall provide potable water for hand and face washing and provide a portable shower unit.

D. The Contractor shall place 6-mil poly drop cloths on floor/ground surfaces prior to beginning removal work to facilitate clean-up.

3.06 WORK AREA CLEAN-UP

- A. The Contractor shall remove all loose chips and debris from floor surfaces and place in hazardous waste disposal bags.
- B. The Contractor shall clean using a HEPA filter equipped vacuum the adjacent surfaces to remove dust and debris.
- C. Poly drop cloths shall be cleaned and properly disposed of general construction and demolition waste.

3.07 WASTE DISPOSAL

- A. The Contractor's contractual liability shall be the proper disposal of all non-hazardous wastes generated at the Site in accordance with all applicable federal, state, and local regulations as referenced herein.
 - 1. Fuss & O'Neill, Inc. did not collect a TCLP sample for disposal characterization of the anticipated waste stream due to the destructive nature of sampling/testing. Because components identified to contain LBP are in contact with presumed PCB bulk product waste, such components cannot be recycled, and therefore will require TCLP sampling/analysis to determine proper disposal. If additional painted materials are to be disturbed at the site that were not previously tested, they will need to be tested for lead content If toxic levels of lead are identified, the materials will need to be handled using RRP contractor and methods and materials in contact with pre-1980 caulk will require TCLP sampling/analysis to determine proper disposal of the waste. The waste stream shall also be considered RCRA lead waste until TCLP sampling proves otherwise.

3.08 CONSULTANT

- A. The Owner may retain a Consultant for the purpose of construction administration and project monitoring during demolition work at the Site.
- B. The Consultant will represent the Owner in all tasks of the project at the discretion of the Owner.

3.09 CONSULTANT'S INSPECTION RESPONSIBILITIES

- A. The Consultant may conduct inspections throughout the progress of the demolition project. Inspections shall be conducted to document the progress of the work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant shall perform the following inspections during the course of abatement activities:
 - 1. <u>Pre-commencement Inspection</u>. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed a minimum of 12 hours prior to the time the inspection is required. If deficiencies are identified during the

- pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
- 2. <u>Work Area Inspections</u>. Work area inspections shall be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant will observe the Contractor's removal methods and procedures, assess project progress, and inform the Contractor of specific remedial activities if deficiencies are noted.

END OF SECTION 02 83 19

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions, shall apply to this Section.
- B. Fuss & O'Neill, Inc. Hazardous Building Materials Inspection Report dated September 2023 (Attachment A).
- C. Unit Prices Section 01 22 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Lead Paint Awareness Section 02 83 19.
- F. Abatement Plan HM-01

1.02 CONSULTANT

- A. The Owner may retain Fuss & O'Neill, Inc. (the "Consultant") for the purposes of project management and monitoring during presumed Polychlorinated Biphenyl (PCB) Bulk Product Waste Removal & Disposal. The Consultant will represent the Owner in all phases of the project at the discretion of the Owner. The PCB Abatement Contractor, Asbestos Abatement Contractor, RRP Contractor, Demolition Contractor, and/or other Building Trades (collectively the "Contractor") shall regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
 - 1. Work area approval
 - 2. Monitoring results review
 - 3. Various segments of work completion
 - 4. Abatement final completion
 - 5. Data submission review
 - 6. Daily field punch list items

1.03 SCOPE OF WORK

- A. Work outlined in this Section includes all work necessary for the removal and disposal of the presumed greater than or equal to (≥) 50 parts per million (ppm) PCB-containing material (PCB Bulk Product Waste herein) impacted during the Governor William Pitkin Elementary School renovation project (the "Work") at 330 Hills Street, East Hartford, Connecticut (the "Site").
- B. The Work of this Section includes the following:
 - 1. Site preparation and controls to facilitate renovation and minor disturbance of PCB Bulk Product Waste.
 - 2. Health and Safety in accordance with Occupational Safety and Health Administration (OSHA) requirements.

- 3. Removal and cleaning of the work areas following impacts to identified presumed PCB Bulk Product materials.
- 4. Packaging, transportation, and disposal of presumed PCB Bulk Product Waste at a facility permitted to accept PCB Bulk Product Waste (Contractor's Responsibility).
- 5. Packaging, transportation, and disposal of containment, personal protective equipment (PPE), cleaning materials and supplies, and waste generated during impacts to presumed PCB Bulk Product Waste as PCB Remediation Waste at a facility permitted to accept PCB Remediation Waste (Contractor's Responsibility).
- Recordkeeping and distribution as required in accordance with EPA Title 40 CFR, Part 6. 761.125 (c) (5).

1.04 **USE OF THE CONTRACT DOCUMENTS**

- All work shall comply with the Contract Documents and with applicable codes, laws, regulations, Α. and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.
- В. It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all materials and labor necessary for the completion of the Work in accordance with the intent of the Specifications.
- C. In case of ambiguity among the Contract documents, the more stringent requirement as determined by the Consultant shall prevail.
- D. The Work of this Contract includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts between Contract Documents.
- E. All items not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

1.05 SITE EXAMINATION

Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor Α. shall make no claim for additional cost due to the existing Site conditions.

1.06 ADDITIONAL GENERAL REQUIREMENTS

- The Contractor shall furnish all labor, materials, equipment, current employee training medical Α. surveillance clearance and fit tests for assigned respirators and incidentals necessary to perform the specified work. Work shall be performed in accordance with the Contract Documents, the latest regulations from OSHA, the United State Environmental Protection Agency (EPA), and all other applicable federal, state, and local agencies. Whenever the requirements of the above references conflict or overlap, the more stringent provision shall apply.
- B. All project personnel engaged in the work covered under this Section shall be trained in accordance with OSHA Title 29 CFR, Parts 1910.1000 and 1910.1200.
- C. This Section specifies the procedures for removal and disposal of identified materials as presumed PCB Bulk Product Waste.

- D. This Section also specifies the procedures for removal of containment, PPE, cleaning materials and supplies, and waste generated during removal of presumed PCB Bulk Product Waste and disposal of containment, PPE, cleaning materials and supplies, and waste generated during removal of PCB Bulk Product Waste as PCB Remediation Waste.
- E. Subsequent cleaning of all adjacent surfaces upon completion of Work is also included in this Section.
- F. Disturbance or removal of presumed PCB-containing material may cause a health hazard to workers and building occupants. The Contractor shall disclose to workers, supervisory personnel, sub-contractors, and consultants who will be at the Site of the seriousness of the hazard and proper work procedures that must be followed.
- G. During performance of the Work, workers, supervisory personnel, Subcontractors, or consultants who may encounter, disturb, or otherwise function in the immediate vicinity of the presumed PCB-containing material, shall take continuous measures as necessary to protect workers from the hazard of exposure. Such measures shall include the procedures and methods described in this Section, OSHA regulations, EPA regulations, and local requirements, as applicable.
- H. If requested or required by local, state, federal, and any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this Contract to be inspected. The Contractor shall immediately notify the Owner and the Consultant and shall maintain written evidence of such inspection for review by the Owner and the Consultant.
- I. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance, as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance, or negligence.

1.07 PROJECT DESCRIPTION

A. This work includes impacts to the following Presumed PCB Bulk Product Waste and the generation of PCB Remediation Waste:

BASE BID - PRESUMED PCB BULK PRODUCT WASTE

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
All Windows/Window Openings Throughout School	All Caulks, Adhesives, Sealants, & Glazing Associated with Windows, Sills, Frames & Window Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non-Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 82 13 See Section Asbestos Abatement	19 @ 40 LF EA 6 @ 30 LF EA 1 @ 12 LF EA 19 @ 100 LF EA 6 @ 60 LF EA 1 @ 12 LF EA	1,2,3,4,5
Exterior Doors Systems Windows	White Exterior Door Window Glazing Compound Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non-Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 82 13 See Section Asbestos Abatement	11 Door Systems: 1 @ 126 LF 6 @ 46 LF EA 2 @ 14 LF EA 1 @ 26 LF EA 1 Door @ 8 LF	1,2,3,4,5

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Door Openings Behind Door System Frames and under Sills	All Caulks, Adhesives & Sealants Associated with Doors, Sills, Frames & Door Openings Includes Removal, Packaging, Transporting, & Disposing as Contaminated Non- Friable ACM and Presumed PCBs Bulk Product Waste See Section 02 82 13 See Section Asbestos Abatement	12 Door Systems: 8 @ ~30 LF EA 2 @ 24 LF EA 1 @ 54 LF EA 1 @ 26 LF EA	1,2,3,4,5

BASE BID - PRESUMED PCB REMEDIATION WASTE

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Caulk & Glazing Removal Locations	Personal Protective Equipment (PPE), Polyethylene Sheeting and Used Cleaning Supplies	1 Cubic Yard Wate Cube	1,2,3,4,5

Project Notes:

- Location of PCB waste storage containers shall be verified by Contractor during the time of the walk through. The Contractor shall cross-reference their work scope with areas that presumed PCB Bulk Product in the form of window & door caulk and window glazing compound that will be disturbed. Discrepancies of locations of presumed PCB-containing building materials shall be addressed prior to the work with the Owner and Consultant.
- 2. All window caulk and components in contact with caulk, as well as window sash/glazing compound shall be disposed of as asbestos and PCB Bulk Product Waste. The waste stream from the cafeteria windows shall also be considered RCRA lead waste until TCLP sampling proves otherwise.
- 3. Polyethylene sheeting, PPE, cleaning materials and supplies, and other waste generated during removal of presumed PCB Bulk Product Waste shall be disposed of as PCB Remediation Waste.
- 4. Coordinate with Architectural, Demolition and Construction Annotation Drawings for areas and locations that will be impacted.
- Window and door openings shall be sealed on the inside of openings with critical barriers 5. and windows/doors removed from the exterior within a PCB and Asbestos regulated work area. Cafeteria windows and any work that will disturb the painted steel beam above windows shall also be conducted within a lead RRP regulated work area complying with the EPA's RRP Rule (40 CFR 745.80 through 92). Work includes removing the window and door frames/sills and window sash\door windows for disposal as asbestos and PCB Bulk Product Waste. The window\door openings shall be removed of all caulking materials to a clean undamaged substrate. The caulking (asbestos containing) and window/\door frames and sills that were in contact with caulk are presumed > 50ppm PCB Bulk Product Waste, and shall be packaged, stored, and disposed of as asbestos and > 50ppm PCB Bulk Product Waste. The waste stream from the cafeteria window removal shall also be considered RCRA lead waste until TCLP sampling proves otherwise. Work shall be coordinated with the CM to allow proper timing between window removal and replacement. The contractor is responsible for securing and weatherproofing the openings at the completion of each shift when openings are made. Materials also contain asbestos, See Asbestos Specification Section 028213 - Abatement Note 3.
- B. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to Site delivery.

C. The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site. Temporary lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels, installed by a State of Connecticut-licensed electrician, permitted as required, and located outside of the work area.

1.08 **DEFINITIONS**

- A. The following definitions relative to PCB abatement shall apply:
 - Abatement Procedures to control PCB release from PCB Bulk Product Waste and PCB 1. Remediation Waste; includes removal, encapsulation, and enclosure.
 - 2. Air Monitoring - The process of measuring PCB concentrations of an area or exposure of a person.
 - CERCLA Comprehensive Environmental Response, Compensation, and Liability Act 3. (Title 42 CFR, Parts 9601-9657).
 - Chemical Waste Landfill A landfill at which protection against risk of injury to health or the 4. environment from migration of PCBs to land, water, or the atmosphere is provided from PCBs and PCB Items deposited therein by locating, engineering, and operating the landfill as specified in EPA Title 40 CFR, Part 761.75.
 - 5. Cleanup Site - The areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of a cleanup of PCB Remediation Waste, regardless of whether the Site was intended for management of
 - 6. Competent Person - As defined by OSHA, a representative of the Contractor who is capable of identifying existing PCBs hazards in the workplace and selecting the appropriate control strategy for PCB exposure. Person who has authority to take prompt corrective measures to eliminate such hazards during PCB removal.
 - Consultant Fuss & O'Neill, Inc. 7.
 - Containment An enclosure within the building which establishes a contaminated area and surrounds the location where PCB and/or other toxic or hazardous substance removal is performed and establishes a Control Work Area.
 - Designated Facility An off-site disposer or commercial storer of PCB-containing waste 9. designated on the manifest as the facility that will receive a manifested shipment of PCB containing waste.
 - 10. Disposal - An intentional or accidental act of discarding, throwing away, completing, or terminating the useful life of PCBs and PCB-containing items. Disposal includes spills, leaks, and other uncontrolled discharges of PCBs, as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB items.
 - 11. DOT - The United States Department of Transportation.
 - EPA Identification Number The 12-digit number assigned to a facility by EPA upon 12. notification of PCB waste activity under EPA Title 40 CFR, Part 761.205.
 - Fixed Object Mechanical equipment, electrical equipment, fire detection systems, alarms, 13. or all other fixed equipment, fixtures, or items which cannot be removed from the work area.
 - Generator of PCB Waste Any person who acts, processes, or produces PCBs that are regulated for disposal under EPA Title 40 CFR, Part 761, Subpart D, whose act first causes PCBs or PCB-containing -items to become subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D, or who has physical control over the PCBs when a decision is made that the use of the PCBs has been terminated, and is therefore subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D. Unless another provision of EPA Title 40 CFR, Part 761 specifically requires a site-specific meaning, "generator of PCB waste" includes all of the sites of PCB waste generation owned or operated by the person who generates PCB waste.
 - GFCI Ground Fault Circuit Interrupter

- 16. HEPA - High Efficiency Particulate Air
- 17. HEPA Filter - Filter in compliance with ANSI Z9.2 1979.
- HEPA Vacuum Equipment Vacuum equipment equipped with a HEPA filter system for 18. filtering the air effluent.
- 19. Laboratory - A facility that analyzes samples for PCBs and is unaffiliated with any entity whose activities involve PCBs.
- 20. Large PCB Mark (M_L) - Mark that includes letters and striping on a white or yellow background and shall be sufficiently durable to equal or exceed the life (including storage for disposal) of the PCB Article, PCB Equipment, or PCB Container. The size of the mark shall be at least six inches (6") on each side. If the PCB Article or PCB Equipment is too small to accommodate this size, the mark may be reduced in size proportionately down to a minimum of two inches on each side.
- 21. Manifest - The shipping document EPA form 8700–22 and any continuation sheet attached to EPA form 8700-22, originated and signed by the generator of PCB-containing waste.
- 22. Mark - The descriptive name, instructions, cautions, or other information applied to PCBs, and PCB Items, or other objects.
- 23. Marked - The marking of PCB Items and PCB storage areas and transport vehicles by means of applying a legible mark by painting, fixation of an adhesive label, or by any other method that meets the requirements of the EPA Title 40 CFR, Part 761.
- 24. Movable Object - Unit of equipment of furniture in the work area that can be removed from the work area.
- 25. Negative Air Pressure Equipment - A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 26. On-Site - Within the boundaries of a contiguous property unit.
- 27. Owner - East Hartford Public Schools: An employee or executive who has the principle responsibility for a process, program, or project.
- 28. PCB(s) - A chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances that contain such substance. Refer to EPA Title 40 CFR, Part 761.1(b) for applicable concentrations of PCBs. PCB and PCBs as contained in PCB items are defined in EPA Title 40 CFR, Part
- 29. PCB Article - A manufactured article, other than a PCB Article Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. Includes capacitors, transformers, electric motors, pumps, pipes, and other manufactured item which (1) is formed to a specific shape or design during manufacture, (2) has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) has either no change of chemical composition during its end use, or only those changes of composition that have no commercial purpose separate from that of the PCB Article.
- 30. PCB Article Container - A package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.
- 31. PCB Bulk Product Waste - A waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is greater than (≥) 50 ppm PCBs. Does not include PCBs or PCB Items regulated for disposal under EPA Title 40 CFR Parts 761.60(a)-(c), 7611.61, 761.63, or 761.64. PCB Bulk Product Waste is further defined in EPA Title 40 CFR, Part 761.3.
- 32. PCB Item - A PCB Article, PCB Article Container, PCB Container, PCB Equipment, or anything that deliberately or unintentionally contains, or has as a part of it any PCB or PCBs.
- PCB Remediation Waste Waste containing PCBs in concentrations greater than 1 ppm 33. as a result of a spill, release, or other unauthorized disposal.
- 34. PCB Waste(s) - PCBs and PCB Items that are subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D.

- 35. RCRA - The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 -
- 36. Regulated Work Area - An area established by the employer to demarcate where PCB abatement is conducted and any adjoining area where debris, and waste from such abatement work accumulate.
- 37. Storage for Disposal - Temporary storage area for PCBs that have been designated for disposal.
- 38. Totally Enclosed Manner - A manner that will ensure no exposure of human beings or the environment to a concentration of PCBs.
- Transfer Facility A transportation-related facility including loading docks, parking areas, and other similar areas where shipments of PCB waste are held during normal transportation. Transport vehicles are not transfer facilities under this definition, unless they are used for the storage of PCB waste, rather than for actual transport activities. Storage areas for PCB waste at transfer facilities are subject to the storage facility standards of EPA Title 40 CFR, Part 761.65, but such storage areas are exempt from the approval requirements of EPA Title 40 CFR, Part 761.65(d) and the recordkeeping requirements of EPA Title 40 CFR, Part 761.180, unless the same PCB waste is stored there for a period of more than 10 consecutive days between destinations.
- 40. Transporter of PCB Waste - For the purposes of Title 40 CFR, Part 761, Subpart K, any person engaged in the transportation of regulated PCB waste by air, rail, highway, or water for purposes other than consolidation by a generator.
- Transport Vehicle A motor vehicle or rail car used for the transportation of cargo by any 41. mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport
- 42. TSCA - The Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

1.09 **SUBMITTALS**

- The Contractor shall submit the following to the Consultant in one complete package prior to the Α. pre-construction meeting, and no later than 10 business days prior to the anticipated start of the Work:
 - 1. Site-Specific Health and Safety Plan (HASP): The Contractor shall prepare a site-specific HASP plan for protection of workers and control of the work site in accordance with OSHA regulatory requirements (Title 29 CFR, Part 1910.120). The HASP shall govern all work conducted at the site during the removal of PCB-Containing Materials and related debris, waste handling, sampling, waste management, and waste transportation. At a minimum, the HASP shall address the requirements set forth in OSHA Title 29 CFR, Part 1910.120, as further outlined below:
 - Health and Safety Organization
 - Site Description and Hazard Assessment b.
 - **Training** C.
 - Medical Surveillance d.
 - e. Work Areas
 - f. Personal Protective Equipment
 - Personal Hygiene and Decontamination g.
 - Standard Operating Procedures and Engineering Controls h.
 - **Emergency Equipment and First Aid Provisions** i.
 - **Equipment Decontamination** j.
 - Air Monitoring k.
 - Ι. Telephone List
 - m. Emergency Response and Evacuation Procedures and Routes
 - Site Control n.
 - Heat and Cold Stress O

- p. Recordkeeping
- q. Community Protection Plan
- 2. <u>Employee Training, Medical, and Fit Test Documentation</u>: The Contractor submit the following documentation:
 - Documentation of Training for all employees and Sub-contractors to be used for the removal work.
 - b. Medical clearance and respirator fit test records of each employee who may be on the project site.
- 3. PCB and/or other Toxic or Hazardous Substances Disposal Plan (Contractor Responsibility):

A written plan that details the Contractor's plan for transportation and disposal of PCB-Containing Materials, or other Toxic or Hazardous Substance wastes generated during the project. The Disposal Plan shall identify:

- The Contractor's insurance certificate and landfill's operating permits and insurance certificates.
- b. Waste packaging, labeling, placarding, and manifesting procedures.
- c. The name, address, and 24-hour contact number for the proposed treatment or disposal facility, or facilities to which waste generated during the project will be transported.
- d. The name, address, contact person(s) and state-specific permit numbers for proposed waste transporters, and EPA and DOT identification number for firms that will transport PCB-Containing Material waste.
- e. The license plate numbers of vehicles to be used in transporting of the waste from the Site to the disposal facility.
- f. The route(s) by which the waste will be transported to the designated disposal facility, and states or territories through which the waste will pass.
- 4. <u>Air Sampling Professional Qualifications</u>: The qualifications of the air sampling professional that the Contractor proposed to use for this project to perform OSHA required employee exposure monitoring.
- B. The following documents shall be submitted to the Consultant within 15 working days following removal of waste from the Site (Contractor Responsibility):
 - 1. Waste Profile Sheets
 - 2. Pre-Disposal Analysis Test Results (if required by disposal facility)
 - 3. Waste Manifests signed by the disposal facility
 - 4. Tipping Receipts provided by the disposal facility
 - 5. Certification of Final Treatment/Disposal signed by the responsible disposal facility official
- C. The following shall be submitted to the Consultant at the completion of the Work (Abatement Contractor Responsibility):
 - 1. <u>Disposal Site Receipts</u>: Copy of waste shipment record(s) and disposal site receipt(s) that indicate that PCB-Containing Materials or other Toxic, or Hazardous Substances materials have been properly disposed.

1.10 REGULATIONS AND STANDARDS

- A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to presumed PCB Bulk Product impacted by work. Specifically, the Contractor shall comply with the requirements of the following:
 - 1. EPA TSCA (Title 40 CFR, Part 761);

- 2. OSHA Hazardous Waste Operations and Emergency Response Regulations (Title 29 CFR, Parts 1910.120);
- 3. OSHA Respiratory Protection Standard (Title 29 CFR, Part 1910.134);
- 4. OSHA Hazard Communication (Title 29 CFR, Part 1910.1200);
- 5. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 180);
- 6. CTDEEP Regulations;
- 7. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, 2016, and 2018 amendments;
- 8. Life Safety Code (National Fire Protection Association [NFPA]); and
- 9. Local health and safety codes, ordinances or regulations pertaining to PCB remediation and all national codes and standards including American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

1.11 POSTING AND RECORD MAINTENANCE REQUIREMENTS

- A. The following items shall be conspicuously displayed proximate but outside of the regulated work areas.
 - 1. <u>Warning Signs</u>: Warning signs shall be in English and the language of any workers on-site who do not speak English, and be of sufficient size to be clearly legible and display the following or similar language in accordance with OSHA Title 29 CFR, Part 1910.1200:

WARNING HAZARDOUS WASTE WORK AREA PCBs-POISON NO SMOKING, EATING OR DRINKING AUTHORIZED PERSONNEL ONLY PROTECTIVE CLOTHING IS REQUIRED IN THIS AREA

In addition, all entrances to work areas shall be posted with a PCB M_L large marker.

- B. The Contractor shall maintain the following items on-site and available for review by all employees and authorized visitors:
 - 1. Documentation of Training, Medical Clearance, and Fit Test Records for all employees and the project Supervisor.
 - 2. SDS for all chemicals used during the project.
 - 3. Copies of Contractor's written hazard communication and respiratory protection programs.

1.12 MINIMUM REQUIREMENTS FOR WORKER HEALTH AND SAFETY

- A. The Contractor is responsible and liable for the health and safety of all on-site personnel and the off-site community affected by the Work. All on-site workers or other persons entering the regulated work areas shall be knowledgeable of and comply with all applicable federal, state, and local regulations protecting human health and the environment from the hazards posed by the Work.
- B. In addition to exposure concerns relating to the presence of PCBs, other health and safety considerations will apply to the Work. The Contractor shall be responsible for recognizing such hazards and shall be responsible for the health and safety of the Contractor's employees at all

times. It is the Contractor's responsibility to comply with all applicable health and safety regulations.

1.13 WORK AREA IDENTIFICATION

- A. The Contractor shall lay out and clearly identify regulated work areas at the Site. Access by equipment, site personnel, and the public to the work areas shall be limited as follows:
 - 1. Abatement Zone: The Abatement Zone(s) shall consist of all areas where removal of PCB-Containing Materials and other Toxic or Hazardous Substances, and waste handling and staging activities are on-going and the immediately surrounding locale or other areas where contamination could occur. Each Abatement Zone for purposes of removal of PCB-Containing Materials or other Toxic or Hazardous Substances for disposal shall be performed within a regulated work area (refer to Section 3.2 of this Specification) to demarcate work areas from non-work areas. The regulated work area shall be visibly delineated with appropriate warning signs at all approaches to the area (including a large PCB M_L marker) and be restricted from access by all personnel except those directly necessary for the completion of the respective abatement tasks. The Abatement Zones shall be relocated and delineated as necessary as work progresses from one portion of the Site to another, to limit access to each area and to minimize risk of exposure to Site workers and the general public. Access shall be controlled at the periphery of the Abatement Zones to regulate the flow of personnel and equipment into and out of each zone and to help verify that proper procedures for entering and exiting are followed. All persons within the Abatement Zones shall wear the appropriate level of protection established in the Contractor's HASP.
 - 2. Decontamination Zone: The Decontamination Zone is the transition zone between the Abatement Zone and the clean support zone of the project site and is intended to reduce the potential for contaminants from being dispersed from the Abatement Zone to clean areas of the Site. The Decontamination Zone shall consist of a buffer area surrounding each Abatement Zone through which the transfer of equipment, materials, personnel, and containerized waste products will occur, and in which decontamination of equipment, personnel, and clothing will occur. The Decontamination Zones shall be constructed as a three-chamber decontamination unit for workers and a two-chamber equipment room for waste load out as detailed in Section 3.3 of this Specification. All emergency response and first aid equipment shall be readily maintained in this zone. All PPE and clothing shall be removed or decontaminated in the Decontamination Zone prior to exiting to the Support Zone.
 - 3. Support Zone: The Support Zone shall consist of the area outside the Decontamination Zones and the remainder of the project site. Administrative and other support functions and any activities that by nature need not be conducted in the Abatement or Decontamination Zone related to the project shall occur in the Support Zone. Access to the Abatement and Decontamination Zones shall be controlled by the Contractor Site Supervisor and limited to those persons necessary to complete the abatement work, and who have reviewed and signed the HASP.

1.14 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

A. The Contractor shall be responsible to determine and to provide the appropriate level of PPE in accordance with applicable regulations and standards necessary to protect the Contractor's employees from all hazards that are present.

- B. The Contractor shall provide all employees with the appropriate safety equipment and protective clothing to ensure an appropriate level of protection for each task, taking into consideration the chemical, physical, ergonomic, and biological hazards posed by the Site and Work.
- C. The PPE to be utilized for the project shall be selected based upon the potential hazards associated with the Site and the Work. Appropriate PPE shall be worn at all times within the regulated work area.
- D. The Contractor shall provide the appropriate level of respiratory protection to all field personnel engaged in activities where respiratory hazards exist, or where there is a potential for such hazard to exit.
- E. The Contractor shall provide, as necessary, protective coveralls, disposable gloves and other protective clothing for all personnel that will be actively involved in abatement activities or waste handling activities, or otherwise present in the regulated work area. Coveralls shall be Tyvek™ or equivalent material. Should the potential for exposure to liquids exist, splash resistant disposable suits shall be provided and utilized.
- F. Protective coveralls, and other protective clothing shall be donned and removed outside of the regulated work area and shall be disposed at the end of each day. Ripped coveralls shall be immediately replaced after appropriate decontamination has been completed to the satisfaction of the Contractor Site Supervisor. Protective clothing shall not be worn outside of the regulated work area.
- G. Hard hats, protective eyewear, rubber boots, and/or other non-skid footwear shall be provided by the Contractor as required for workers and authorized visitors.
- H. All contaminated protective clothing, respirator cartridges, disposable protective items HEPA filters, vacuum bags/collection devices, etc. shall be placed into proper containers provided by the Abatement Contractor for transport and proper disposal in accordance with EPA regulations as presumed PCB Remediation Waste.

1.15 **EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS**

- Α. At a minimum, the Contractor shall provide and maintain at the Site the following Emergency and First Aid Equipment:
 - 1. Fire Extinguishers: At a minimum, one fire extinguisher shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work. Each extinguisher shall be a minimum of a 20-pound Class ABC dry fire extinguisher with Underwriters Laboratory approval per OSHA Title 29 CFR, Part 1910.157.
 - First Aid Kit: At a minimum, one first aid kit meeting the requirements of OSHA Title 29 2. CFR, Part 1910.151 shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work.
 - 3. Communications: Telephone communications (either cellular or land line) shall be provided by the Contractor for use by site personnel at all times during the Work.
- B. The Contractor Site Supervisor shall be notified immediately in the event of personal injury, potential exposure to contaminants, or other emergency. The Contractor Site Supervisor shall then immediately notify the Owner and Consultant.

1.16 STANDARD SAFETY AND HEALTH PROCEDURES AND ENGINEERING CONTROLS

- A. The following provisions shall be employed to promote overall safety, personnel hygiene, and personnel decontamination:
 - Each Contractor or Subcontractor shall ensure that all safety equipment and protective clothing to be utilized by its personnel is maintained in a clean and readily accessible manner at the Site.
 - 2. All prescription eyeglasses in use on this project shall be safety glasses conforming to ANSI Standard Z87.1. No contact lenses shall be allowed on the Site.
 - 3. Prior to exiting the regulated work area(s), all personnel shall remove protective clothing, and place disposable items in appropriate disposal containers to be dedicated to that purpose. Following removal of PPE, personnel shall thoroughly wash and rinse their face, hands, arms, and other exposed areas with soap and tap water wash and subsequent tap water rinse. A fresh supply of tap water shall be provided at the Site on each workday by the Contractor for this purpose.
 - 4. All PPE used on-site shall be decontaminated or disposed at the end of each workday. Discarded PPE shall be placed in sealed DOT-approved 55-gallon drums for off-site disposal provided by the Abatement Contractor.
 - 5. Respirators shall be dedicated to each employee, and not interchanged between workers without cleaning and sanitizing.
 - 6. Eating, drinking, chewing gum or tobacco, smoking, and any other practice that increases the likelihood of hand to mouth contact shall be prohibited within the delineated abatement and decontamination work zones. Prior to performing these activities, each employee shall thoroughly cleanse their face, hands, arms, and other exposed areas.
 - 7. All personnel shall thoroughly cleanse their face hands, arms, and other exposed areas prior to using toilet facilities.
 - 8. No alcohol, illicit drugs, or firearms will be allowed on the Site at any time.
 - Contact with potentially contaminated surfaces should be avoided, if possible. Field
 personnel should minimize walking through standing water/puddles, mud, or other wet or
 discolored surfaces, kneeling on the ground, and placing equipment, materials, or food on
 the ground, or other potentially contaminated surface.
- B. Workers must wear protective suits, protective gloves, and eye protection. Respiratory protection shall be in accordance with OSHA Title 29 CFR Part 1910.134 and ANSI Z88.2.
 - 1. Workers must be trained per OSHA requirements, have medical clearance, and must have recently received pulmonary function test (PFT) and respirator fit test by a trained professional.
 - 2. A personal air sampling program shall be in place, as required by OSHA.
 - 3. The use of respirators must also follow a complete written respiratory protection program as specified by OSHA.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with PCBs shall be decontaminated or disposed as PCB waste.

- B. Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 4 or 6-mil thickness.
- Poly disposable bags shall be 6-mil thickness with pertinent pre-printed label. Tie wraps for bags C. shall be plastic, five inches long (minimum), pointed and looped to secure filled plastic bags.
- Tape or adhesive spray will be capable of sealing joints in adjacent poly and for attachment of D. poly to finished or unfinished surfaces of dissimilar materials, and capable of adhering under both dry and wet conditions, including use of cleaning products.
- E. The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with PCBs.

2.02 **TOOLS AND EQUIPMENT**

- Α. The Contractor shall provide all tools and equipment necessary for PCB removal.
- B. The Contractor's air monitoring professional shall have air monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work including protective clothing, respirators, filter cartridges, poly of proper size and thickness, tape, and air filters.
- C. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticutlicensed electrician.
- D. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and Α. must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.
- B. The Contractor shall present a detailed project schedule and project submittals at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.
- C. Following the Pre-Construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORK AREA PROTECTION – REGULATED AREA

- A. Where necessary, deactivate electrical power. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician, permitted as required, and located outside the work area.
- B. Post warning signs in accordance with OSHA Title 29 CFR, Part 1910.1200 at all approaches to the regulated work area(s). Signs shall be conspicuously posted to permit a person to read signs and take precautionary measures to avoid exposure to PCBs or other Toxic or Hazardous Substances. These signs should include the large PCB M_L markers at each entrance to the work area.
- C. Waste Containers for PCB Bulk Product Waste and PCB Remediation Waste shall be located onsite and shall be placed adjacent to the regulated area. Containers shall be lined, covered, and secured. The PCB waste containers shall be properly marked as described in EPA Title 40 CFR, Part 761.40. Marking shall include a PCB M_L marker formatted in accordance with EPA Title 40 CFR, Part 761.45.

3.03 DECONTAMINATION SYSTEM

- A. The Contractor shall establish an on-site wash facility as near as possible to the regulated work area(s). If a wash facility is not present at the Site, A portable facility will be made available by the Contractor. Hands, face, and all other potentially contaminated areas of the skin will be thoroughly cleaned prior to smoking, eating, or leaving the site.
- B. All equipment which is potentially contaminated is decontaminated prior to leaving the regulated work area. Equipment decontamination procedures will consist of the following:
 - 1. Physically remove packed dirt and debris with a stiff bristle brush and with tap water and hexane or equivalent
 - 2. Tap water rinse
 - 3. Second tap water and hexane or equivalent wash
 - 4. Second tap water rinse
 - 5. Allow to air dry

Note: Most electronic monitoring equipment can be wrapped in plastic to eliminate the need for extensive decontamination protocols which could harm the electronics.

3.04 PRESUMED PCB BULK PRODUCT WASTE REMOVAL PROCEDURES

- A. The Contractor shall have a designated "competent person" on the Site at all times to ensure proper work practices throughout the project.
- B. The Contractor shall regulate the work area as required for compliance with OSHA Title 29 CFR, Part 1910.1200 to prohibit non-trained workers from entering areas where PCBs are to be removed.
- C. The Contractor shall establish a wash facility adjacent the work area.
- D. Materials shall be removed or impacted in a manner which does not breakdown the materials into fine dust or powder to the extent feasible. Equipment and tools to be utilized shall include hand

tools and mechanical equipment such as coring drills, mechanical grinders, etc. to remove materials from adjacent substrates. Mechanical removal equipment shall as appropriate be fitted with HEPA filtered vacuum attachments.

- E. The use of minimal quantities of water to moisten the generated dust prior to collection shall be utilized. Under no circumstances shall the presumed PCB waste show evidence of free liquid water, pooling, or ponding within the waste stream. Any liquid used to wet the dust and debris to control fugitive emissions shall be properly containerized and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1) or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- F. Dry or brittle presumed PCB-Containing Material shall be removed with additional engineering controls such as use of a HEPA filtered vacuum to remove accumulated dust or debris during removal.
- G. Sequence of removal shall follow the following general requirements:
 - 1. Site preparation and controls to facilitate impacts to presumed PCB Bulk Product Waste including establishing a regulated area, preparing polyethylene sheeting drop cloths and the use of engineering controls such as tools and equipment equipped with HEPA filtration. These procedures must be utilized for PCB Waste removal.
 - 2. Health and Safety in accordance with OSHA requirements.
 - 3. Remove and containerize all visible accumulations of presumed PCB Bulk Product Waste. Waste shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5 inches long (minimum), pointed and looped to secure filled plastic bags. Disposal bags shall then be placed in steel 55-gallon DOT-approved drums to be provided by the Abatement Contractor. Packaging and movement of the presumed PCB Bulk Product Waste and PCB Remediation Waste Storage area for PCB waste is the responsibility of the Contractor.
 - 4. Transportation, and disposal of presumed PCB Bulk Product Waste at a facility permitted to accept PCB Bulk Product Waste and shall be the responsibility of the Abatement Contractor.
 - 5. Transportation, and disposal of containment, personal protection equipment (PPE), cleaning materials and supplies, and waste generated during removal of PCB Bulk Product Waste as PCB Remediation Waste at a facility permitted to accept PCB Remediation Waste and shall be the responsibility of the Abatement Contractor.
 - 6. Following complete removal of PCB Bulk Product Waste and PCB Remediation Waste, the regulated work area shall be left clean with no remaining debris.
 - 7. Recordkeeping and distribution as required in accordance with EPA Title 40 CFR, Part 761.125 (c) (5).
- H. At any time during impacts to presumed PCB-containing materials should the Consultant suspect contamination of areas outside the regulated work area, the Consultant shall issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections indicate acceptable decontamination.
- I. If requested by the Owner, the Consultant shall conduct a final visual inspection of the work area. If residual suspect presumed PCB-containing debris is identified during the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all residual PCB.

3.05 CLEANING AND DECONTAMINATION

- A. The Contractor shall be responsible for complete cleaning and decontamination of the regulated work area upon completion of work. The regulated work area will be required to meet proposed final visual inspection requirements.
- B. The Contractor shall utilize HEPA filtered vacuum equipment and wet cleaning products to remove all visible dust and debris from all surfaces within the work area. If specialty cleaning products are utilized, the Contractor shall utilize the product(s) in accordance with manufacturer's specifications including any additional safety and disposal requirements for such use. The Contractor shall assure proper ventilation and engineering controls to prevent an odor or volatile organic compound (VOC) issue in the building when using specialty cleaning products.
- C. Any liquid used to wet the dust and debris to control fugitive emissions shall be collected and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- D. All rags and other cleaning materials used to clean the work area shall be properly disposed as presumed PCB Remediation Waste. All presumed PCB Remediation Waste shall be stored for disposal in accordance with EPA Title 40 CFR, Part 761.61(a)(5)(v)(A). All waste containers shall be appropriately marked and labeled in accordance with EPA Title 40 CFR, Parts 761.40 and 761.45. Waste disposal is the responsibility of the Contractor.
- E. Equipment to be utilized in connection with the removal of PCB Bulk Product Waste including waste collection, or that will or may come in direct contact with the Site contaminants shall be decontaminated prior to leaving the Site to prevent migration of the potential contaminated residues. Decontamination shall be in accordance with EPA Title 40 CFR Part 761.79 and Subpart S procedures.
- F. All non-disposable equipment and tools employed in the Work will be decontaminated at the conclusion of each work day utilizing the following sequence:
 - 1. Initial tap water rinse to remove gross debris
 - 2. Tap water and hexane or equivalent wash
 - 3. Tap water rinse
 - 4. Second tap water and hexane or equivalent wash
 - 5. Second tap water rinse
- G. The wash water and decontamination liquids shall be captured and containerized in DOT approved 55-gallon drums for off-site disposal in accordance with EPA Title 40 CFR, Part 761.60(a). Waste disposal is the responsibility of the Contractor.

3.06 CONSULTANT'S RESPONSIBILITIES

- A. Consultant may conduct inspections throughout the progress of the removal project. Inspections may be conducted to document the progress of the removal work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant's project monitor shall provide continual evaluation of the condition of the building during removal, using their best professional judgments in respect to EPA and CTDEEP regulations.

3.07 CONSULTANT'S INSPECTION RESPONSIBILITIES

- A. Consultant may conduct inspections throughout the progress of the removal project. Inspections may be conducted to document the progress of the removal work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant may perform the following inspections during abatement activities:
 - 1. <u>Pre-commencement Inspection</u>. If requested by the Owner, Pre-commencement inspections shall be performed by the Consultant. The Consultant shall be informed 12-hours prior to the time the inspection is needed. If deficiencies are identified during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
 - Work Area Inspection. If requested by the Owner, Work area inspections may be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant shall observe the Contractor's removal procedures, verify isolation barrier integrity, assess project progress, and inform the Contractor of specific remedial activities if deficiencies are noted.
- C. The Consultant shall perform the following inspection during abatement activities:
 - Final Visual Inspection. The Consultant shall conduct a final visual inspection of the work area. The final visual inspection shall be conducted after completion of the final cleaning procedures. The final visual inspection shall verify that all PCB Waste(s) have been removed from the work area. If during the inspection the Consultant identifies residual dust or debris, the Contractor shall comply with the request of the Consultant to render the area "dust free".

3.08 MARKING OF WASTE CONTAINERS (ABATEMENT CONTRACTOR RESPONSIBILITY)

- All waste containers must be marked with the name of the waste contained, the date in which the first material was placed in the vessel, and the last date at which addition of waste occurred. All waste containers must be marked with a large PCB M_L marker.
- B. All waste containers containing PCB Bulk Product Waste, and PCB Remediation Waste in the form of waste and contaminated debris, containment system components, used PPE, personal and equipment wash water and decontamination fluids, or other wastes generated during the abatement work shall be labeled as follows:

DOT Class 9 UN3432 (solid) Or UN2315 (liquid) PCB Waste RQ

Waste for Disposal Federal law prohibits improper disposal.

If found, contact the nearest police or public safety authority or

The U.S. Environmental Protection Agency.

Generator's Information:	
Manifest Tracking No.:	
Accumulation Start Date:	
EPA ID No.:	
EPA Waste No.:	
Total Weight:	
Container No.:	

HANDLE WITH CARE

C. In addition, these containers must be marked with a PCB M_L marker. Such marking must be durable, in English and printed on, or affixed to the surface of the package, or on a label, tag or sign, and displayed on a background of sharply contrasting color, is unobscured by labels or attachments, and located away from any other marking (such as advertising) that could substantially reduce its effectiveness.

3.09 ON-SITE WASTE MANAGEMENT AND DISPOSAL OF SOLID HAZARDOUS WASTES (ABATEMENT CONTRACTOR RESPONSIBILITY)

- A. The materials as identified in Presumed Polychlorinated Biphenyls Removal and Disposal Section 02 84 34, 1.7 Project Description were presumed to contain PCBs and were classified as PCB Bulk Product Waste. Due to the material being presumed, TCLP analysis is necessary to satisfy landfill requirements for waste characterization. The Owner's Consultant shall collect waste characterization samples for TCLP PCB analysis of the presumed PCB Bulk Product Material and PCB Remediation Waste which is anticipated to be required by the disposal site the Contractor identifies. The Contractor shall factor in time for TCLP testing, TCLP analysis and staging of waste as necessary to complete the waste profile and subsequent landfill facility acceptance of waste.
- B. All solid waste material, containment system components, used PPE, and other solid wastes generated during the Work, shall be placed directly in appropriate waste receptacles immediately upon removal from its in-situ position. Suitable waste receptacles may consist of roll-off containers or DOT approved 55-gallon drums.
- C. The Contractor shall be responsible for all packaging, labeling, transport, disposal, and recordkeeping associated with PCB Bulk Product Waste and PCB Remediation Waste in accordance with all federal, state, and local regulations.
- D. The Contractor shall ensure that the person transporting the waste holds a valid permit issued in accordance with appropriate federal, state, and local regulations.
- E. The Contractor shall provide to the transporter at the time of transfer appropriate shipping records or uniform waste manifests as required by the federal, state, and local regulations with a copy to the Owner and Consultant.
- F. The Contractor shall maintain proper follow-up procedures to assure that waste materials have been received by the designated waste site in a timely manner, and in accordance with all federal, state, and local regulations.
- G. The Contractor shall assure that disposal of PCB Bulk Product Waste and PCB Remediation Waste at a facility approved to accept such waste(s) and shall provide a tracking/manifest form signed by the landfill's authorized representative.
- H. The impermeable cover shall remain securely in place at all times when material is not being actively placed in the vessels. The Contractor shall be responsible for ensuring that the cover remains securely intact until the container is removed from the Site.
- I. If 55-gallon drums are to be utilized for waste containerization, the drums shall consist of suitable DOT approved 55-gallon drums that are watertight and free of corrosion, perforations, punctures, or other damage. All drums shall be securely covered and sealed at the conclusion of each work day.

- J. The waste containers shall remain staged at the Site with a secure impermeable cover in-place until the materials are transported from the Site to be delivered to the designated waste disposal facility.
- K. Drum staging area shall be designated prior to initiation of the abatement work and approved by the Consultant. If this area is located outside of the building, the area (or areas) shall be surrounded by a chain-link fence with a minimum height of six feet. The fence shall be labeled with a PCB M_L marker.
- Properly containerized waste must be transported by a licensed hauler and shipped as PCB Bulk L. Product Waste for disposal at a permitted waste facility in accordance with EPA Title 40 CFR. Part 761.62(b).
- PCB Remediation Waste must be transported by a licensed hauler and shipped as PCB M. Remediation for disposal in accordance with EPA Title 40 CFR, Part 761.61(b) at one of the following facilities:
 - 1. A hazardous waste landfill permitted by EPA under Section 3004 of EPA RCRA,
 - A State authorized landfill under Section 3006 of EPA RCRA, or 2.
 - A chemical waste landfill approved under EPA Title 40 CFR, Part 761.75. 3.
- N. Provide required copies of the uniform waste manifests for PCB Remediation Waste to the Owner, waste generation State, and waste destination State, as required. The Consultant shall review the waste manifest to assure the proper information has been supplied prior to waste shipment. which includes, but is not limited to, Site address, generator information, waste description, waste profile, quantity, etc.
- Any PCB liquid water waste shall be properly containerized and decontaminated in accordance Ο. with EPA Title 40 CFR, Part 761.79 (b)(1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).
- Ρ. Any chemicals, solvents or other products used during decontamination shall be properly containerized as PCB liquid waste. Waste must be properly decontaminated in accordance with EPA Title 40 CFR, Part 761.79 (b) (1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(g).
- Q. All contaminated waste shall be carefully loaded on trucks or other appropriate vehicles for transport. Before and during transport, care shall be exercised to ensure that no unauthorized persons have access to the waste materials.
- R. Waste transporters are prohibited from "back hauling" any freight after the PCB waste disposal, until decontamination of the vehicle and/or trailer is assured.

END OF SECTION 02 84 34

DRAWING HM-01

- 1. THE HAZARDOUS MATERIALS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF ALL EXISTING CONDITIONS AND QUANTITIES, AND FOR NOTIFYING THE CONSULTANT OF ANY DISCREPANCIES PRIOR TO FINALIZING BID
- 2. RENOVATION AREAS REPRESENTED ON THIS DRAWING ARE TO BETTER AID IN THE IDENTIFICATION OF AREAS REQUIRING ABATEMENT. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR RENOVATION INFORMATION.
- 3. SHADING OR HATCHING REPRESENTED ON THIS DRAWING IS TO BETTER AID IN THE IDENTIFICATION OF AREAS REQUIRING ABATEMENT. THE HAZARDOUS MATERIALS ABATEMENT CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND/OR QUANTITIES PRIOR TO FINALIZING BID.
- 4. PLEASE ALSO REFER TO ALL RELATED SPECIFICATION DOCUMENTS FOR ADDITIONAL REQUIREMENTS:
 - A. UNIT PRICES SECTION 01 22 00.
 B. ASBESTOS ABATEMENT SECTION 02 82 13
 - C. LEAD-BASED PAINT AWARENESS SECTION 02 83 19
- D. PRESUMED POLYCHLORINATED BIPHENYL BULK PRODUCT ABATEMENT SECTION 02 84 34 E. HAZARDOUS MATERIALS ABATEMENT DRAWING HM-01 F. ARCHITECTURAL ELEVATION DRAWINGS

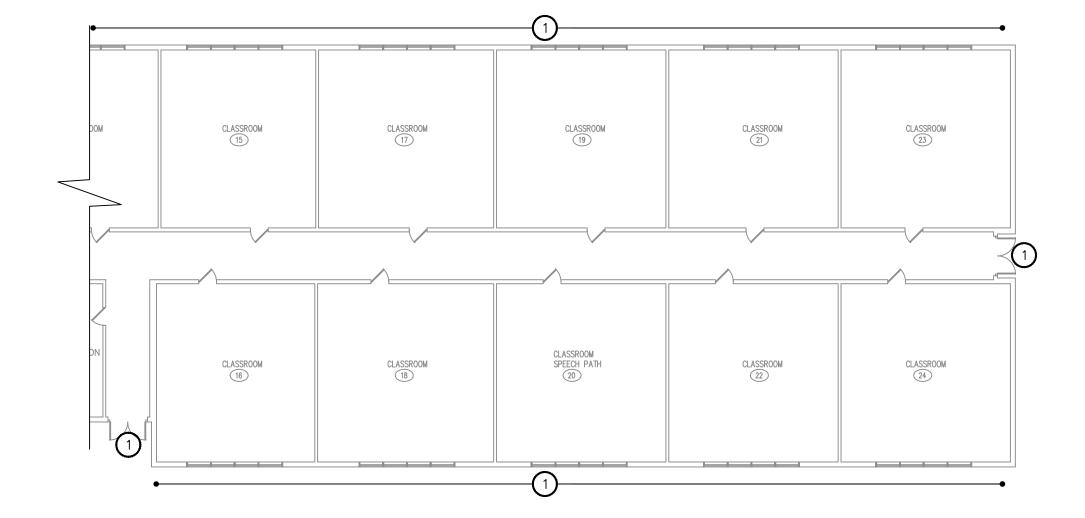
KEYNOTE

ASBESTOS ABATEMENT NOTES

WINDOW AND DOOR OPENINGS SHALL BE SEALED ON THE INSIDE WITH CRITICAL BARRIERS AND WINDOWS/DOORS REMOVED FROM THE EXTERIOR WITHIN AN ASBESTOS AND PCB REGULATED WORK AREA. CAFETERIA WINDOWS AND ANY WORK THAT WILL DISTURB THE PAINTED STEEL BEAM ABOVE WINDOWS SHALL ALSO BE CONDUCTED WITHIN A LEAD RRP REGULATED WORK AREA COMPLYING WITH THE EPA'S RRP RULE (40 CFR 745.80 THROUGH 92). WORK INCLUDES REMOVING OF THE WINDOW\DOOR FRAMES AND WINDOW SASH\DOOR WINDOWS FOR DISPOSAL AS ACM & PCB BULK PRODUCT WASTE. THE WINDOW AND DOOR OPENINGS SHALL BE REMOVED OF ALL SUSPECT ACM TO INCLUDE, BUT NOT LIMITED TO CAULK, ADHESIVES, SEALANTS VAPOR BARRIER ADHESIVES AND FLASHING MATERIALS TO A CLEAN SUBSTRATE. THE CAULKING AND GLAZING COMPOUND ARE ALSO PRESUMED > 50PPM PCB BULK PRODUCT WASTE. CAULK, GLAZING COMPOUND, SEALANTS, FLASHING AND ALL ADJACENT CONTAMINATED COMPONENTS SHALL BE PACKAGED, STORED, AND DISPOSED OF AS ASBESTOS AND > 50PPM PCB BULK PRODUCT WASTE. THE WASTE STREAM FROM THE CAFETERIA WINDOW REMOVAL SHALL ALSO BE CONSIDERED RCRA LEAD WASTE UNTIL TCLP SAMPLING PROVES OTHERWISE. WORK SHALL BE COORDINATED WITH THE CM TO ALLOW PROPER TIMING BETWEEN WINDOW REMOVAL AND REPLACEMENT. THE CONTRACTOR IS RESPONSIBLE FOR SECURING AND WEATHERPROOFING THE OPENINGS AT THE COMPLETION OF EACH SHIFT WHEN OPENINGS ARE MADE BY WINDOW REMOVAL. THE SCOPE OF WORK INCLUDES REMOVAL AND DISPOSAL AS ACM THE TWO TRANSOM WINDOWS COVERED WITH ASBESTOS CEMENT PANELS AND THE ASBESTOS CEMENT PANELS OVER ALL WINDOWS AND DOORS IF THE WINDOWS CAN NOT BE REMOVED AND REPLACED WITHOUT DISTURBING OR DAMAGING THE PANELS.

ADD ALTERNATE WORK

MOISTURE/VAPOR BARRIER DAMP PROOFING BEHIND BRICK FACADE ASSUMED TO BE PRESENT & ACM. BEFORE WALLS ARE PENETRATED FOR UTILITIES / DHVAC LINE SETS OR FOR ANY OTHER REASON, THE ABATEMENT CONTRACTOR SHALL OPEN THE WALL TO PROVIDE ACCESS FOR THE CONSULTANT TO INSPECT AND SAMPLE ANY VAPOR BARRIER / DAMP PROOFING MATERIALS BEHIND THE BRICK FACADE. IF ACM IS IDENTIFIED WITHIN THE WALL, OR IF ASBESTOS CEMENT SOFFITS OR WALL PANELS REQUIRE CORING, OR OTHER PENETRATIONS/DISTURBANCE OF <3 SQUARE FEET, SUCH WORK SHALL BE CONDUCTED BY THE ASBESTOS ABATEMENT CONTRACTOR WITHIN A REGULATE AREA FROM THE EXTERIOR, USING ENGINEERING CONTROLS TO PREVENT MAKING DUST.







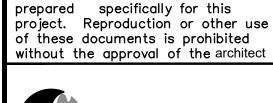
ANTINOZZI ASSOCIATES

ARCHITECTURE & INTERIORS

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www.antinozzi.com

These documents have been





REVI:	SIONS:	
<u> </u>	DATE	DESCRIPTION

ELEMENTARY REPLACEMENT

RNOR WILLIAM PITKIN ELENOR DOOR & WINDOW REPL

DRAWING TITLE:

HAZARDOUS

MATERIALS

ABATEMENT DRAWING

CALE: DRAWN BY: REVIEWE

AWING NO.

HM-01

DATE: JOB NUMBER: SEPTEMBER 2023 22013

	ATTACUMENT A		
LIMITED HAZARDOUS BUILDING MATE	ATTACHMENT A ERIALS INSPECTION	REPORT DATED SEPTEM	BER 2023

Limited Hazardous Building Materials Inspection

Inspection Date: August 23, 2022 Window and Door Replacement Project Governor William Pitkin School 330 Hills Street, East Hartford, Connecticut

Antinozzi Associates, P.C. Bridgeport, CT

September 19, 2023



Fuss & O'Neill, Inc. 146 Hartford Road Manchester, CT 06040



September 19, 2023

Mr. Paul Lisi, AIA Antinozzi Associates, P.C. 271 Fairfield Avenue Bridgeport, CT 06604

Re: Limited Hazardous Building Materials Inspection Window and Door Replacement Project Governor William Pitkin School 330 Hills Street, East Hartford, CT Fuss & O'Neill Project No. 20210525.A10

Dear Mr. Lisi:

Enclosed is the report for the limited hazardous building materials inspection conducted in response to the proposed window and door replacement project for the Governor William Pitkin School located at 330 Hills Street, East Hartford, CT (the "Site"). The work was conducted for Antinozzi Associates, P.C. (the "Client").

The services were performed on August 23, 2022 by a Fuss & O'Neill, Inc. licensed inspector and included a limited asbestos-containing material (ACM) inspection, lead-based paint (LBP) determination, and presumed polychlorinated biphenyl (PCB)-containing source building materials inspection. The information summarized in this report is for the above-mentioned materials only. The work was performed in accordance with our written proposal dated June 25, 2021.

If you should have any questions regarding the contents of this report, please do not hesitate to contact me at (860) 783-4673. Thank you for this opportunity to have served your environmental needs.

146 Hartford Road Manchester, CT

> t 860.646.2469 800.286.2469

f 860.533.5143

Sincerely,

Eric W. Cooley

Project Manager

www.fando.com

EWC/kr

California

Connecticut

Enclosure

Maine

Vermont

Massachusetts New Hampshire

Rhode Island

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APPENDIX D

APPENDIX E

APPENDIX F

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1 Introduction

On August 23, 2022, Fuss & O'Neill, Inc. (Fuss & O'Neill) representative Mr. Benjamin Silverman performed a limited hazardous building materials inspection for the proposed window and door replacement project at Governor William Pitkin School located at 330 Hills Street in East Hartford, Connecticut (the "Site"). The work was conducted for Antinozzi Associates, P.C. (the "Client") in accordance with our written scope of services dated June 25, 2021 and is subject to the limitations included in *Appendix A*.

This limited hazardous building materials inspection was performed in response to the proposed window and door replacement project.

This inspection was limited to non-invasive and discrete sampling techniques. Specific areas that were not inspected include the following:

- Areas and building materials not anticipated to be disturbed by this project;
- Beneath and behind window and door frames;
- Behind the brick façade;
- Inside exterior wall cavities;
- Spaces above fixed ceilings and within solid walls, and
- Sub slab/subgrade vapor barriers or utilities

We have excluded collection and analysis of building materials for polychlorinated biphenyls (PCBs). Sampling for PCBs is presently not mandated by the Environmental Protection Agency (EPA); however, significant liability risk for disposing of PCB-containing wastes exists. Recent knowledge of PCBs within these matrices has become more prevalent, especially with remediation contractors, waste haulers, and disposal facilities. Many property Owners have become subject to large changes in schedule, scope, and costs as a result of failure to identify this possible contaminant prior to renovation or demolition.

1.1 Building and Mechanical System Description

The building structure includes a single story with no basement and was reportedly constructed in 1966. There were no reported additions. The building contains approximately 45,525 square feet (SF) of total floor area. The building is heated by a hot water boiler system.

2 Asbestos Inspection

A property Owner must ensure that a thorough ACM inspection is performed prior to possible disturbance of suspect ACM during renovation or demolition activities. This is a requirement of the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation located at Title 40 CFR, Part 61, Subpart M.



On August 23, 2022, Mr. Benjamin Silverman of Fuss & O'Neill conducted the limited inspection. Mr. Silverman is a State of Connecticut Department of Public Health (CTDPH)-licensed Asbestos Inspector. Refer to *Appendix B* for the Asbestos Inspector license and accreditation.

2.1 Methodology

The limited inspection was conducted by visually inspecting for suspect ACM and touching each of the suspect materials. The suspect materials were categorized into three EPA NESHAP groups: friable and non-friable Category I and Category II type ACM.

- A Friable Material is defined as material that contains greater than 1 percent (> 1%) asbestos that when dry **can** be crumbled, pulverized, or reduced to powder by hand pressure.
- A Category I Non-Friable Material refers to material that contains > 1% asbestos (i.e., packings, gaskets, resilient floor coverings, and asphalt roofing products) that when dry cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- A Category II Non-Friable Material refers to any non-friable material excluding Category I
 materials that contain > 1% asbestos that when dry, cannot be crumbled, pulverized, or
 reduced to powder by hand pressure.

The suspect ACM were also categorized into their applications including Thermal System Insulation (TSI), Surfacing ACM (S), and Miscellaneous ACM (M). TSI includes those materials used to prevent heat loss/gain or water condensation on mechanical systems. Examples of TSI are pipe insulation, boiler insulation, duct insulation, and mudded pipe fitting insulations. Surfacing ACM includes those ACM that are applied by spray, trowel, or otherwise applied to an existing surface. Surfacing ACM is commonly used for fireproofing, decorative, and acoustical applications. Miscellaneous materials include those ACM not listed as thermal or surfacing, such as linoleum, vinyl asbestos flooring, ceiling tiles, caulkings, glues, construction adhesives, etc.

The EPA recommends collecting suspect ACM samples in a manner sufficient to determine asbestos content and to segregate each suspect type of homogeneous (similar in color, texture, and date of application) materials. The EPA NESHAP regulation does not specifically identify a minimum number of samples to be collected for each homogeneous material, but the NESHAP regulation does recommend the use of sampling protocols included in Title 40 CFR, Part 763, Subpart E: Asbestos Hazard Emergency Response Act (AHERA).

The EPA AHERA regulation requires a specific number of samples be collected based on the type of material and quantity present. This regulation includes the following protocol:

- 1. Surfacing Materials (S) (i.e., plasters, spray-applied fireproofings, etc.) must be collected in a randomly distributed manner representing each homogeneous area based on the overall quantity represented by the sampling as follows:
 - a. Three (3) samples collected from each homogeneous area that is less than or equal to 1,000 square feet.



- b. Five (5) samples collected from each homogeneous area that is greater than 1,000 square feet but less than or equal to 5,000 square feet.
- c. Seven (7) samples collected from each homogeneous area that is greater than 5,000 square feet.
- 2. Thermal System Insulation (TSI) (i.e., pipe insulations, tank insulations, etc.) must be collected in a randomly distributed manner representing each homogeneous area. Three (3) samples must be collected from each material. Also, a minimum of one (1) sample of any patching materials applied to TSI presuming the patched area is less than 6 linear or square feet should be collected.
- 3. Miscellaneous materials (M) (i.e., floor tile, gaskets, construction mastics, etc.) should have a minimum of two (2) samples collected for each type of homogeneous material. Sample collection was conducted in a manner sufficient to determine asbestos content of the homogeneous material as determined by the inspector.

The inspector collected samples of those suspect ACM anticipated to be disturbed by the proposed window and door replacement project and prepared a proper chain of custody form for transmission of the samples to EMSL Analytical, Inc. (EMSL) for analysis. EMSL is a State of Connecticut-licensed and American Industrial Hygiene Association (AIHA)-accredited asbestos laboratory. The sample locations, material type, sample identification, and asbestos content are identified by bulk sample analysis in **Table 1** attached hereto. Suspect ACM not listed in the table that may be identified at a later date at the Site, should be assumed to be ACM until sample collection and analysis indicate otherwise. Initial asbestos sample analysis was conducted using the EPA Interim Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116) via Polarized Light Microscopy with Dispersion Staining (PLM/DS).

If samples of suspect materials could not be collected or were inaccessible but observed elsewhere, these materials were assumed to contain asbestos and the inspectors approximated quantities. Intrusive or destructive investigative techniques were not performed at the Site to access and observe concealed areas that may have had suspect ACM that were hidden or obstructed from normal view. Limitations are discussed in Section 1 of this report.

2.2 Results

Utilizing the EPA protocol and criteria, the following materials were determined to contain asbestos:

- Tan interior window frame caulking;
- Gray exterior window frame caulking;
- White window glazing compound;
- Gray cementitious soffit panels;
- White/Grey exterior door window glazing compound.



The following materials were assumed to contain asbestos but could not be inspected and sampled due to the limitations noted:

- Original door frame/sill caulk and sealants.
- Vapor barrier coating/flashing materials behind brick façade and behind/between window frames and adjacent substrates.

Refer to **Table 1** for a complete list of ACM and non-ACM sampled as part of this limited inspection. Refer to **Table 2** attached hereto for the identified and assumed ACM inventory. Refer to *Appendix C* for the asbestos laboratory report and chain of custody form. Refer to *Appendix D* for Site photographs and *Appendix E* for the Site floor plan.

2.3 Discussion

The EPA and the Occupational Safety and Health Administration (OSHA) define a material that contains greater than one percent (> 1%) asbestos, utilizing PLM/DS, as being an ACM. The CTDPH defines any material that contains equal to or greater than one percent (≥ 1%) asbestos, utilizing PLM/DS, as being an ACM. Materials that are identified as "none detected" are specified as not containing asbestos.

Suspect ACM not identified during this limited inspection should be presumed to contain asbestos until sample collection and laboratory analysis indicate otherwise.

Additionally, the EPA has suggested that materials that are non-friable organically bound (NOB) materials (e.g., asphaltic-based materials, adhesives, etc.) are recommended for further confirmatory analysis utilizing Transmission Electron Microscopy (TEM). The Client did not choose to have TEM analysis conducted on samples collected for this project.

2.4 Conclusions and Recommendations

Based on visual observations, sample collection, and laboratory analysis, asbestos has been identified in some of the materials sampled at the Site.

Prior to disturbance, ACM that would likely be impacted by the proposed renovation/demolition activities must first be abated by a state-licensed Asbestos Abatement Contractor. This is a requirement of CTDPH and EPA NESHAP regulations governing asbestos abatement.

It can sometimes be ineffective to separate asbestos window components from non-ACM, these materials are considered asbestos-contaminated and must be managed as ACM for the purposes of removal and disposal. Components that can be removed and do not have suspect ACM or PCB materials on them, as verified by an environmental consultant may be recycled.



Fuss & O'Neill will develop a comprehensive scope of work and technical specification as part of renovation plans for the Site. We have provided a cost in our proposal to develop the specifications for inclusion in the window and door replacement project.

Suspect materials encountered during renovation that are not identified in this report as being non-ACM should be presumed to be ACM until sample collection and laboratory analysis indicate otherwise.

This report is not intended to be utilized as a bidding document or as a project specification document. The report is designed to aid the Client in locating identified and assumed ACM.

3 Lead-Based Paint Determination

On August 23, 2022, Mr. Benjamin Silverman of Fuss & O'Neill performed a lead-based paint (LBP) determination associated with coated building components at the Site that may be disturbed during renovation activities. An x-ray fluorescence (XRF) analyzer was used to perform the LBP determination.

3.1 Methodology

A Radiation Monitoring Device Model LPA-1, serial number 1157, was utilized for the LBP determination. The instrument was checked for proper calibration prior to use as detailed by the manufacturer and the Performance Characteristic Sheet (PCS) developed for the instruments.

For the purpose of this LBP determination, representative building components were tested that may be impacted by the window and door replacement project. Individual repainting efforts are not discoverable in such a limited program. LBP issues involving properties that are not residential are regulated to a limited degree for worker protection relating to paint-disturbing work activities and waste disposal.

Worker protection is regulated by OSHA regulations, as well as CTDPH regulations. These regulations involve air monitoring of workers to determine exposure levels when disturbing lead-containing paint. An LBP determination cannot determine a safe level of lead but is intended to provide guidance for implementing industry standards for lead in paint at identified locations. Contractors may then better determine exposure of workers to airborne lead by understanding the different concentrations of LBP activities that disturb paint on representative surfaces.

The EPA Resource Conservation and Recovery Act (RCRA), as well as the Connecticut Department of Energy and Environmental Protection (CTDEEP), regulate disposal of lead-containing waste. Lead-containing materials that will be impacted during renovation or demolition activities, and result in waste for disposal must either be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) analysis if lead is determined to be present in non-residential buildings or be presumed as a hazardous waste. A TCLP sample is a representative sample of the intended waste stream. The results are compared to a threshold value of 5.0 milligrams per liter (mg/L); results equal to or exceeding this value is considered hazardous lead waste. If the result is below the established level, the material is not considered hazardous and may be disposed as general construction debris.



A level of LBP equal to or exceeding 1.0 milligrams of lead per square centimeter (mg/cm²) by XRF is considered toxic or dangerous for compliance with residential standards. For purpose of this LBP determination the level of 1.0 mg/cm² has been utilized as a threshold for areas where possible worker exposures may occur.

3.2 XRF Determination Results

The LBP determination indicated consistent painting trends associated with representative building components that may be impacted by potential renovation work. The following building components were determined to contain levels of lead (equal to or greater than 1.0 mg/cm²) by XRF:

- Exterior Metal Window Components at the Cafeteria Window; and
- Interior Steel Beams above Windows.

Refer to Appendix F for the XRF lead determination field data sheets.

3.3 Discussion

OSHA published a Lead in Construction Standard (OSHA Lead Standard) Title 29 CFR, Part 1926.62 in May 1993. The OSHA Lead Standard has no set limit for the content of lead in paint below which the standards do not apply. The OSHA Lead Standards are task based and derived from airborne exposure and blood lead levels.

The results of this LBP determination are intended to provide guidance to contractors for occupational lead exposure controls. Building components coated with lead levels above industry standards may cause exposures to lead above OSHA standards during proposed demolition and renovation activities. The results of this determination are also intended to provide insight into waste disposal requirements, in accordance with EPA RCRA regulations. Due to the destructive nature, TCLP sampling was not conducted.

3.4 Conclusion and Recommendations

Based on our LBP determination results, LBP is present on coated building components located on or in the building that were tested by XRF as part of this limited inspection.

Contractors must be made aware that OSHA has not established a level of lead in a material below which Title 29 CFR, Part 1926.62 does not apply. Contractors shall comply with exposure assessment criteria, interim worker protection, and other requirements of the regulation as necessary to protect workers during any renovation work that will impact lead paint.



If disturbed by renovation or demolition activities, LBP-coated building components should be segregated from the general waste stream for sample collection and analysis by TCLP to determine proper off-site waste disposal. Metal LBP-coated building components cannot be subject to grinding, sawing, drilling, sanding, or torch cutting. Components that are in contact with caulking or glazing compound will be asbestos and assumed PCB bulk product waste. Future work involving surface preparation of identified painted surface(s) must be performed in accordance with OSHA worker protection requirements, as well as EPA Renovation, Repair and Painting Rule (RRP).

For purposes of complying with the EPA's RRP Rule (40 CFR 745.80 through 92) a Comprehensive Lead Inspection of the entire structure or targeted areas scheduled for renovation is necessary to determine if the RRP rule is applicable. A Comprehensive Lead Inspection includes testing representative coated surfaces of each building component in each room or room equivalent for LBP content. Other types of lead surveys, such as lead paint screening, determination, and risk assessments, do not include testing all coated surfaces for LBP and typically do not satisfy the LBP testing requirements of the RRP Rule. Since the testing performed was not a comprehensive inspection, the testing will not satisfy applicability requirements of the RRP for any untested surfaces. The testing was performed for surfaces targeted for renovation or demolition as described by the Client. Only the results for those specific surfaces and locations tested within this targeted testing can be utilized to determine applicability requirements for RRP. Reliance on this report for determining RRP applicability for any other surfaces than those tested is not authorized by Fuss & O'Neill, Inc..

The building is considered a "child-occupied facility" and therefore, it is subject to EPA lead safe renovation requirements. If a specific component or surface is not identified as having been tested it should be presumed to contain lead paint unless tested.

Those surfaces which contain LBP are subject to RRP work practice and training requirements if more than de-minimus amounts are disturbed in renovation or for projects involving window replacement. Those surfaces which do not contain LBP are not subject to the RRP requirements. If a specific component or surface is not identified as having been tested it should be presumed to contain lead paint unless tested. Contractors should be aware that the threshold limit of 1.0 mg/cm² for purposes of RRP requirements is not recognized by OSHA and workers exposures are still subject to lead in construction regulation 29 CFR 1926.62 regardless of paint testing results.

4 Presumed PCB-Containing Source Building Materials Inspection

Sampling of building materials for polychlorinated biphenyls (PCBs) is presently not mandated by the EPA. However, significant liability exists for building owners who improperly dispose a PCB-containing waste material. Recent knowledge and awareness of PCBs within matrices such as caulking compounds, glazing compounds, paints, adhesives, and ceiling tiles has become more prevalent, especially amongst remediation contractors, waste haulers, and disposal facilities.

Presently, building materials containing PCBs at concentrations equal to or greater than (≥) 50 parts per million (ppm) or the equivalent units of milligrams per kilogram (mg/kg) are regulated by the EPA and characterized as PCB Bulk Product. Building materials containing less than (<) 50 ppm may also be



regulated unless proven to be an Excluded PCB Product. The definition of an Excluded PCB Product includes those products or source of the products containing < 50 ppm concentration PCBs that were legally manufactured, processed, distributed in commerce, or used before October 1, 1984. Building materials determined to be Excluded PCB Product containing > 1 ppm PCBs but < 50 ppm PCBs are regulated by the CTDEEP. Building materials containing ≤ 1 ppm PCBs are considered non-regulated.

Additionally, the identification of building materials containing regulated PCBs requires additional testing of the adjacent porous surfaces and/or soils, asphalts, and concrete located below source materials. The building materials adjacent to the regulated PCB material must be tested to determine if the adjacent materials are PCB contaminated and may also be considered PCB Bulk Products, if disposed with source materials. Soils, asphalts, and concrete located below source materials must be tested to determine if the materials are PCB contaminated and considered PCB Remediation Waste.

4.1 Methodology

On August 23, 2022, Mr. Benjamin Silverman performed a visual inventory of caulking and glazing compounds scheduled to be impacted by the proposed window and door replacement project as materials which may contain PCBs.

Refer to Table 3 for a list of presumed PCB-containing building materials.

4.2 Observations

The following materials are suspect PCB-containing materials that will be impacted by the renovations activities:

- Interior and Exterior Window Frame Caulk;
- Window Glazing Compounds; and
- Door Frame/Sill Caulk & Window Glazing Compound.

4.3 Conclusions and Recommendations

At a minimum, Fuss & O'Neill recommends the window and door frame caulking compounds and window glazing compound scheduled to be removed during the Project be presumed to contain PCBs and handled and disposed of in accordance with EPA regulations as asbestos and PCB Bulk Product Waste.

As stated in our proposal dated June 25, 2021, Fuss & O'Neill will develop a comprehensive scope of work and technical specification for presumed PCB remediation during the window and door replacement project.



This report is not intended to be utilized as a bidding document or as a project specification document. The report is designed to aid the Client in locating hazardous building materials.

Report prepared by Environmental Engineer Benjamin Silverman.

Reviewed by:

Eric W. Cooley

Project Manager

Carlos Texidor

Associate



Tables



Table 1
Summary of Suspect Asbestos-Containing Materials

Sample No.	Sample Location	Material Type	Asbestos Content	Analysis Method
082322BS-PK-1A	Exterior	Red Brick	ND	PLM
082322BS-PK-1B	Exterior	Red Brick	ND	PLM
082322BS-PK-2A	Exterior	Mortar for Red Brick	ND	PLM
082322BS-PK-2B	Exterior	Mortar for Red Brick	ND	PLM
082322BS-PK-3A	Room 14	Tan Interior Window Frame Caulk	8.0% Chrysotile	PLM
082322BS-PK-3B	Room 7	Tan Interior Window Frame Caulk	NA/Pos Stop	
082322BS-PK-4A	Room 14	White Interior Window Glazing Compound	3.0% Chrysotile	PLM
082322BS-PK-4B	Room 7	White Interior Window Glazing Compound	NA/Pos Stop	
082322BS-PK-5A	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5B	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5C	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5D	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5E	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5F	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-5G	Exterior	Stucco Coating Under Windows	ND	PLM
082322BS-PK-6A	Exterior - Door E07 Soffit	Gray Cementitious Panels	35.0% Chrysotile	PLM
082322BS-PK-6B	Exterior - Door E07	Gray Cementitious Soffit Panels	NA/Pos Stop	
082322BS-PK-7A	Exterior - Single Door Near Door E09	Gray Louvered Vent Caulk Above Door	ND	PLM
082322BS-PK-7B	Exterior - Single Door Near Door E09	Gray Louvered Vent Caulk Above Door	ND	PLM
082322BS-PK-8A	Exterior - Media Center	Gray Exterior Window Frame Caulk	3.0% Chrysotile	PLM
082322BS-PK-8B	Exterior - Room 11A	Gray Exterior Window Frame Caulk	NA/Pos Stop	
082322BS-PK-8C	Exterior - Room 29	Gray Exterior Window Frame Caulk	NA/Pos Stop	
082322BS-PK-9A	Exterior - Media Center	White Exterior Window Glazing Compound	5.0% Chrysotile	PLM
082322BS-PK-9B	Exterior - Room 11A	White Exterior Window Glazing Compound	NA/Pos Stop	
082322BS-PK-9C	Exterior - Room 29	White Exterior Window Glazing Compound	NA/Pos Stop	
082322BS-PK-10A	Exterior - Media Center	Gray Exterior Door Frame Caulk	ND	PLM
082322BS-PK-10B	Exterior - E06	Gray Exterior Door Frame Caulk	ND	PLM



Sample No.	Sample Location	Material Type	Asbestos Content	Analysis Method
082322BS-PK-11A	Exterior - Media Center	White Exterior Door Window Glazing Compound	3.0% Chrysotile	PLM
082322BS-PK-11B	Exterior - Media Center	White Exterior Door Window Glazing Compound	NA/Pos Stop	

NA/Pos Stop = Not Analyzed/Positive Stop ND = None Detected

Table 2
Summary of Identified and Assumed Asbestos-Containing Materials Inventory

Location	Material Type	Asbestos Content	Estimated Total Quantity	Comments
All Windows/Window	Tan Interior & Grey Exterior Window Frame Caulk	8.0% & 3% Chrysotile	19 @ 40 LF EA 6 @ 30 LF EA 1 @ 12 LF EA	Material also presumed PCBs Bulk Product Waste (≥50 ppm)
Openings Throughout School	White Interior/Exterior Window Glazing Compound	3.0%-5.0% Chrysotile	19 @ 100 LF EA 6 @ 60 LF EA 1 @ 12 LF EA	Material also presumed PCBs Bulk Product Waste (≥50) ppm
Exterior Door System Windows	White Exterior Door Window Glazing Compound	3.0% Chrysotile	11 Door Systems: 1 @ 126 LF 6 @ 46 LF EA 2 @ 14 LF EA 1 @ 26 LF EA 1 Door @ 8 LF	Material also presumed PCBs Bulk Product Waste (≥50 ppm)
Behind All Door Frames\Sills and Door Openings	Original Caulk	Assumed	12 Door Systems: 8 @ ~30 LF EA 2 @ 24 LF EA 1 @ 54 LF EA 1 @ 26 LF EA	Assumed Present Material also presumed PCBs Bulk Product Waste (≥50) ppm
All Soffits, on face of beams over windows and Covering Some Window Transoms	Gray Asbestos Cement Panels	35.0% Chrysotile	Not Estimated	Impact Dependent upon Scope of Work
All Exterior Building Walls behind Brick Facade	Flashing/Damp proofing	Assumed	Not Estimated	Assumed present

LF = Linear Feet; SF = Square Feet; EA = Each



Table 3
Summary of Presumed PCB-Containing Source Building Materials Inventory

Location	Material Type	Estimated Total Quantity	Comments
	Tan Interior & Grey	19 @ 40 LF EA	
All Window	Exterior Window Frame	6 @ 30 LF EA	Material also ACM
Systems/Window	Caulk	1 @ 12 LF EA	
Openings Throughout	White Interior/Exterior	19 @ 100 LF EA	
School	Window Glazing	6 @ 60 LF EA	Material also ACM
	Compound	1 @ 12 LF EA	
		11 Door Systems: 1 @ 126 LF	
E tarian Dann Catana	White Exterior Door	6 @ 46 LF EA	
Exterior Door System Windows	Window Glazing	2 @ 14 LF EA	Material also ACM
Wifidows	Compound	1 @ 26 LF EA	
		1 Door @ 8 LF	
		12 Door Systems:	
Behind All Door	Original Cardleina acalemta	8 @ ~30 LF EA	Assumed Present
Frames\Sills and Door	Original Caulking, sealants	2 @ 24 LF EA	Material also
Openings	and or Flashings	1 @ 54 LF EA	Assumed ACM
		1 @ 26 LF EA	



Appendix A

Limitations



APPENDIX A

Site: Governor William Pitkin School, 330 Hills Street, East Hartford, CT

- 1. This inspection report has been prepared for the exclusive use of the Antinozzi Associates, P.C. (the "Client") and is subject to and is issued in connection with the terms and conditions of the original Agreement and all of its provisions. Any use or reliance upon information provided in this report, without the specific written authorization of the Client and Fuss & O'Neill, Inc. (Fuss & O'Neill) shall be at the User's individual risk. This report should not be used as an abatement specification. All quantities of materials identified during this inspection are approximate.
- 2. Fuss & O'Neill has obtained and relied upon information from multiple sources to form certain conclusions regarding likely environmental issues at and in the vicinity of the subject property in conducting this inspection. Except as otherwise noted, no attempt has been made to verify the accuracy or completeness of such information or verify compliance by any party with federal, state, or local laws or regulations.
- 3. Fuss & O'Neill has obtained and relied upon laboratory analytical results in conducting the inspection. This information was used to form conclusions regarding the types and quantities of ACM that must be managed prior to renovation or demolition activities that may disturb these materials at the Site. Fuss & O'Neill has not performed an independent review of the reliability of this laboratory data.
- 4. Unless otherwise noted, only suspect hazardous materials associated within or located on the building (aboveground) were included in this inspection. Suspect hazardous materials may exist below the ground surface that were not included in the scope of work of this inspection. Fuss & O'Neill cannot guarantee all asbestos or suspect hazardous materials were identified within the areas included in the scope of work. Only visible and accessible areas were included in the scope of work for this inspection.
- 5. The findings, observations and conclusions presented in this report are limited by the scope of services outlined in our original Agreement dated June 25, 2021 which reflects schedule and budgetary constraints imposed by Client. Furthermore, the assessment has been conducted in accordance with generally accepted environmental practices. No other warranty, expressed or implied, is made.
- 6. The conclusions presented in this report are based solely upon information gathered by Fuss & O'Neill to date. Should further environmental or other relevant information be discovered at a later date, the Client should immediately bring the information to the Fuss & O'Neill's attention. Based upon an evaluation and assessment of relevant information, Fuss & O'Neill may modify the letter report and its conclusions.



Appendix B

Fuss & O'Neill Inspector Licenses and Accreditations

Dear BENJAMIN L SILVERMAN,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health P.O. Box 340308 M.S.#12MQA Hartford, CT 06134-0308 (860) 509-7603 oplc.dph@ct.gov www.ct.gov/dph/license

Sincerely,

DEIDRE S. GIFFORD, MD, MPH, ACTING COMMISSIONER

DEPARTMENT OF PUBLIC HEALTH

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED BY THIS DEPARTMENT AS A

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

CERTIFICATE NO.

000349

CURRENT THROUGH

08/31/22

VALIDATION NO.

03-902348

Wew enh

BENJAMIN L SILVERMAN

Deidre 5 57

EMPLOYER'S COPY

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO.

CERTIFICATE NO. 000349

CURRENT THROUGH 08/31/22

03-902348

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

Den de

SIGNATUR

Derite S. S. F.

INSTRUCTIONS:

- 1. Detach and sign each of the cards on this form
- 2. Display the large card in a prominent place in your office or place of business.
- 3. The wallet card is for you to carry on your person. If you do not wish to carry the wallet card, place it in a secure place.
- 4. The employer's copy is for persons who must demonstrate current licensure/certification in order to retain employment or privileges. The employer's card is to be presented to the employer and kept by them as a part of your personnel file. Only one copy of this card can be supplied to you.

WALLET CARD

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-902348

CERTIFICATE NO. 000349

CURRENT THROUGH 08/31/22

PROFESSION

ASBESTOS CONSULTANT-INSP/MGMT PLANNER

sen en

ACTING COMMISSIONER



CERTIFICATE OF ACHIEVEMENT

This certifies that

Benjamin Silverman

has successfully completed the 8 Hour Asbestos Site Inspector/Management Planner Refresher Training Asbestos Accreditation Under TSCA Title II 40 CFR Part 763 and CT Department of Public Health Title 20

Training held via a Live Webinar

Score: 92%

conducted by: ATC Group Services LLC dba ATLAS Technical 73 William Franks Drive West Springfield, MA 01089

(413) 781-0070

Dregory J. morsel

Principal Instructor: Gregory Morsch

Dregory J. Morsel

January 20, 2022 Date of Course

Expiration Date

January 20, 2023

Regional Training Director: Gregory Morsch

MPAR-3435

Certificate Number

January 20, 2022 Examination Date

Dear BENJAMIN L SILVERMAN,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health P.O. Box 340308 M.S.#12MQA Hartford, CT 06134-0308

(860) 509-7603 oplc.dph@ct.gov www.ct.gov/dph/license

Sincerely,

DEIDRE S. GIFFORD, MD, MPH, ACTING COMMISSIONER DEPARTMENT OF PUBLIC HEALTH

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED BY THIS DEPARTMENT AS A

LEAD INSPECTOR RISK ASSESSOR

CERTIFICATE NO.

002241

CURRENT THROUGH

08/31/22

VALIDATION NO.

03-901676

BENJAMIN L SILVERMAN

EMPLOYER'S COPY

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-901676

CERTIFICATE NO.

CURRENT THROUGH

002241 08/31/22

PROFESSION

LEAD INSPECTOR RISK ASSESSOR

INSTRUCTIONS:

- 1. Detach and sign each of the eards on this form
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- 4. The employer's copy is for persons who must demonstrate current licensure/certification in order to retain employment or privileges. The employer's eard is to be presented to the employer and kept by them as a part of your personnel file. Only one copy of this eard can be supplied to you.

WALLET CARD

STATE OF CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

NAME

BENJAMIN L SILVERMAN

VALIDATION NO. 03-901676

CERTIFICATE NO. 002241

CURRENT THROUGH 08/31/22

PROFESSION

LEAD INSPECTOR RISK ASSESSOR

CERT#: L-600-Virtual.1212

CHEMSCOPE TRAINING DIVISION LEAD INSPECTOR/RISK ASSESSOR REFRESHER 8-HOUR TRAINING CERTIFICATE

Benjamin Silverman

146 Hartford Road, Manchester CT

Has attended an 8-hour course on the subject discipline on

02/28/2022 and has passed a written examination.

The above individual has successfully completed the above training course approved in accordance with the Department of Public Health Standards established pursuant to Section 20-477 of the Connecticut General Statutes.

Course topics include all required topics of State of Connecticut DPH and EPA.

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (U.S.C. 1001 and 15 U.S. C. 2615), I certify that this training complies with all applicable requirements of Title IV of TSCA, 40 CFR part 745 and any other applicable Federal, State or local requirements.

Examination Score: 100% Exam Date: 02/28/2022 Expiration Date: 02/28/2023

> Daniel Sullivan Training Manager

Chem Scope, Inc. 15 Moulthrop Street North Haven CT 06473 Phone: 203.865.5605 www.chem-scope.com



Appendix C

Asbestos Laboratory Report and Chain of Custody Form

146 Hartford Road, Manchester, CT 06040

www.fando.com

Phone (860) 646-2469

Page 1 of 2

Date: 9/01/2022

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

Project Name: Pitkin ES - Window & Door Replacement

Project No. 20210525.A10

Task No.: 000015

Site Address: 330 Hills Street, East Hartford, CT

Location: _

Project Manager: Eric Cooley

Sample ID	Sample Location	Type of Material		
082322BS-PK-1A	Exterior	Red Brick		
082322BS-PK-1B	Exterior	Red Brick		
082322BS-PK-2A	Exterior	Mortar for Red Brick		
082322BS-PK-2B	Exterior	Mortar for Red Brick		
082322BS-PK-3A	Room 14	Tan Interior Window Frame Caulk		
082322BS-PK-3B	Room 7	Tan Interior Window Frame Caulk		
082322BS-PK-4A	Room 14	White Interior Window Glazing Compound		
082322BS-PK-4B	Room 7	White Interior Window Glazing Compound		
082322BS-PK-5A	Exterior	Stucco Coating under Windows		
082322BS-PK-5B	Exterior	Stucco Coating under Windows		
082322BS-PK-5C	Exterior	Stucco Coating under Windows		
082322BS-PK-5D	Exterior	Stucco Coating under Windows		
082322BS-PK-5E	Exterior	Stucco Coating under Windows		
082322BS-PK-5F	Exterior	Stucco Coating under Windows		
082322BS-PK-5G	Exterior	Stucco Coating under Windows		
082322BS-PK-6A	Exterior – Door E07	Gray Cementitious Soffit Panels		
082322BS-PK-6B	Exterior – Door E07	Gray Cementitious Soffit Panels		
082322BS-PK-7A	Exterior Single Door Near Door E09	Gray Louvered Vent Caulk above Door		
082322BS-PK-7B	Exterior – Single Door Near Door E09	Gray Louvered Vent Caulk above Door		
082322BS-PK-8A	Exterior - Media Center	Gray Exterior Window Frame Caulk		
082322BS-PK-8B	Exterior Room 11A	Gray Exterior Window Frame Caulk		
082322BS-PK-8C	Exterior – Room 29	Gray Exterior Window Frame Caulk		
082322BS-PK-9A	Exterior – Media Center	White Exterior Window Glazing Compound		
082322BS-PK-9B	Exterior – Room 11A	White Exterior Window Glazing Compound		

F:\P2021\0525\A10\Lab Results\Pitkin ES CoC.docx

Deen Holous

9/2/22

~485.

Sample ID

Samples Received by:

Shipped To:

EMSL

Method of Shipment: FedEx

Other

☐ Lab Drop Off

0372 15085

Sample Location

Fuss & O'Neill EMSL Customer No. ENVI54

Type of Material

www.fando.com

146 Hartford Road, Manchester, CT 06040

FUSS&O'NEILL

Phone (860) 646-2469

Page <u>2</u> of <u>2</u>

Date: 9/01/2022

Time: 9284

082322BS-PK-9C	Exterior – Room 29	White Exterior Window Glazing Compound
082322BS-PK-10A	Exterior – Media Center	Gray Exterior Door Frame Caulk
082322BS-PK-10B	Exterior – E06	Gray Exterior Door Frame Caulk
082322BS-PK-11A	Exterior – Media Center	White Exterior Door Window Glazing Compound
082322BS-PK-11B	Exterior – Media Center	White Exterior Door Window Glazing Compound
Analysis Method: 🛛 PLM	Other	Turnaround Time: PLM: 1 Week
	e indicated above, analyses are due to Fuss & O completed for requested t/a/t at (860) 646-246	Neill on or before this date: Please call Fuss & 9.
Email Results to: <u>LabResu</u> Total # of Samples: <u>29</u>	lts@fando.com and ECooley@fando.com	Do Not Mail Hard Copy Report
Special Instructions: Stop 2	<u>malysis on first positive sample in each homoge</u>	neous set of samples unless otherwise noted. Do not layer samples
(1/1/	nt Count. DO NOT ANALYZE ANY SAMP	d/27/20
Samples collected by:	0 1	te: Time:

Other



Fuss & O'Neill, Inc.

146 Hartford Road

Manchester, CT 06040

Attention: Eric Cooley

EMSL Order: 032215085

Customer ID: ENVI54

Customer PO: 20210525.A10

Project ID:

Phone: (203) 605-2429

Fax:

Received Date: 09/02/2022 9:20 AM

Analysis Date: 09/09/2022 **Collected Date:** 09/01/2022

Project: 20210525.A10/ Pitkin ES- Window & Door Replacement/ 330 Hills Street East Hartford, CT

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		<u>Asbestos</u>
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
082322BS-PK-1A	Exterior - Red Brick	Red		15% Quartz	None Detected
032215085-0001		Non-Fibrous		85.0% Non-fibrous (Other)	
		Homogeneous			
082322BS-PK-1B	Exterior - Red Brick	Brown		60% Quartz	None Detected
032215085-0002		Non-Fibrous		40.0% Non-fibrous (Other)	
		Homogeneous			
082322BS-PK-2A	Exterior - Mortar for	Gray		45% Quartz	None Detected
032215085-0003	Red Brick	Non-Fibrous		25% Ca Carbonate	
		Homogeneous		2% Mica	
				28.0% Non-fibrous (Other)	
082322BS-PK-2B	Exterior - Mortar for	Gray		65% Quartz	None Detected
032215085-0004	Red Brick	Non-Fibrous		20% Ca Carbonate	
		Homogeneous		15.0% Non-fibrous (Other)	
082322BS-PK-3A	Room 14 - Tan Interior	Gray/Tan		55% Ca Carbonate	8% Chrysotile
032215085-0005	Window Frame Caulk	Non-Fibrous		37.0% Non-fibrous (Other)	
		Homogeneous			
082322BS-PK-3B	Room 7 - Tan Interior				Positive Stop
032215085-0006	Window Frame Caulk				(Not Analyzed)
082322BS-PK-4A	Room 14 - White	Gray/White		60% Ca Carbonate	3% Chrysotile
032215085-0007	Interior Window	Non-Fibrous		37.0% Non-fibrous (Other)	- / · · · · · · · · · · · · · · · · · ·
002270000 0007	Glazing Compound	Homogeneous		,	
			Result includes a small amount of inse	parable attached material	
082322BS-PK-4B	Room 7 - White Interior				Positive Stop
032215085-0008	Window Glazing Compound				(Not Analyzed)
082322BS-PK-5A	Exterior - Stucco	Gray		40% Quartz	None Detected
032215085-0009	Coating Under	Non-Fibrous		35% Ca Carbonate	
	Windows	Homogeneous		25.0% Non-fibrous (Other)	

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Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC--IHLAP Accredited #102581, NVLAP Lab Code 101048-9, NJ NY022, CT PH-0170, MA AA000170

Initial report from: 09/09/2022 18:41:29



 EMSL Order:
 032215085

 Customer ID:
 ENVI54

 Customer PO:
 20210525.A10

Project ID:

Attention: Eric Cooley Phone: (203) 605-2429

Fuss & O'Neill, Inc.

146 Hartford Road Received Date: 09/02/2022 9:20 AM

Manchester, CT 06040 Analysis Date: 09/09/2022 Collected Date: 09/01/2022

Project: 20210525.A10/ Pitkin ES- Window & Door Replacement/ 330 Hills Street East Hartford, CT

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

				Non-Asbestos	
Sample Description		Appearance	% Fibrous	% Non-Fibrous	% Type
082322BS-PK-5B	Exterior - Stucco	Brown/Gray		30% Quartz	None Detected
032215085-0010	Coating Under	Non-Fibrous		35% Ca Carbonate	
	Windows	Homogeneous		35.0% Non-fibrous (Other)	
082322BS-PK-5C	Exterior - Stucco	Brown/Gray		35% Quartz	None Detected
032215085-0011	Coating Under	Non-Fibrous		35% Ca Carbonate	
	Windows	Homogeneous		30.0% Non-fibrous (Other)	
082322BS-PK-5D	Exterior - Stucco	Gray		30% Quartz	None Detected
032215085-0012	Coating Under	Non-Fibrous		40% Ca Carbonate	
	Windows	Homogeneous		30.0% Non-fibrous (Other)	
082322BS-PK-5E	Exterior - Stucco	Gray		60% Quartz	None Detected
032215085-0013	Coating Under	Non-Fibrous		18% Ca Carbonate	
	Windows	Homogeneous		2% Mica	
				20.0% Non-fibrous (Other)	
082322BS-PK-5F	Exterior - Stucco	Gray		65% Quartz	None Detected
032215085-0014	Coating Under	Non-Fibrous		15% Ca Carbonate	
	Windows	Homogeneous		20.0% Non-fibrous (Other)	
082322BS-PK-5G	Exterior - Stucco	Gray		60% Quartz	None Detected
032215085-0015	Coating Under	Non-Fibrous		18% Ca Carbonate	
	Windows	Homogeneous		2% Mica	
		<u> </u>		20.0% Non-fibrous (Other)	
082322BS-PK-6A	Exterior- Door E07 -	Gray		40% Ca Carbonate	35% Chrysotile
032215085-0016	Gray Cementitious	Fibrous		25.0% Non-fibrous (Other)	
	Soffit Panels	Homogeneous			
082322BS-PK-6B	Exterior- Door E07 -				Positive Stop
032215085-0017	Gray Cementitious				(Not Analyzed)
	Soffit Panels				
082322BS-PK-7A	Exterior- Single Door	Gray		60% Ca Carbonate	None Detected
032215085-0018	Near Door E09 - Gray	Non-Fibrous		40.0% Non-fibrous (Other)	
	Louvered Vent Caulk	Homogeneous			
	Above Door				

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Initial report from: 09/09/2022 18:41:29



Fuss & O'Neill, Inc.

146 Hartford Road

Manchester, CT 06040

Attention: Eric Cooley

EMSL Order: 032215085

Customer ID: ENVI54

Customer PO: 20210525.A10

Project ID:

Phone: (203) 605-2429

Fax:

Received Date: 09/02/2022 9:20 AM

Analysis Date: 09/09/2022 **Collected Date**: 09/01/2022

Project: 20210525.A10/ Pitkin ES- Window & Door Replacement/ 330 Hills Street East Hartford, CT

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			<u>Asbestos</u>		
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
082322BS-PK-7B 032215085-0019	Exterior- Single Door Near Door E09 - Gray Louvered Vent Caulk Above Door	Gray Non-Fibrous Homogeneous		15% Ca Carbonate 15% Gypsum 70.0% Non-fibrous (Other)	None Detected
082322BS-PK-8A 032215085-0020	Exterior- Media Center - Gray Exterior Window Frame Caulk	Gray Non-Fibrous Homogeneous		55% Ca Carbonate 42.0% Non-fibrous (Other)	3% Chrysotile
082322BS-PK-8B 032215085-0021	Exterior- Room 11A - Gray Exterior Window Frame Caulk				Positive Stop (Not Analyzed)
082322BS-PK-8C 032215085-0022	Exterior- Room 29 - Gray Exterior Window Frame Caulk				Positive Stop (Not Analyzed)
082322BS-PK-9A 032215085-0023	Exterior- Media Center - White Exterior Window Glazing Compound	Gray/Tan Non-Fibrous Homogeneous		65% Ca Carbonate 30.0% Non-fibrous (Other)	5% Chrysotile
082322BS-PK-9B 032215085-0024	Exterior- Room 11A - White Exterior Window Glazing Compound				Positive Stop (Not Analyzed)
082322BS-PK-9C 032215085-0025	Exterior- Room 29 - White Exterior Window Glazing Compound				Positive Stop (Not Analyzed)
082322BS-PK-10A 032215085-0026	Exterior- Media Center - Gray Exterior Door Frame Caulk	Gray Non-Fibrous Homogeneous		55% Ca Carbonate 45.0% Non-fibrous (Other)	None Detected
082322BS-PK-10B 032215085-0027	Exterior- E06 - Gray Exterior Door Frame Caulk	Brown/Gray Non-Fibrous Homogeneous		8% Quartz 22% Ca Carbonate 70.0% Non-fibrous (Other)	None Detected

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Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC--IHLAP Accredited #102581, NVLAP Lab Code 101048-9, NJ NY022, CT PH-0170, MA AA000170

Initial report from: 09/09/2022 18:41:29



EMSL Order: 032215085 **Customer ID:** ENVI54 **Customer PO:** 20210525.A10

Project ID:

Attention: Eric Cooley Phone: (203) 605-2429

Fuss & O'Neill, Inc. Fax:

146 Hartford Road Received Date: 09/02/2022 9:20 AM

Manchester, CT 06040 Analysis Date: 09/09/2022 Collected Date: 09/01/2022

Project: 20210525.A10/ Pitkin ES- Window & Door Replacement/ 330 Hills Street East Hartford, CT

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-A	<u>Asbestos</u>	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
082322BS-PK-11A	Exterior- Media Center	Brown/Gray		5% Quartz	3% Chrysotile
032215085-0028	- White Exterior Door	Non-Fibrous		50% Ca Carbonate	
	Window Glazing Compound	Homogeneous		42.0% Non-fibrous (Other)	
082322BS-PK-11B	Exterior- Media Center				Positive Stop
032215085-0029	- White Exterior Door				(Not Analyzed)
	Window Glazing				
	Compound				

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Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC--IHLAP Accredited #102581, NVLAP Lab Code 101048-9, NJ NY022, CT PH-0170, MA AA000170

Initial report from: 09/09/2022 18:41:29



Fuss & O'Neill, Inc.

146 Hartford Road

Manchester, CT 06040

EMSL Order: 032215085 **Customer ID:** ENVI54 **Customer PO:** 20210525.A10

Project ID:

Phone: (203) 605-2429

Fax:

Received Date: 09/02/2022 9:20 AM

Analysis Date: 09/09/2022 **Collected Date:** 09/01/2022

alues Bluline

Project: 20210525.A10/ Pitkin ES- Window & Door Replacement/ 330 Hills Street East Hartford, CT

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk materials via EPA/600 (0513) Method using Polarized Light Microscopy. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Attention: Eric Cooley

Sample Receipt Date: 09/02/2022 Sample Receipt Time: 9:20 AM

Analysis Completed Date: 09/09/2022 Analysis Completed Time: 6:31 PM

Analyst(s):

Christopher Cernansky PLM (7)

Johannes Breckheimer PLM (14)

Samples Reviewed and approved by:

Charles Johnson, Asbestos Laboratory Manager or other approved signatory

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Appendix D

Site Photographs





Typical Window System



Typical Door System





Interior – Media Center Window



Interior of Typical Classroom



Appendix E

Site Floor Plan







Appendix F

XRF Lead Determination Field Data Sheets

DATE: 8/23/22 XRF: PMD 1157

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146 Hartford Road, Manchester, CT 06040

XRF FIELD DATA SHEET

o	ress: Potkin S	'/		Room:				ge	of
Project Name: Bristol Housing Authority - Cambridge Park Pro						oject Number: 20160080.A80			
oj	ect Manager:]	Kathleen	Pane	Gir Codes at	Positive - C	heck All T	hat Apply	y)	
de	Surface	XRF Readings	POS	Substrate/Color	Defective	Chewable	Priction	Impact	Comments
	Calibania	09		×					Exterior
	1	0.9							N
	1	09							W
3	Das	0.3		M/Gas					Side "B" Double
5	11 Some	0.1		V					Duor FOG
3	11 transom	01		W/Gray					1
3	50157	0.0		W/Whore					1 0
	Wh Sash	0.1		M/Graz					Rom 03
7	1. Frame	0.1		1					-
	1. Frame	0.0		W/white					1
7	Parel and with	0.3		Stace white					0 5 1/
	Oas	0.0		M/600			-		Dov- 606
	11 FERM							-	
_	(1 lipte)	0.0							0 4
	D00-	0.0		Mora			-	-	Por E07
	11 FERM	0.0		Mlore					
7	11 transon	0.0		Why?					
	i Soffix	0.		w/white					.5
	Win sash (fixel)	0.0		M/Gray					Para 17
	msh seal Copporeble)	0.0						-	
	11 Drew	0.0	L.L.	A					
7	" I bear 600	0.2		w/white				-	
	the tank	0.2		Strcco/white				-	1
	your wither							-	W
)	Dour	0.5		M/63			-		Doa- E08
)	1) Franc	0.6	100	V					
)	4 transm	6.0		Wholed /work Gra					
_	11 50+PA	0.2		w/white					
0	11 20+14	0.0		77477					

Extension



146 Hartford Road, Manchester, CT 06040

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XRF FIELD DATA SHEET

de	Surface	XRF Readings	POS	Substrate/Color	Defective	Chewable	Friction	Impact	Comments
1	Win Sash(the			M/Gas					Roser 17
1	n Sax(garabi)			i i					
4	1 France	0.1		V					
4	a Meada Board			W/white					
4	Parel moder unda			Stacco/white					V
	Single Pow	0.2		M/GM					Shell Dir by
4	4 Fame	0.1		W					€09
4	4 train	0.0		Wicos					1/
+	Como vent	0,2		M/G/ky					4
4	Du	0.3		MOG					Mail Don Et
4	Solht	0.4							
4	Solfit	0,2		Wywhite					2/1/1/1
4	WATORN	1,4	/	MIGOS				_	Cotoron under
1	11 Sash	1.6	V					_	
1	n liktel	6.0		Mas/ Brans W/oshity					
4	11 Header Board	0.2	-	Washity	_				
1	the linde from	0.2		Streegwhite			-	_	Run 10
+	Who Sash	0.2		M/Gas				_	Fain 10
_	" From	0.1		Whyte					
+	11 Heder booked	01	-	W/white					1/
+	Parel and from	0.3	_	snigo/white					May Ceno P
	Osor	0.4		M/G/Es					1. MA COMO H
+	11 Fram	0.2	_						
4	1 50/17	0,1		/whit					
			-						
			_						



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146 Hartford Road, Manchester, CT 06040

XRF FIELD DATA SHEET

Add	ress: Pitka	scho	1-	East Harful			Ap	t. #:	
Floo	r:		R	loom:			Pa	ge <u>3</u>	of
Proje	Project Name: Bristol Housing Authority - Cambridge Park Project Number: 20160080 A80								
Proj	Project Manager: Kathleen Pane En Cooley (If Positive - Check All That Apply)								
Side	Surface	XRF Readings	POS	Substrate/Color	Defective	Chewable	Friction	Impact	Comments
	Starl Bran								Pour 14
	about whiten	1,5	V	Steel/Red					
	an wall	0,2		(M'W/white					
	Padioter	0,5		Muhite					
	Steel Bran	(.0	~	Strel/red					Pwm 17
	well	0,1		(mn/white					
	Redigion	05		M/white					
	SII Plane	0.0		M/Gray					W
					I K				
						•			
							1/6		
									•
				16			- X		
								. 1	
			72.5						
									y
				()					
		100							
						IF I			
N/A:	strate Type: Metal = M, Not Accessible; N/C: N	Wood = W, P ot Coated; CC	laster = P DV: Cover	, Sheetrock = S, Concrete = C, B ed; VR – Vinyl Replacement	rick = B	24			

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All rough and finished carpentry are included under this Section of the Specifications, unless specifically noted otherwise.
- B. Furnish and erect all wood blocking, studs, sheathing, etc., as required for complete framing job, (Where sleeves are required, they shall be delivered by those trades involved and set by them). The general Contractor shall assume full responsibility for properly coordinating all of the work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. "Grade Mark", "Trade Mark" A and Mill Identification Mark" of the Association having jurisdiction shall appear on each piece of framing lumber when delivered to the job site.
- B. Plywood shall conform to the U.S. Department of Commerce, Commercial Standard CS45-60 and shall branded or stamped with grade.
- C. Structural Lumber shall be as Follows:
 - 1. Light framing lumber used for studs, partitions, and miscellaneous framing shall not be less than standard grade and shall have the following minimum allowable unit stresses:

2.	Extreme fiber in bending	\dots Fb = 550 PSI
	Tension parallel to grain	Ft = 375 PSI
	Compression parallel to grain	Fc = $1,350 \text{ PSI}$
	Modulus of elasticity	E = 1,400,000 PSI

- 3. Nailing shall be as per article 23 of the Connecticut Building Code/2005
- E. The general contractor shall furnish, in place, all necessary blocking as may be required by all other trades.
- F. All lumber shall bear the grade marks and mill identification.
- G. Identify all plywood as to species grade and glue type by the stamp of the American Plywood Association (APA)
- H. All plywood shall be manufactured from a Group 1 or Group 2 species.
- I. Provide APA performance rated panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

PART 3 - EXECUTION

3.01 STORAGE AND PROTECTION

A. Protect lumber, against all dampness or damage of any character during and after delivery. Store under cover in a well-ventilated building.

3.02 WORKMANSHIP

- A. All workmanship shall be of the highest caliber. Brace, plumb, and level all members and secure with sufficient nailing to insure rigidity.
- B. Nails shall be sized to be in length 2 ½ times the thickness of the material which is to be fastened.

3.03 INSTALLATION OF PLYWOOD

- A. Place all plywood with face grain perpendicular to supports and continuous over at least two supports. Center joist accuracy over supports and stagger the end joints.
- B. Allow 1/8" spacing at panel ends and 1/4" at panel edges for square edge panels.
- C. Supply and install all wood blocking as required at plywood openings and end joints.

END OF SECTION 06 10 00

SECTION 07 42 00 - METAL PANELS

PART 1 - GENERAL

1.01 - Scope

- 1. The Panels required are as manufactured by Mapes Architectural Panels, LLC, Lincoln, NE. Panels consist of metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into a window system or curtain wall system.
- 2. Related Work
 - 1. Section 07920 Joint Sealants
 - 2. Section 08500 Windows

1.02 - Quality Assurance

- 1. Panel manufacturer shall have a minimum of 25 years experience.
- 2. Field measurements shall be taken prior to completion of manufacturing and cutting.
- 3. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" (3mm) in 20' (6m) non-commutative.

1.03 - References

- 1. American Society of Testing Materials (ASTM)
 - A. E330-84: Structural Performance of Exterior Windows, Curtain Walls and Doors under the influence of wind loads.
 - B. D1781-76: Climbing Drum Peel Test for Adhesives.
 - C. D3363-74: Method for Film Hardness by Pencil Test.
 - D. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
 - E. D3359-90: Method for Measuring Adhesion by the tape test.

1.04 - Substitutions

- 1. The materials and products specified in this section establish a minimum standard of required function, design, appearance quality and warranty to be met by any proposed substitution.
- 2. No substitutions will be considered unless a written request for approval has been submitted by the bidder and received by the architect 10 days prior to the bid date.

1.05 - Submittals

- 1. Submittals shall be in conformance with section _____. Included section number of Division and refer to CSI Division I, Section 1340 Shop Drawings, Product Data and Samples.
- 2. Samples:
 - A. Panel makeup 2 samples 10"x10"
 - B. Two samples of each color and finish texture 3"x5"
- 3. Submission Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.
- 4. Affidavit certifying materials meet all requirements as specified.
- 5. 2 copies of manufacturers standard literature for specified material.

1.06 - Delivery, Storage and Handling

- 1. Protect finish and edge in accordance with panel manufacturer's recommendations.
- 2. Store materials in accordance with panel manufacturer's recommendations.

PART 2 - PRODUCTS

METAL PANELS 074200 - 1

2.01 - Panels - Laminated

- 1. Laminated metal faced Mapes-R+ (5-Ply) panels as manufactured by Mapes Industries, Inc.
- 2. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.

2.02 - Finish

- 1. Finishes
- 2. Exterior: Smooth Primed Aluminum
- 3. Interior: Smooth Primed Aluminum
- 4. Color as selected by architect.

2.03 - Panel Fabrication

- 1. Exterior Substrate: Tempered Hardboard
- 2. Core: Isocyanurate
- 3. Interior Substrate: Tempered Hardboard
- 4. Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
- 5. Panel Thickness 1"
- 6. R-Value 6.56
- 7. U-Value 0.15

2.04 - Accessories

- 1. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
- 2. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

PART 3 - EXECUTION

3.01 - Installation

1. Panel surfaces shall be free from defects prior to installation.

3.02 - Execution

- 1. Erect panels plumb, level and true.
- 2. Glaze panels securely and in accordance with approved shop drawings and manufacturers instructions to allow for necessary thermal movement and structural support.
- 3. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.
- 4. Weatherseal all joints as required using methods and materials as previously specified.
- 5. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.03 - Adjusting and Cleaning

- 1. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.
- 2. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

END OF SECTION 074200

METAL PANELS 074200 - 2

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints windows and adjacent materials.
 - 2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints between interior wall surfaces, sills and frames of windows.
- B. Related Sections include the following:
 - 1. Division 8 Section "Aluminum Windows"

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Field Test Report Log: For each elastomeric sealant application.
- J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
 - E. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
 - 1. Basis of Design: Pecora Corporation Silicone Sealant #890
 - 2. Subject to compliance with the requirements, provide the specified product or a comparable product by the following:
 - a. Pecora Corporation
 - b. Dow Corning Corporation
 - c. Tremco Incorporated
 - d. Sika Corporation

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide selfadhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

- 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Masonry.
- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Vinyl
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab; Method B, Exposed Surface Finish Hand Pull Tab; or Method C, Field-Applied Sealant Joint Hand Pull Flap, in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 2. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type

of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

- b. Whether sealants filled joint cavities and are free of voids.
- c. Whether sealant dimensions and configurations comply with specified requirements.
- 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
- 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081743 - FRP/ Aluminum Hybrid Doors

PART 1 GENERAL

1.01 SECTION INCLUDES

A. SL-17 Pebble Grain FRP/ Aluminum Hybrid Door installed in Thermally Broken Aluminum Framing.

1.02 RELATED SECTIONS

- A. Section 08 71 00 Door Hardware.
- B. Section 08 88 53 Security Glazing
- C. Section 08 90 00 Louvers.

1.03 REFRENCES

- A. <u>AAMA 1304</u> Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
- B. <u>AAMA 1503-98</u> Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- C. <u>ANSI A250.4</u> Test Procedure and Acceptance Criteria for Physical Endurance of Steel Doors and Hardware Reinforcing.
- D. ASTM-B117 Standard Practices for Operating Salt Spray (Fog) Apparatus.
- E. ASTM-B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- F. <u>ASTM-B221</u> Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- G. <u>ASTM-C518</u> Standard test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
- H. <u>ASTM-D256</u> Standard Test Methods for Determining the Pendulum Impact Resistance of Plastics.
- I. ASTM-D570 Standard Test Method for Water Absorption of Plastics.
- J. ASTM-D638 Standard Test Method for Tensile Properties of Plastics.
- K. <u>ASTM-D790</u> Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- L. <u>ASTM-D1621</u> Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- M. <u>ASTM-D1622</u> Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- N. <u>ASTM-D1623</u> Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
- O. <u>ASTM-D2126</u> Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- P. <u>ASTM-D2583</u> Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- Q. <u>ASTM-D3029</u> Test Methods for Impact Resistance of Flat Rigid Plastic Specimens by Means of a Tup (Falling Weight) (Withdrawn 1995) (Replaced by ASTM-D5420).
- R. <u>ASTM-D5116</u> Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/ Products.
- S. <u>ASTM-D5420</u> Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).

- T. <u>ASTM-D6670</u> Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/ Products.
- U. <u>ASTM-E84</u> Standard Test Method for Surface Burning Characteristics of Building Materials.
- V. <u>ASTM-E90</u> Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- W. <u>ASTM-E283</u> Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- X. <u>ASTM-E330</u> Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- Y. <u>ASTM-E1886</u> Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- Z. <u>ASTM-E1996</u> Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes.
- AA. ASTM-F476 Standard Test Methods for Security of Swinging Door Assemblies.
- BB. <u>ASTM-F1642-04</u> Standard Test Method for Glazing Systems Subject to Air Blast Loading.
- CC. NWWDA T.M. 7-90 Cycle Slam Test Method.
- DD. NFRC 100 Procedure for Determining Fenestration Products U-Factors.
- EE. NFRC 400 Procedure for Determining Fenestration Products Air Leakage.
- FF. TAS 201 Impact Test Procedures.
- GG. <u>TAS 202</u> Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure.
- HH. TAS 203 Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

1.04 SUBMITTALS

- A. Must comply with Section 01 33 00 Submittal Procedures.
- B. Action Submittals/ Informational Submittals.
 - 1. Product Data.
 - a. Submit manufacturer's product data sheets, catalog pages illustrating the products, description of materials, components, fabrication, finishes, installation instructions, and applicable test reports.
 - 2. Shop Drawings.
 - a. Submit manufacturer's shop drawings, including elevations, sections, and details indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.
 - 3. Samples.
 - a. Submit manufacturer's door sample composed of door face sheet, core, framing and finish
 - b. Submit manufacturer's sample of standard colors for door face and frame.
 - 4. Testing and Evaluation Reports.
 - a. Submit testing reports and evaluations provided by manufacturer conducted by and accredited independent testing agency certifying doors and frames comply with specified performance requirements listed in Section 2.04.
 - 5. Manufacturer Reports.
 - a. Manufacturer's Project References.
 - 1. Submit list of successfully completed projects including project name, location, name of architect, type, and quantity of doors manufactured.

C. Closeout Submittals.

- 1. Operation and Maintenance Manual.
 - a. Submit manufacturer's maintenance and cleaning instructions for doors and frames, including maintenance and operating instructions for hardware.
- 2. Warranty Documentation.
 - a. Submit manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications.
 - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years concurrent successful experience.
 - 2. Door and frame components must be fabricated by the same manufacturer.
 - 3. Evidence of a documented complaint resolution quality management system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery.
 - 1. Deliver materials to site in manufacturer's original, unopened, containers and packaging.
 - 2. Labels clearly identify opening, door mark, and manufacturer.
- B. Storage
 - 1. Store materials in a clean, dry area, indoors in accordance with manufacturer's instructions.
- C. Handling.
 - 1. Protect materials and finish from damage during handling and installation.

1.07 WARRANTY

- A. Warrant doors, frames, and factory installed hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Standard Period.
 - 1. Ten years starting on date of shipment.
- C. Limited lifetime
 - 1. Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.
- D. Finish
 - 1. Fluropan painted aluminum: 10 years.
 - 2. Anodized, aluminum:10 years.

PART 2 PRODUCTS

2.01 FRP/ALUMINUM HYBRID DOORS

- A. Manufacturer.
 - 1. Special-Lite, Inc. Basis of Design
 - a. Or compatible products by following manufacturers.
 - 2. CMI Architectural
 - 3. Old Castle Building Envelope

2.02 DESCRIPTION

A. Model.

- 1. SL-17 Pebble Grain FRP/ Aluminum Hybrid Door.
- B. Door Opening Size: As indicated on schedule and plans
- C. Construction.
 - 1. Door Thickness.
 - a. 1-3/4".
 - 2. Stiles & Rails.
 - a. Aluminum extrusions made from 6063 aluminum alloys with a minimum temper of T5.
 - b. Minimum 2-5/16" deep one-piece extrusion with integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - c. Screw or snap in place applied caps are not acceptable.
 - d. Top rails must have integral legs for interlocking continuous extruded aluminum flush cap.
 - e. Bottom rails must have integral legs for interlocking continuous weather bar with single nylon brush weather stripping or manually adjustable SL-301 door bottom with two nylon brush weather stripping.
 - f. Meeting stiles to include integral pocket to accept pile brush weather seal.

3. Corners.

- a. Mitered.
- b. Secured with 3/8" diameter full-width steel tie rod through extruded splines top and bottom which are integral to standard tubular shaped rails.
- c. 1-1/4" x 1-1/4" x 3/16" 6061 aluminum angle reinforcement at corner to give strong, flat surface for locking hex nut to bear on.
- d. Weld, glue, or other methods of corner joinery are not acceptable.

4. Core.

- a. Poured-in-place polyurethane foam.
- b. Laid in foam cores are not acceptable.
- c. Foam Plastic Insulated Doors: IBC 2603.4.
 - 1. Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
 - 2. Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.
 - 3. IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032" aluminum or 0.016" steel.
 - 4. Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. If no independent testing is conducted all doors with foam plastic core must have a thermal barrier.

5. Face Sheet.

- a. Exterior
 - 1. 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - 2. Optional painted finish consult manufacturer.
 - 3. Class C standard.
- b. Interior
 - 1. 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.

- 2. Optional painted finish consult manufacturer.
- 3. Class C standard optional Class A available consult manufacturer.
- c. Attachment of face sheet.
 - 1. Extruded stiles and rails to have integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - 2. Use of glue to bond face sheet to core or extrusions is not acceptable.
- 6. Cutouts.
 - a. Manufacture doors with cutouts for required vision lites, louvers, and panels.
- 7. Hardware.
 - a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
 - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
 - c. Factory install door hardware.
- 8. Reinforcements.
 - a. Aluminum extrusions made from 6061 or 6063 aluminum alloys.
 - b. Sheet and plate to conform to ASTM-B209.
 - c. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
 - d. Bars and tubes to meet ASTM-B221.
- D. Sustainability Characteristics.
 - 1. LEED Declaration.
 - a. Entrance Products contribute to point calculations for the following credits:
 - 1. MR Credit 4.1 Recycled Content 10% (post-consumer = ½ pre-consumer) 1 point.
 - 2. MR Credit 4.2 Recycled Content 20% (post-consumer = ½ pre-consumer) 1 point.
 - b. All aluminum extrusions are produced using prime-equivalent billet produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes. The USGBC classifies these extrusions as pre-consumer recycled material.
 - c. Manufacturing facility located within 500 miles of major components and materials, including aluminum extrusions.
 - d. The point of recovery and smelting of pre-consumer recycled material within 500 miles of the manufacturing facility.

2.03 FRAMING

- A. Framing
 - 1. Thermally Broken Aluminum Framing.
 - a. Model: SL-450-TB or SL-600-TB as indicated on details.
 - b. Materials.
 - 1. See 2.05.A.
 - c. Perimeter Frame Members.
 - 1. Storefront frame with thermally broken pocket filler.
 - 2. Factory fabricated.
 - 3. Open-back framing is not acceptable.
 - d. Thermal Strut.
 - 1. Fiber reinforced plastic, no other materials will be accepted.
 - e. Applied Door Stops.

- 1. 5/8" x 1-1/4" or 5/8" x 1-3/4", 0.125" wall thickness, with screws and weather-stripping.
- 2. Provide solid ½" aluminum bar behind door stop for closer shoe attachment.
- 3. Pressure gasketing for weathering seal.
- 4. Counterpunch fastener holes in door stop to preserve full-metal thickness under fastener head.
- 5. Minimum ½" aluminum bar reinforcement under doorstop for required hardware attachments, aluminum to meet ASTM-B221.

f. Caulking.

- 1. Caulk joints before assembling frame members.
- g. Frame Member to Member Connections.
 - 1. Secure joints with fasteners.
 - 2. Provide hairline butt joint appearance.
 - 3. Shear block construction only, no screw spline allowed.

h. Hardware

- 1. Pre-machine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
- 2. Surface mounted closures will be reinforced for but not prepped or installed at factory.
- 3. Factory install door hardware.

i. Anchors:

- 1. Anchors appropriate for wall conditions to anchor framing to wall materials.
- 2. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
- 3. Secure head and sill members of transom, side lites, and similar conditions.

2.04 PERFORMANCE

A. Face Sheet.

- 1. Standard Interior and Exterior Class C 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - a. Flexural Strength, ASTM-D790: 21 x 10³ psi.
 - b. Flexural Modulus, ASTM-D790: 0.7 x 10⁶ psi.
 - c. Tensile Strength, ASTM-D638: 13 x 10³ psi.
 - d. Tensile Modulus, ASTM-D638: 1.2 x 10⁶ psi.
 - e. Barcol Hardness, ASTM-D2583: 55.
 - f. Izod Impact, ASTM-D256: 14.0 ft-lb/in.
 - g. Gardner Impact Strength, ASTM-D5420: 120 in-lb.
 - h. Water Absorption, ASTM-D570: 0.20%/24hrs at 77°F.
 - i. Surface Burning, ASTM-E84: Flame Spread \leq 200, Smoke Developed \leq 450.
 - j. Taber Abrasion Resistance, Taber Test: 0.007% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
 - k. Chemical Resistance.
 - Excellent Rating.
 - a. Acetic Acid, Concentrated.
 - b. Acetic Acid, 5%.
 - c. Bleach Solution.
 - d. Detergent Solution.
 - e. Distilled Water.
 - f. Ethyl Acetate.
 - g. Formaldehyde.

- h. Heptane.
- i. Hydrochloric Acid, 10%.
- j. Hydrogen Peroxide, 3%.
- k. Isooctane.
- Lactic Acid, 10%.
- 1. USDA/FSIS Requirements.
 - 1. FRP face sheet with SpecLite 3[®] integral surfaseal is a finished outer surface material that is rigid; durable; non-toxic; non-corrosive; moisture resistant; a light, solid color such as white; easily inspected; smooth or an easily cleaned texture.
 - 2. FRP face sheet with SpecLite 3[®] integral surfaseal does not contain any known carcinogen, mutagen, or teratogen classified as hazardous substances; heavy metals or toxic substances; antimicrobials; pesticides or substances with pesticidal characteristics.
- 2. Optional Interior Face Only Class A 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - a. Flexural Strength, ASTM-D790: 13 x 10³ psi.
 - b. Flexural Modulus, ASTM-D790: 0.57 x 10⁶ psi.
 - c. Tensile Strength, ASTM-D638: 6.8 x 10³ psi.
 - d. Tensile Modulus, ASTM-D638: 0.90 x 10⁶ psi.
 - e. Barcol Hardness, ASTM-D2583: 40.
 - f. Izod Impact, ASTM-D256: 12.0 ft-lb/in notched.
 - g. Gardner Impact Strength, ASTM-D3029: 45 in-lb.
 - h. Water Absorption, ASTM-D570: 0.32%/24hrs at 77°F.
 - i. Surface Burning, ASTM-E84: Flame Spread \leq 25, Smoke Developed \leq 450.
 - j. Taber Abrasion Resistance, Taber Test: 0.02% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
- B. Door Core.
 - 1. Density, ASTM-D1622: ≤ 5.0 pcf.
 - 2. Compressive Properties, ASTM-D1621: Compressive Strength ≥ 60 psi, Compressive Modulus ≥ 1948 psi.
 - 3. Tensile and Tensile Adhesion Properties, ASTM-D1623: Tensile Adhesion, 3" x 3" FRP Facers ≥ 53 psi, Tensile Adhesion, 1" x 1" Foam ≥ 104 psi.
 - 4. Thermal and Humid Aging, ASTM-D2126: Volume Change at 158 °F, 100% humidity, 14 days < 13%.
 - 5. Thermal Conductivity, ASTM-C518, Thermal Resistance $\geq 0.10 \text{ m}^2\text{K/W}$.
- C. Door Panel.
 - 1. Thermal Transmittance, AAMA 1503-98: U-Factor = 0.29 Btu/hr·ft²·°F, CRFp = 55.
 - 2. Indoor Air Quality, ASTM-D5116, ASTM-D6607: GreenGuard, GreenGuard Gold.
- D. Door and Thermally Broken Aluminum Frame Assembly.
 - 1. Thermal Transmittance, NFRC 100.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. U-Factor = $0.31 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{°F}$.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. U-Factor = $0.64 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{°F}$.
 - 2. Air Leakage, NFRC 400, ASTM-E283.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. 0.01 cfm/sqft @ 1.57 psf.
 - 2. 0.01 cfm/sqft @ 6.24 psf.

- b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. 0.38 cfm/sqft @ 1.57 psf.
 - 2. 0.73 cfm/sqft @ 6.24 psf.
- 3. Sound Transmission, ASTM-E90: STC = 30, OITC = 29.
- E. Door and AF-150 Frame Assembly.
 - 1. Thermal Transmittance, NFRC 100.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. U-Factor = $0.32 \text{ Btu/hr} \cdot \text{ft}^2 \cdot ^{\circ}\text{F}$.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. U-Factor = $0.57 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{°F}$.
 - 2. Air Leakage, NFRC 400, ASTM-E283.
 - a. Opaque Swinging Door (< than 50% glass)
 - 1. 0.12 cfm/sqft @ 1.57 psf.
 - 2. 0.06 cfm/sqft @ 6.24 psf.
 - b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - 1. 0.04 cfm/sqft @ 1.57 psf.
 - 2. 0.14 cfm/sqft @ 6.24 psf.
- F. Door and Hollow Metal Steel Frame.
 - 1. Cycle Slam, NWWDA T.M. 7-90.
 - a. 5,000,000 cycles.
 - 1. No Operational Damage.
 - 2. No Hinge Separation.

2.05 MATERIALS

- A. Aluminum Members.
 - 1. Aluminum extrusions made 6061 or 6063 aluminum alloys.
 - 2. Sheet and plate to conform to ASTM-B209.
 - 3. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
- B. Fiberglass.
 - 1. See 2.02.C.5.
- C. Fasteners.
 - 1. All exposed fasteners will have a finish to match material being fastened.
 - 2. 410 stainless steel or other non-corrosive metal.
 - 3. Must be compatible with items being fastened.

2.06 FABRICATION

- A. Factory Assembly.
 - 1. Door and frame components from the same manufacturer.
 - 2. Required size for door and frame units, shall be as indicated on the drawings.
 - 3. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 - 4. All cut edges to be free of burs.
 - 5. Welding of doors or frames is not acceptable.
 - 6. Maintain continuity of line and accurate relation of planes and angles.
 - 7. Secure attachments and support at mechanical joints with hairline fit at contact surfaces.
- B. Shop Fabrication
 - 1. All shop fabrication to be completed in accordance with manufactures process work instructions.
 - 2. Quality control to be performed before leaving each department.

2.07 FINISHES

- A. Door & Frame
 - 1. Aluminum.
 - a. Anodizing.
 - 1. Class 1 Anodizing, minimum 0.7 mils thick.
 - a. Color.
 - 1. Clear 215 R1, AA-M10C12C22A41.
 - b. Paint.
 - 1. Aluminum.
 - a. Fluropan[®].
 - 1. Topcoat.
 - a. 70% polyvinylidene difluoride (PVDF) resin, meets or exceeds all AAMA 2605 specifications
 - 2. Color.
 - a. Consult manufacturer.
 - 2. FRP Face Sheets
 - a. Through color.
 - 1. Color. As selected by Owner and Architect

2.08 ACCESSORIES

- A. Hardware.
 - 1. Pre-machine doors in accordance with templates from specified hardware manufactures and hardware schedule.
 - 2. Factory install hardware required to obtain ten-year warranty on hardware attachment.
 - 3. Hardware Schedule.
 - a. Choose an item.
 - 1. Hinges.
 - a. Hinges: SL-11HD continuous hinges by Special-Lite. Hinge covers to be factory painted to match doors
 - 2. Concealed adjustable bottom brush.
 - a. SL-301.
 - 1. Not for use with CVR type hardware.
 - 3. Concealed adjustable meeting stile astragal.
 - a. Adjustable astragal by Special-Lite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive doors.
- B. Notify architect of conditions that would adversely affect installation or subsequent use.
- C. Do no proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.03 ERECTION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.

- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by architect.
- E. Set thresholds in bed of mastic and back seal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by architect.

3.04 FIELD QUALITY CONTROL

- A. Manufacture's Field Services.
 - Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.05 ADJUSTING

A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.06 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish.

3.07 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 081743

SECTION 085113 – ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 WORK INCLUDED

- A. Furnish and install aluminum architectural windows complete with hardware and related components as shown on drawings and specified in this section.
- B. Glass and Glazing
 - 1. All units shall be factory glazed.

1.03 RELATED WORK

A. Section 07 92 00 – Joint Sealants

1.04 PERFORMANCE REQUIREMENTS

A. Test Units

- 1. Air, water, and structural test unit shall conform to requirements set forth in AAMA/WDMA/CSA 101/I.S.2/A440-08 and manufacturer's standard locking/operating hardware and insulated glazing configuration.
- 2. Thermal test unit sizes shall be 24" (610 mm) x 60" (1524 mm). Unit shall consist of a projected vent.

B. Test Procedures and Performances

- 1. Windows shall conform to all AAMA/WDMA/CSA 101/I.S.2/A440-08 requirements for the window type referenced in 1.01.B. In addition, the following specific performance requirements shall be met.
- 2. Life Cycle Testing
 - a. Test in accordance with AAMA 910. There shall be no damage to fasteners, hardware parts, support arms, activating mechanisms, or any other damage that would cause the window to be inoperable. Air infiltration and water resistance tests shall not exceed specified requirements.
- 3. Air Infiltration Test
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).

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- b. Air infiltration shall not exceed .10 cfm/SF (.50 l/s•m²) of unit.
- 4. Water Resistance Test
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 331/ASTM E 547 at a static air pressure difference of 15.0 psf (730 Pa).
 - b. There shall be no uncontrolled water leakage.
- 5. Uniform Load Deflection Test (AW80)
 - a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 180.45 psf (8640 Pa), both positive and negative.
 - b. No member shall deflect over L/175 of its span.
- 6. Forced Entry Resistance
 - a. Windows shall be tested in accordance to ASTM F 588 and meet the requirements of performance grade 40.
- 7. Condensation Resistance Test (CRF)
 - a. Test unit in accordance with AAMA 1503.1.
 - b. Condensation Resistance Factor (CRF) shall not be less than 77 (frame) when glazed with 0.24 center of glass U-Factor.
- 8. Condensation Resistance (CR)
 - a. With ventilators closed and locked, test unit in accordance with NFRC 500-2010.
 - b. Condensation Resistance (CR) shall not be less than 60 when glazed with 0.24 center of glass U-Factor.
- 9. Thermal Transmittance Test (Conductive U-Factor)
 - a. With ventilators closed and locked, test unit in accordance with NFRC 100-2010.
 - b. Conductive thermal transmittance (U-Factor) shall not be more than 0.38 BTU/hr•ft²•°F when glazed with 0.24 center of glass U-Factor.

C. Project Wind Loads

1. The system shall be designed to withstand 110 mph wind loads.

1.05 QUALITY ASSURANCE

- A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.04.
- B. Test reports shall be accompanied by the window manufacturer's letter of certification, stating the tested window meets or exceeds the referenced criteria for the appropriate window type.

1.06 SUBMITTALS

- A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.
 - 1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.
- B. Manufacturer must provide NFRC certified and labeled energy performance values for U-factor, Solar Heat Gain Coefficient (SHGC), and Visible Transmittance (VT) for the aluminum windows using NFRC's Component Modeling Approach Software Tool (CMAST). The label certificate shall be project specific and will contain the energy performance values of the manufacturer's approved framing as used on the project, combined with the job specific glass and glass spacer to be

ALUMINUM WINDOWS 085113 - 2

used in the fabrication of the glass. Certified framing sizes and configurations are defined in NFRC 100-2014 table 4-3.

1.07 WARRANTIES

A. Total Window Installation

- 1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings.
- 2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

B. Window Material and Workmanship

1. Provide written guarantee against defects in material and workmanship for ten (10) years from the date of substantial completion.

C. Glass

- 1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
- 2. Warranty period shall be for 10 (ten) years from the date of substantial completion.

D. Finish

- 1. Warranty period shall be for 10 years from the date of substantial completion.
- 2. Provide organic finish warranty based on AAMA standard 2604.

1.08 MAINTENANCE MATERIALS

A. Furnish extra glazing. Provide 5 (five) panes of glazing of each of the 3 (three) most common sized window units to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Product: The design for the project windows is based on EFCO Corporation Series 325X Thermal Window.
- B. Subject to compliance with the requirements, provide the named product or a comparable product by one of the following:
 - 1. Kawneer North America, an Alcoa Company.
 - 2. Winco Window
- C. Other manufacturers requesting approval to bid their product as an equal must submit the following information ten (10) calendar days prior to close of bidding.
 - 1. A sample window, 36" (914 mm) x 24" (610 mm) single unit, as per requirements of architect.
 - 2. Test reports documenting compliance with requirements of Section 1.05.

3. A CMAST (Component Modeling Approach Software Tool) Bid Report must be provided to ensure compliance with the specified thermal performance.

2.02 MATERIALS

A. Aluminum

1. Extruded aluminum shall be 6063-T6 alloy and tempered.

B. Hardware

- 1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.
- 2. Operating hardware shall be 4-bar stainless steel arms or equal.

C. Weather-Strip

1. All weather-strip shall be Santoprene® or equal.

D. Glass

- 1. Insulated glass shall be 1" thick with a center of glass U-Factor of 0.24 constructed as follows:
 - a. Exterior lite 1/4" thick.
 - b. Air space ½" inch, argon filled.
 - c. Interior lite $-\frac{1}{4}$ " thick.
- 2. Basis of Design: Solarban 60 clear low-E glass as manufactured by PPG Industries with argon filled air space or equal.

E. Thermal Barrier

- 1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
- 2. The thermal barrier shall be thermal struts, consisting of glass reinforced polyamide nylon, mechanically crimped in raceways extruded in the exterior and interior extrusions.
- 3. Poured and de-bridged urethane thermal barriers shall not be permitted.

2.03 FABRICATION

A. General

- 1. All aluminum frame and vent extrusions shall have a minimum wall thickness of .125" (3 mm).
- 2. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and vent corners.
- 3. Depth of frame and vent shall not be less than 3 1/4" (82 mm).
- 4. All frame and vent members shall be able to accommodate separate interior and exterior finishes and colors.

B. Frame

1. Frame components shall be mechanically fastened.

C. Ventilator

- 1. All vent extrusions shall be tubular.
- 2. Each corner shall be mitered, reinforced with an extruded corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.
- 3. Each vent shall utilize two rows of weather stripping installed in specifically designed dovetail grooves in the extrusion. The exterior gasket will be omitted at the vent top rail for project-in vents, allowing air to pressure equalize the void between the vents and frame.

D. Screens

- 1. Provide removable insect screen on each operable sash, with screen frame finished to match window unit.
- 2. Screen frames shall be extruded.
- 3. Screen mounting holes in the window frame shall be factory drilled.
- 4. Screen mesh shall be aluminum or fiberglass.

E. Glazing

- 1. All units shall be glazed with the manufacturer's standard sealant process provided the glass is held in place by a removable, extruded aluminum, glazing bead. The glazing bead must be isolated from the glazing material by a gasket.
- 2. All units shall be glazed with a minimum of 9/16" glass bit.

F. Finish

1. Organic

a. Finish all exposed areas of aluminum windows and components with 70% PVDF fluoroplymer Ultrapon. Color to be selected from manufacturer's full range of standard colors, including options for separate interior and exterior finishes, by Architect and Owner.

AA Description	Description	AAMA Guide Spec.
AA-M12-C42-R1X	70% PVDF Ultrapon	2605-98

PART 3 - EXECUTION

3.01 INSPECTION

A. Job Conditions

1. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface, and are in accordance with approved shop drawings.

3.02 INSTALLATION

- A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
- B. Plumb and align window faces in a single plane for each wall plane, and erect windows and materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.
- C. Adjust windows for proper operation after installation.

D. Furnish and apply sealants to provide a weather tight installation at all joints and intersections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

3.03 ANCHORAGE

A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 PROTECTION AND CLEANING

A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the general contractor.

END OF SECTION 085113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Furnish and deliver all finish hardware necessary for all doors, also hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware.
- B. Related Sections: Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Division 1 Section "Construction and Demolition Waste Management."
 - 2. Division 8 Section "FRP Doors."
 - 3. Division 8 Section "Aluminum-Framed Entrances and Storefronts."
 - 4. Division 8 Section "Glazing."
 - 5. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
 - a. Windows.

1.3 HIGH PERFORMANCE BUILDINGS GENERAL REQUIREMENTS

- A. Implement practices and procedures to meet the project's environmental goals, which include complying with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, September 2011, with additional mandatory building project requirements for schools. Specific project goals which may impact this and the other sections of this specification include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section and other Sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes substantially compromise the stated High Performance Building criteria.
- B. Comply with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, September 2011, with additional mandatory building project requirements for

schools and the Department of Administrative Services / Office of School Construction Grants & Review High Performance School Construction Bulletin, June 2017.

1.4 REFERENCES

- A. International Code Congress (ICC)/American National Standards Institute (ANSI):
 - 1. ICC/ANSI A117.1, Accessible and Usable Buildings and Facilities.
 - 2. ANSI/BHMA A156.1 A156.24 Standards for Hardware and Specialties.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 80 Standard for Fire Doors and Fire Windows
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 105 Smoke and Draft Control Door Assemblies
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 10C Positive Pressure Test of Fire Door Assemblies
 - 2. UL 1784 Air Leakage Tests of Door Assemblies
 - 3. UL 305 Panic Hardware
- D. Applicable state and local building codes.
- E. Accessibility
 - 1. ADA Americans with Disabilities Act
 - 2. Massachusetts Architectural Access Board Regulation 521 CMR
- F. Door and Hardware Institute (DHI):
 - 1. Sequence and Format for the Hardware Schedule.
 - 2. Recommended Locations for Builders Hardware

1.5 SUBMITTALS

- A. Product Data: Include manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- B. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - 1. Type, style, function, size, and finish of each hardware item.
 - 2. Name and manufacturer of each item.
 - 3. Fastenings and other pertinent information.
 - 4. Location of each hardware set cross-referenced to indications on Drawings.
 - 5. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 6. Mounting locations for hardware.
 - 7. Mounting type for closers.
 - 8. Door and frame sizes, materials, degree of opening, handing, and fire/smoke rating.
 - 9. Name and phone number for the local manufacturer's representative for each product.

- C. Key Schedule: After a keying meeting between representatives of the Owner, Architect, and the hardware supplier, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. This schedule can be submitted as a part of the hardware schedule or as a separate schedule.
- D. Samples: If requested by the Architect, submit samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - 1. Samples will be returned to the supplier in like-new condition. Units that are acceptable may, after final check of operations, be incorporated in the Work, within limitations of key coordination requirements.
- E. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.
- F. Wiring Diagrams: After final approval of the hardware schedule, submit wiring diagrams as required for the proper installation of all electrical, electro-mechanical, and/or electro-magnetic products.
- G. Operations and Maintenance Data: Provide in accordance with Section 01 78 23 and include the following:
 - 1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - 2. Catalog pages for each product.
 - 3. Name, address, and phone number of local representative for each manufacturer.
 - 4. Parts list for each product.
 - 5. Copy of final approved hardware schedule, edited to reflect "As installed."
 - 6. Copy of final keying schedule.
 - 7. As installed "Wiring Diagrams" for each opening connected to power, both low voltage and 110 volts.
 - 8. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
 - 9. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.
- H. High Performance Building Submittal Requirements: The contractor or subcontractor shall submit the following High Performance Building certification items:
 - 1. A Connecticut High Performance Building Compliance letter shall be provided verifying agreement with relevant High Performance requirements. Information to be supplied includes, but is not limited to:
 - a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
 - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).

- c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
- 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
- 3. Product Cut Sheets for all materials of this Section that meet High Performance Building Requirements.
- 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

1.6 QUALITY ASSURANCE

- A. Substitutions: Submit substitutions in accordance with Division 01.
- B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an accredited Architectural Hardware Consultant (AHC), who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.
- C. Product Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
- D. Supplier Single Source Responsibility: Procure hardware for all doors from a single supplier.
- E. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Warnock Hersey, Factory Mutual, or other testing and inspecting organization acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
- F. Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems, who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers and provide installation and technical data to the Architect and other related sub-contractor. Upon completion of electronic security hardware installation, verify that all components are working properly, and state in the required guarantee that this inspection has been performed.

G. High Performance Building Requirements:

- 1. Adhesives, sealants, paints or coatings used for work in this section for interior applications shall meet the requirements of Division 1 Section "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings", where applicable.
- 2. Materials manufactured within a radius of 500 miles from the project site where all or a portion of the raw resources also originate within a radius of 500 miles shall be documented in accordance with the High Performance Building Requirements of this Section.
- 3. Materials that contain recycled content shall be documented in accordance with the High Performance Building Requirements of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Each article of hardware shall be individually packaged in manufacturer's original packaging.
- C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of the Work will not be delayed by hardware losses both before and after installation.
- D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.
- E. All the hardware shall be handled at this project in a manner to avoid damage, marring or scratching. Any irregularities that occur to the hardware after it has been delivered to the project shall be corrected, replaced or repaired by the Contractor at their expense. All hardware items shall be protected against malfunction due to paint, solvent, cleanser or any chemical agent.
- F. No direct shipments will be allowed unless approved by the Contractor.

1.8 WARRANTY

- A. Starting date for warranty periods to be date of manufacture of that hardware item.
- B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper usage or abuse.
- C. Provide guarantee from hardware supplier as follows:
 - 1. Hinges: Life of the building.
 - 2. Closers All openings, except STC Assemblies: Life of the building.
 - 3. Closers STC Assemblies: Twenty-Five (25) years.
 - 4. Locksets: Life of the building; except electrified locksets, five (5) years.
 - 5. Exit Devices: Five (5) years; except electrified devices, one (1) year.

- 6. All other Hardware: One (1) year.
- D. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

1.9 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approval of manufacturers other than those listed shall be in accordance with Paragraph 1.6A.
- B. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.
- C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- D. Where the exact types of hardware specified are not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having as nearly as possible the same operation and quality as the type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners:

- 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
- 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- 3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely.
- 4. All hardware shall be installed with the fasteners provided by the hardware manufacturer.

2.3 HINGES

- A. Provide five-knuckle, concealed bearing hinges of type, material, and height as outlined in the following guide for this specification:
- B. 1-3/4 inch thick doors, up to and including 36 inches wide:
 - 1. Exterior: standard weight, stainless steel, 4-1/2 inches high
 - 2. Interior: standard weight, steel, 4-1/2 inches high
- C. 1-3/4 inch thick doors over 36 inches wide:
 - 1. Exterior: heavy weight, stainless steel, 5 inches high
 - 2. Interior: heavy weight, steel, 5 inches high
- D. 2 inches or thicker doors:
 - 1. Exterior: heavy weight, stainless steel, 5 inches high
 - 2. Interior: heavy weight, steel, 5 inches high
- E. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
- F. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1. Steel Hinges: Steel pins
 - 2. Non-Ferrous Hinges: Stainless steel pins
 - 3. Out-Swinging Exterior Doors: Non-removable pins
 - 4. Out-Swinging Interior Lockable Doors: Non-removable pins
 - 5. Interior Non-lockable Doors: Non-rising pins
- G. The width of hinges shall be 4-1/2 inches at 1-3/4 inch thick doors, and 5 inches at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.
- H. Provide hinges with electrified option where specified. Provide with sufficient number and gage of concealed wires to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to the electrified locking component.
- I. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal frame specification.
- J. Acceptable manufacturers and/or products: Stanley CB series, Hager AB series, and McKinney TCA/T4CA series.

2.4 CONTINUOUS HINGES - GEARED

- A. Provide aluminum geared continuous hinges conforming to ANSI A156.25, Grade 1.
- B. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T5 aluminum.

- C. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation. Provide hinge with no less than 32 bearings.
- D. Hinges shall be capable of supporting door weights up to 600 pounds, and shall be successfully tested for 1,500,000 cycles.
- E. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by a testing agency acceptable to the authority having jurisdiction.
- F. Provide aluminum geared continuous hinges with electrified option where specified. Provide with sufficient number and gage of concealed wires to accommodate electric function of specified hardware.
- G. Install hinges with fasteners supplied by manufacturer.
- H. Acceptable manufacturers and products: Stanley, 661HD series, and Select SL11HD series.

2.5 ELECTRIC POWER TRANSFER

- A. Provide power transfer sufficient for number and gage of wires to accommodate electric function of specified hardware.
- B. Electric power transfer is to be located per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.
- C. Acceptable manufacturers and/or products: Precision, Adams Rite, Von Duprin.

2.6 FLUSH BOLTS

- A. Provide automatic and manual flush bolts with forged bronze face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch steel or brass rods at doors up to 90 inches in height. Top rods at manual flush bolts for doors over 90 inches in height shall be increased by 6 inches for each additional 6 inches of door height. Provide dust-proof strikes at each bottom flush bolt.
- B. Acceptable manufacturers and/or products: Trimco, Burns, Don-Jo Mfg.

2.7 COORDINATORS

- A. Provide a bar-type coordinating device, surface applied to the underside of the stop at the frame head where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors.
- B. Provide a filler bar of the correct length for the unit to span the entire width of the opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices if required.

C. Acceptable manufacturers and/or products: Trimco, Burns, Don-Jo Mfg.

2.8 MORTISE LOCKS

- A. Provide mortise locks that comply with ANSI A156.13, Series 1000, BHMA Grade 1 Operational and Grade 2 Security and are ULC listed, and appear in BHMA's "Directory of Certified Locks & Latches".
- B. Locks shall have stamped steel case with steel or brass parts, and levers constructed of forged or cast brass, bronze or stainless steel construction.
- C. Lever design shall be Best 15R.
- D. Provide function numbers and descriptions indicated at the end of this Section.
- E. Lock throw shall comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
 - 1. Mortise Locks: Minimum 3/4-inch latch bolt throw.
 - 2. Mortise Locks & Latches shall have an anti-friction, 3/4-inch throw latch bolt with anti-friction piece made of self-lubricated stainless steel. Latch bolt with plastic insert and three-piece latch bolt are unacceptable on this project.
 - 3. Mortise Locks & Latches shall have levers to be operated with a roller bearing spindle hub mechanism.
- F. Acceptable manufacturers and/or products: Best 45H series, Schlage L9000 series, and Sargent 8200 series.

2.9 EXIT DEVICES

- A. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit and/or Fire Exit Hardware.
- B. Provide touchpad type exit devices, fabricated of stainless steel, plated to the standard architectural finishes to match the balance of the door hardware.
- C. Touchpad shall extend a minimum of one half of the door width, but not the full length of the exit device rail.
- D. Devices to incorporate a deadlatching feature.
- E. Provide manufacturer's standard strikes.
- F. Provide exit devices cut to door width and height. Locate exit devices at a height recommended by the exit device manufacturer, allowable by governing building codes, and approved by the Architect.

- G. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates.
 - 1. Lever style will match the lever style of the locksets.
- H. Exit devices for fire rated openings shall be UL labeled fire exit hardware.
- I. Provide electrical options as scheduled.
- J. Acceptable manufacturers and/or products: Precision Apex series, Von Duprin 98 series, and Sargent 80 series.

2.10 POWER SUPPLIES

- A. Provide power supplies, recommended and approved by the manufacturer of the electrified locking component, for the operation of electrified locks, electrified exit devices, magnetic locks, electric strikes, and other components requiring a power supply.
- B. Provide the appropriate quantity of power supplies necessary for the proper operation of the electrified locking component and/or components as recommended by the manufacturer of the electrified locking components with consideration for each electrified component utilizing the power supply, the location of the power supply, and the approved wiring diagrams. Locate the power supplies as directed by the Architect.
- C. Provide a power supply that is regulated and filtered 24 VDC, or as required, and UL class 2 listed.
- D. Provide a power supply, where specified, with the internal capability of charging optional sealed backup batteries 24 VDC, or as required, in addition to operating the DC load.
- E. Provide a power supply complete requiring only 120VAC to the fused input and shall be supplied in an enclosure.
- F. Provide a power supply with emergency release terminals, where required, that allow the release of all devices upon activation of the fire alarm system complete with fire alarm input for initiating "no delay" exiting mode.
- G. Acceptable manufacturers and/or products: Precision ELR series, Dorma PS series, Dynalock 5000 series, Security Door Controls 600 series.

2.11 DOOR CLOSERS – HEAVY DUTY

A. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder. Cylinder body shall be 1-1/2 inch diameter.

- B. Provide hydraulic fluid requiring no seasonal closer adjustment. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
- C. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
- D. Provide closers with heavy-duty forged forearms for parallel arm closers.
- E. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
- F. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
- G. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- H. Door closers meeting this specification: Stanley Commercial Hardware QDC100 series, LCN 4040XP Series, and Sargent 280 series.

2.12 DOOR CLOSERS – STC ASSEMBLIES

- A. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Door closers shall have fully hydraulic, full rack and pinion action with an aluminum cylinder.
- B. Provide hydraulic fluid requiring no seasonal closer adjustment. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
- C. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
- D. Provide closers with heavy-duty forged forearms for parallel arm closers.
- E. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
- F. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
- G. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- H. Door closers meeting this specification: Dorma 8900 series, or approved equivalent.

2.13 DOOR TRIM

- A. Provide push plates 8 inches wide x 16 inches high x 0.050 inch thick and beveled 4 edges. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
- B. Provide anti-vandal pulls of solid stock, and length as scheduled.
- C. Provide pull plates 4 inches wide x 16 inches high x 0.050 inch thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
- D. Acceptable manufacturers and/or products: Trimco, Burns, Don-Jo Mfg.

2.14 PROTECTION PLATES

- A. Provide kick plates, and mop plates, minimum of 0.050 inch thick as scheduled. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:
 - a. Kick Plates 8 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs
 - b. Mop Plates 4 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs
- B. Acceptable manufacturers and/or products: Trimco, Don-Jo Mfg., Burns.

2.15 OVERHEAD STOPS

- A. Provide heavy duty concealed mounted overhead stop as specified for exterior and interior vestibule single acting doors.
- B. Provide medium duty surface or concealed mounted overhead stop for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop or a floor stop presents a tripping hazard.
- C. Acceptable manufacturers and/or products: Dorma, ABH Manufacturing, Glynn-Johnson.

2.16 DOOR STOPS AND HOLDERS

- A. It shall be the responsibility of the hardware supplier to provide door stops for all doors in accordance with the following requirements:
 - 1. Use wall stops wherever possible; only on CMU walls.
 - 2. Where wall bumpers cannot be used, provide dome type floor stops of the proper height.
 - 3. At any opening where a wall or floor stop cannot be used, a heavy-duty overhead stop will be required.

B. Acceptable manufacturers and/or products: Trimco, Don-Jo Mfg., Burns.

2.17 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

- A. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
 - 1. Exterior Saddle Thresholds -1/2 inch high x refer to detail x door width
 - 2. Interior Saddle Thresholds 1/4 inch high x refer to detail x door width
 - 3. Bumper Seal Thresholds -1/2 inch high x 5 inches wide x door width
- B. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
- C. Acceptable manufacturers and/or products: National Guard, Zero, Reese.
- D. Extended thresholds required at all doors into Gymnasium (Room 326).

2.18 MAGNETIC HOLDERS

- A. Provide wall or floor mounted electromagnetic door release as specified with a minimum of 25 pounds of holding force. Projection of holder and armature must be coordinated with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Where magnetic holders are used on fire-rated doors, they must be wired into the fire control panel for fail-safe operation.
- B. Acceptable manufacturers and/or products: Dorma, ABH Manufacturing, Rixson.

2.19 SILENCERS

- A. Furnish "push-in" type silencers for each hollow metal or wood frame, three (3) for each single frame, two (2) for each pair frame. Omit where gasketing is scheduled.
- B. Acceptable manufacturers and/or products: Trimco, Don-Jo Mfg., Burns.

2.20 FINISHES

- A. With the exception of items listed below, the finish of hardware items shall be US26D satin chrome or US32D satin stainless steel.
- B. Exceptions are as follows:
 - 1. Aluminum Geared Continuous Hinges: US28 (BHMA 628).
 - 2. Push Plates, Pulls, Anti-Vandal Pulls: US32D (BHMA 630).
 - 3. Exit Devices: US32D (BHMA 630).

- 4. Protection Plates: US32D (BHMA 630).
- 5. Overhead Stops: Painted to Match.
- 6. Door Closers: Powder Coat to Match.
- 7. Wall Stops: US32D (BHMA 630).
- 8. Weatherstripping: Clear Anodized Aluminum.
- 9. Thresholds: Mill Finish Aluminum.

2.21 CYLINDERS AND KEYING

- 1. Provide a key system conforming to the Owner's existing Best Cormax key system and the following requirements:
- 2. Provide removable core cylinders at all keyed devices. The manufacturer's agent, accompanied by the Owner or Owner's security agent, shall install permanent keyed cores upon completion of the project. The temporary construction cores are to be returned to the manufacturer.
- 3. The manufacturers' agent, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Architect for approval.
- 4. Lock core and keying provided by owner.
- 5. Provide keys as follows:
 - a. Ten grand master keys for each set.
 - b. Ten master keys for each set.
 - c. Three keys per core and/or cylinder.
 - d. Two construction core control keys
 - e. Two permanent core control keys
 - f. Six construction master keys for each type (Contractor is to provide one set of construction keys to Architect)
- 6. Visual key control:
 - a. Keys shall be stamped with their respective key set number and stamped "DO NOT DUPLICATE".
 - b. Grand master and master keys shall be stamped with their respective key set letters.
 - c. Do not stamp any keys with the factory key change number.
 - d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.
- 7. Deliver grand master keys, master keys, change keys, and/or key blanks from the factory or directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.

2.22 KEY CONTROL SYSTEM

- A. Provide a key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the Project.
 - 1. Provide complete cross index system set up by the hardware supplier, and place keys on markers and hooks in the cabinet as determined by the final key schedule.

2. Provide hinged-panel type cabinet for wall mounting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installation of any hardware, examine doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct defects prior to proceeding with installation.
- B. Pre-Installation Conference: Prior to the installation of hardware, manufacturer's representatives for locksets, closers, and exit devices shall arrange and hold a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. A letter of compliance, indicating when the meeting was held and who was in attendance, shall be sent to Architect and Owner.

3.2 INSTALLATION

- A. Hardware shall be installed by qualified tradesmen skilled in application of commercial grade hardware. For technical assistance if necessary, installers may contact manufacturer's representative for the item in question, as listed in the hardware schedule.
- B. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.
- D. Do not install surface mounted items until finishes have been completed on the substrate. Protect installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- F. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.
- G. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant complying with requirements specified in Section 07 92 00.

3.3 ADJUSTING, CLEANING AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly.

- B. Where door hardware is installed more than one (1) month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Clean adjacent surfaces soiled by hardware installation. Remove bulk trash form the building, clean up any dust/debris caused by the installation of hardware.
- D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

3.4 FIELD QUALITY CONTROL

- A. At completion of the project, a qualified factory representative for the manufacturers of locksets, closers, and exit devices shall inspect installations of their products. After the inspections, a letter shall be sent to the Architect reporting on conditions, verifying that their respective products have been properly installed and adjusted.
- B. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the installer, accompanied by representatives of the manufacturers of latchsets and locksets, door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:
 - 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
 - 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
 - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
 - 4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.5 PROTECTION

A. Provide for the proper protection of items of hardware until Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

3.6 HARDWARE SCHEDULE

- A. Provide hardware for each door to comply with requirements of hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
- B. It is intended that the following schedule includes all items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

C. Hardware sets:

NOTE: ALL ELECTRONIC HINGES AND HARDWARE ON RIGHT HAND DOORS

SET #01 – EXTERIOR PAIR– MAIN ENTRY – Door 101A

2	Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG.		
1	Removable Mullion	KR822	689	PR
1	Exit Device	C ELR TS 2103 x C03 LD	630	PR
1	Exit Device	C ELR TS 2101 LD	630	PR
1	Anti-Vandal Pull	1097PHI-21 S-N	630	TR
1	Anti-Vandal Pull	1097PHI-21 S-C	630	TR
2	Rim Cylinder	AS REQUIRED	626	BE
2	Door Closer	QDC115 R	689	SH
2	Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
2	Door Holder	EM508 24120	689	DM
1	Video Intercom/Card Reade	er PROVIDED/SPECIFIED BY SECURITY VEN	NDOR	
2	Wire Harness	WH-192		ST
2	Power Transfer	EPT-12C		PR
2	Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1	Door Seals	INTEGRAL SEALS BY FRAME MFR.		
	Door Sweep	C627 A (DOOR WIDTH)		NA
1	Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
		(PAIR) SEE DETAILS		

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #02 - INTERIOR - LOBBY/ENTRY - Door 101B

2 C	Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG.		
1 R	Removable Mullion	KR822	689	PR
1 A	anti-Vandal Pull	1097PHI-21 S-C	630	TR
1 E	Exit Device	C ELR TS 2103 x C03 LD	630	PR
1 E	Exit Device	C ELR TS 2101 LD	630	PR
2 R	Rim Cylinder	AS REQUIRED	626	BE
2 D	Ooor Closer	QDC113 R	689	SH
2 C	Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
2 D	Ooor Holder	EM508 24120	689	DM
2 D	Ooor Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1 D	Ooor Seals	INTEGRAL SEALS BY FRAME MFR.		
1 S	addle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
		(PAIR) SEE DETAILS		

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28. OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #03 – EXTERIOR PAIR – SIDE ENTRY – Doors 103, 108, 110, & 113

2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1 Removable Mullion	KR822	689	PR
1 Exit Device	C ELR TS 2103 x C03 LD	630	PR
1 Exit Device	C ELR TS 2101 LD	630	PR
1 Anti-Vandal Pull	1097PHI-21 S-N	630	TR
1 Anti-Vandal Pull	1097PHI-21 S-C	630	TR
2 Rim Cylinder	AS REQUIRED	626	BE
2 Door Closer	QDC115 R	689	SH
2 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
2 Door Holder	EM508 24120	689	DM
1 Video Intercom/Card Reade	er PROVIDED/SPECIFIED BY SECURITY VEN	NDOR	
2 Wire Harness	WH-192		ST
2 Power Transfer	EPT-12C		PR
2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1 Door Seals	INTEGRAL SEALS BY FRAME MFR.		
2 Door Sweep	C627 A (DOOR WIDTH)		NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
	(PAIR) SEE DETAILS		

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET~#04-EXTERIOR~PAIR-SIDE~ENTRY-Doors~104,~105~&~107

2	Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
]	Removable Mullion	KR822	689	PR
]	Exit Device	C ELR TS 2103 x C03 LD	630	PR
]	Exit Device	C ELR TS 2101 LD	630	PR
1	Anti-Vandal Pull	1097PHI-21 S-N	630	TR
]	Anti-Vandal Pull	1097PHI-21 S-C	630	TR
2	Rim Cylinder	AS REQUIRED	626	BE
2	2 Door Closer	QDC115 R	689	SH
2	2 Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
]	Video Intercom/Card Reade	er PROVIDED/SPECIFIED BY SECURITY VEI	NDOR	
2	Wire Harness	WH-192		ST
2	Power Transfer	EPT-12C		PR
2	2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
]	Door Seals	INTEGRAL SEALS BY FRAME MFR.		
2	2 Door Sweep	C627 A (DOOR WIDTH)		NA
]	Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA

(PAIR) SEE DETAILS

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26 & 28.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. ACCESS BY KEY OR BY VIDEO

INTERCOM/CARD READER. VIDEO INTERCOM/CARD READER WILL RETRACT EXIT DEVICE LATCHBOLTS AND ALLOW ACCESS. REQUEST TO EXITS AND DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #05 - EXTERIOR	SINGLE AT	CLASSROOM –	EXIT ONLY	– Doors 102.	109A. & 109B

1	Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1	Exit Device	2101 LD	630	PR
1	Door Closer	QDC115 R	689	SH
1	Overhead Stop	CONCEALED HEAVY DUTY 910 S SERIES	689	DM
1	Door Contact	PROVIDED/SPECIFIED BY SECURITY VEN	DOR	
1	Door Seals	INTEGRAL SEALS BY FRAME MFR.		
1	Drip Cap	16 A - 4" ODW		NA
1	Door Sweep	C627 A (DOOR WIDTH)		NA
1	Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WII	OTH AL	NA
		(SGL.) SEE DETAILS		

SET #06 - EXTERIOR PAIR – Door 106

CONTINUOUS HINGE BY DOOR MFG	
2201 LD 63	0 PR
2203 X 4903A LD 63	0 PR
AS REQUIRED 620	6 BE
QDC113 R 689	9 SH
PROVIDED/SPECIFIED BY SECURITY VENDO	R
C627 A (DOOR WIDTH)	NA
16 A - 4" ODW	NA
706 E (HEAD & JAMBS - PAIR)	NA
115 NA SET (DOOR HEIGHT)	NA
1/2" HIGH X JAMB WIDTH X OPENING WIDTH	H AL NA
(PAIR) SEE DETAILS	
	2201 LD 63 2203 X 4903A LD 63 AS REQUIRED 62 QDC113 R 68 PROVIDED/SPECIFIED BY SECURITY VENDO C627 A (DOOR WIDTH) 16 A - 4" ODW 706 E (HEAD & JAMBS - PAIR) 115 NA SET (DOOR HEIGHT) 1/2" HIGH X JAMB WIDTH X OPENING WIDTH

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #07 - EXTERIOR SINGLE – Do	oor 111		
1 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFC	j	
1 Exit Device	2201 LD	630	PR
1 Exit Device	2203 X 4903A LD	630	PR
1 Rim Cylinder	AS REQUIRED	626	BE
1 Door Closer	QDC113 R	689	SH
1 Door Contact	PROVIDED/SPECIFIED BY SECURITY	Y VENDOR	
1 Door Sweep	C627 A (DOOR WIDTH)		NA

087100 - 19 DOOR HARDWARE

1 Drip Cap	16 A - 4" ODW	NA
1 Perimeter Seal	706 E (HEAD & JAMBS - PAIR)	NA
1 Astragal Set	115 NA SET (DOOR HEIGHT)	NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING WIDTH AL	NA
	(PAIR) SEE DETAILS	

NOTE: ALL WIRING AND CONNECTIONS BY DIVISION 26.

OPERATIONAL DESCRIPTION:

IMMEDIATE EGRESS ALWAYS ALLOWED. DOOR CONTACTS TO BE CONNECTED TO BUILDING'S SECURITY SYSTEM.

SET #08 - EXTERIOR PAIR - Door 112

2 Continuous Hinge	CONTINUOUS HINGE BY DOOR MFG		
1 Exit Device	2201 LD	630	PR
1 Exit Device	2203 X 4903A LD	630	PR
1 Rim Cylinder	AS REQUIRED	626	BE
2 Door Closer	QDC113 R	689	SH
2 Door Contact	PROVIDED/SPECIFIED BY SECURITY VE	NDOR	
2 Door Sweep	C627 A (DOOR WIDTH)		NA
1 Drip Cap	16 A - 4" ODW		NA
1 Perimeter Seal	706 E (HEAD & JAMBS - PAIR)		NA
1 Saddle Threshold	1/2" HIGH X JAMB WIDTH X OPENING W	TDTH AL	NA
	(PAIR) SEE DETAILS		

END OF SECTION 087100

SECTION 088853 - SECURITY GLAZING

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.
- B. Carefully review and examine all other Contract Documents for requirements therein affecting the work of this Section. Furthermore, coordinate and sequence the work of this Section with all other trades affected

1.2 SUMMARY

- A. This Section includes glass and glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Exterior Aluminum doors and frames.
 - 2. Exterior Aluminum windows and curtain wall.

B. Related Requirements:

- 1. Section 084113 "Aluminum Windows" for aluminum windows receiving glass and glazing.
- 2. Section 084413 "Glazed Aluminum Curtain Walls."

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Division 01 Section "References". Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM C 1036 Flat Glass.
 - 2. ASTM C 1048 Heat-Treated Flat Glass Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. ANSI Z97.1 Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
 - 4. Federal Safety Standards for Architectural Glazing Materials 16CFR1201-I.II.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

- A. Product data sheets on glazing products: Provide chemical, functional, and environmental characteristics, size limitations, special application requirements. Identify available colors.
- B. Glass Samples: For each type of the following products:
 - 1. 12 by 12-inch pieces of each specified type and thickness of glass, bearing labels indicating locations where each type of glass will be used.
 - 2. Glazing tape: 12-inch length of specified type and size.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturers of insulating-glass units with sputter-coated, low-E coatings and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For security glass and glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.

- B. Installer Qualifications: A firm with a minimum of three years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
- C. Glass Thickness: Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section. Provide units with proper thickness, edge clearance and tolerance to comply with recommendations of glass manufacturer.
- D. Perform work in accordance with FGMA Glazing Manual Sealant Manual.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
 - 1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
 - 2. Sequence deliveries to avoid delays, but minimize on-site storage.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 50°F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.11 WARRANTY

- A. General: Warranties are in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- C. Manufacturer's Special Project Warranty on Insulating Glass Products:
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with security glazing performance requirements, provide products by a single manufacturer.
- B. Basis of Design: Laminated Technologies, Inc.; School Guard Glass, SG4.

2.2 SECURITY GLASS PERFORMANCE REQUIREMENTS

- A. Security Glazing: Security glass and surrounding frames shall demonstrate the ability, through independent third-party testing, to provide the following attributes:
 - 1. Products will be tested as a whole system, including glass and doors or frames.
 - 2. Products tested shall be tested in full size, actual doors and framing members usable in a commercial setting, as applicable to project requirements, with security glazing installed as prescribed by the security glazing manufacturer. Testing shall not be done in framing other than what is specified in regards to quality or manufacturer as stated in the Contract Documents.
 - 3. Glass bite during testing shall be no more than the allowable glass bite in the specified door or framing system for this project.
 - 4. The security glass shall resist attack for a minimum of 6 minutes or greater to meet the desired level of protection required by the owner.
 - 5. Attack duration shall be continuous. Breaks between testing phases shall not be counted or timed for total duration.
 - 6. Security glass will be integrated into a framing system in such a way that the frame and glass are able to withstand a constant attack for 6 minutes.
 - 7. Attack resistance shall mean the security glazing is subjected to the following without failure:
 - a. Withstand a minimum of 5 shots from a military style assault rifle with a minimum caliber of 7.62mm.
 - b. Withstand a minimum of abuse as applied by a single assailant at full force and including strikes with feet, bricks, hammers, baseball bats, and sledgehammers without stoppage for 6 or 12 minutes.
 - 8. Failure is defined as a tear in the security glass large enough to allow an object 4-inches in diameter or more to pass through or separation made between the glass and surrounding door frame, storefront or curtain wall framing materials.

- 9. Product shall not be damaged or scratched by scissors, writing implements, razor blades or the use of any similar sharp object.
- 10. Glass shall not have an optical haze of more than 1.8 percent so glass is indistinguishable from standard tempered glass.
- B. Test reports from a recognized independent testing company shall show testing means and methodology consistent or similar to the 5-aa1 assault test.

2.3 GLASS PRODUCTS, GENERAL

- A. General requirements for glass: Of domestic manufacture, conforming to the referenced standards and with the additional requirements specified herein; factory labeled on each pane stating the strength, type, thickness and quality; with all labels remaining on glass until final cleaning.
- B. Fabricate glass as required to openings with edge clearances and bite on glass as recommended by the manufacturer with clean-cut edges where concealed, and smooth ground, polished and seamed edges where exposed to view. Do not cut, seam, nip or abrade glass after tempering.
 - 1. For non-tempered to be cut at site, provide glass larger than required so as to obtain clean cut edges without seaming or nipping. Laminated glass products should not be cut on site.
- C. Glass thickness shown and heat treatment specified are minimum requirements. Provide glass thickness and heat treatment as required to meet specified performance criteria, State and local codes and ordinances.

2.4 INSULATED SECURITY GLASS PRODUCTS

- A. Insulating Security Glass: Product established as performance standard. Substitution must provide certified independent testing of performance data equal to specified Security Glass Performance Requirements.
- B. Insulating Glass Units for Vertical Glazing (SG4 IGU)
 - 1. Overall thickness: 1-inch (25.4 mm) insulating glass.
 - 2. Outer-lite: 1/4-inch (6 mm) tempered glass, low-e coating on the No. 2 surface.
 - 3. Airspace: 3/8-inch (9.5 mm) thick argon gas filled space, and mill finish air spacer.
 - 4. Inner-lite: School Guard Glass SG4.
 - 5. Required Ratings:
 - a. 5-aal rated for a minimum of 6 minutes.
 - 6. Minimum Visible Light Transmittance: 59 percent.
 - 7. Reflectance Visible Light: 13 percent.
 - 8. U-Value (Winter): 0.24.
 - 9. Shading Coefficient: 0.32.

10. Solar Heat Gain Coefficient: 0.28.

2.5 GLAZING SEALANTS

A. General:

- 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Silicone Rubber Glazing Sealant; silicone rubber one-part elastomeric sealant; FS TT-S-001543, Class A; acid-type for non-porous channel surfaces, and nonacid type where any of the channel surfaces are porous.
 - 1. Basis of Design: Dow Corning Corporation; 995.
- C. Preformed Butyl Rubber Glazing Sealant; tape or ribbon (coiled on release paper) of polymerized butyl, or mixture of butyl and polyisobutylene, compounded with inert fillers and pigments, solvent-based with minimum 95 percent solids, thread or fabric reinforcement, tackfree within 24 hours, paintable, non-staining.

2.6 GLAZING TAPES

- A. Preformed Butyl Rubber Glazing Sealant; tape or ribbon (coiled on release paper) of polymerized butyl, or mixture of butyl and polyisobutylene, compounded with inert fillers and pigments, solvent-based with minimum 95 percent solids, thread or fabric reinforcement, tackfree within 24 hours, paintable, non-staining.
- B. Pure silicone caulk, closed cell PVC tape, or DAP 33 putty as recommended by Technical Glass Products to comply with U.L. Listing. Must be used for fire-rated glass to meet fire rated labeling requirements.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Type recommended by glazing material manufacturer.

- C. Glazing Gaskets: Molded Neoprene Glazing Gaskets; molded or extruded neoprene gaskets of the profile and hardness required for watertight construction; ASTM D 2000 designation 2BC 415 to 3BC 620.
- D. Setting Blocks: Neoprene, 70-90 durometer hardness, with proven compatibility with sealants used.
- E. Spacers: Neoprene, 40-50 durometer hardness, with proven compatibility with glazing materials used.
- F. Compressible Filler Rod: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with glazing materials used, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect receiving surfaces and ensure that are dry and free from dust, or other foreign materials before glazing. Clean all surfaces with cloth saturated with mineral spirits of high-flash naphtha as recommended by glazing tape manufacturer, before glazing.
- B. Verify all openings, prior to glazing, to make certain that the opening is square, plumb and secure in order that uniform face and edge clearances are maintained.
- C. Determine the actual sizes required by measuring the receiving openings. Size glass
 - to permit required clearance and bite around full perimeter of glass, as set forth in the referenced FGMA standards, or as recommended by the glass manufacturer. Do not nip edges, to remove flares or to reduce oversize dimensions, under any circumstance.
- D. Perform glazing work in accordance with FGMA Glazing Manual SIGMA and LSGA standards for glazing and installations methods.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Each installation shall withstand normal temperature changes, applicable wind loading, and impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the Work.
- B. Install glass in accordance with the standards detailed in the "Glazing Manual" of the Glass Association of North America and the "Sealant Manual" of the Flat Glass Marketing

Association except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.

- C. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other pieces.
- D. Install glazing materials in accordance with the manufacturer's printed instructions.

3.3 GLAZING, GENERAL

- A. Install setting blocks of proper size at quarter points of sill rabbet. If required to keep in place set blocks in thin course of the heel-bead compound.
- B. Provide spacers inside and out, and of proper size and spacing, for all glass sizes larger than 50 united inches, except where gaskets are used for glazing. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Voids and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels) except as otherwise indicated, depending on light sizes, thickness and type of glass, and complying with manufacturer's recommendations.
- D. Do not cut, seam, nip, or abrade glass which is tempered, heat strengthened, or coated.
- E. Force glazing materials into channel to eliminate voids and to ensure complete "wetting" or bond of glazing material to glass and channel surfaces.
- F. Tool exposed surfaces of glazing sealants and compounds to provide a substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.
- G. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead.
- H. Gasket Glazing: Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in the glazing system.

3.4 CURE, PROTECTION AND CLEANING

A. Cure glazing materials in accordance with manufacturer's printed instructions and recommendations, to obtain high early bond strength, internal cohesive strength, and surface durability.

- B. Mark glazed openings immediately upon installation of glass by attaching crossed streamers to framing. Do not apply markers of any type to surfaces of glass.
- C. Replace glass included in the work which is broken, or otherwise damaged, from the time Work is started at the site until the date of physical completion.
- D. Maintain glass in a reasonably clean condition during construction to protect from buildup of harmful construction contaminants.
 - 1. Clean and trim excess glazing material from the glass and stops or frames promptly after installation.
- E. Remove dirt and other foreign material and wash and polish glass included in the work on both sides.

END OF SECTION 088853

SECTION 089000 - LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fixed, extruded-aluminum louvers.
- B. Related Sections: Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
 - 1. Division 1 Section "Construction and Demolition Waste Management."
 - 2. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.3 HIGH PERFORMANCE BUILDINGS GENERAL REQUIREMENTS

- A. Implement practices and procedures to meet the project's environmental goals, which include complying with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, June, 2015, with additional mandatory building project requirements for schools. Specific project goals which may impact this and the other sections of this specification include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section and other Sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes substantially compromise the stated High Performance Building criteria.
- B. Comply with Connecticut Standard Guidelines Compliance Manual for High Performance Buildings, June, 2015, with additional mandatory building project requirements for schools and the Department of Administrative Services / Office of School Construction Grants High Performance School Construction Bulletin, 2015.

1.4 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
- B. Seismic Performance: Provide louvers capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - 1. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of metal finish required.

- E. High Performance Building Submittal Requirements: The contractor or subcontractor shall submit the following High Performance Building certification items:
 - 1. A Connecticut High Performance Building Compliance letter shall be provided verifying agreement with relevant High Performance requirements. Information to be supplied includes, but is not limited to:
 - a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
 - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
 - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
 - 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
 - 3. Product Cut Sheets for all materials of this Section that meet High Performance Building Requirements.
 - 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

1.7 OUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2, "Structural Welding Code--Aluminum."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.
- D. UL and NEMA Compliance: Provide motors and related components for motor-operated adjustable louvers that are listed and labeled by UL and comply with applicable NEMA standards.
- E. High Performance Buildings Requirements:
 - 1. Adhesives, sealants, paints or coatings used for work in this section for interior applications shall meet the requirements of Division 1, Section 018113: "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings", where applicable.
 - 2. Materials manufactured within a radius of 500 miles from the project site where all or a portion of the raw resources also originate within a radius of 500 miles shall be documented in accordance with the High Performance Building Requirements of this Section.
 - 3. Materials that contain recycled content shall be documented in accordance with the High Performance Building Requirements of this Section.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

1.9 WARRANTY

- A. Manufacturer shall provide standard limited warranty for louver systems for a period of five years (60 months) from date of installation, no more than 60 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without direct financial cost to the Owner.
- B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on extruded aluminum substrates.
 - 1. Finish coating shall not peel, blister, chip, crack or check.
 - 2. Chalking, fading or erosion of finish when measured by the following tests:
 - a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
 - b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.
 - c. Finish coating shall not erode at a rate in excess of 10%/ 5 year as determined by Florida test sample.
- C. Manufacturer shall provide a 5 year limited warranty for Class I and a 3 year limited warranty for Class II anodized finish on extruded aluminum substrates.
 - 1. Seller warrants the Finish under normal atmospheric conditions.
 - a. Will not crack, craze, flake or blister
 - b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM method D-2244
 - c. Will not chalk in excess of ASTM D-4214-07 number (8) rating, determined by the procedure outlined in ASTMD-4214-07 specification test.
 - 2. Any forming or welding must be done prior to finishing. Post forming or welding will void the warranty.
 - 3. This Warranty applies only if the anodized aluminum product is installed in strict accordance with Seller's recommended practices and maintained in accordance with AAMA (American Architectural Manufacturers Association) publication number 609 and 610-09 ("Cleaning and Maintenance Guide for Architecturally Finished Aluminum").

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Louvers:
 - a. Construction Specialties, Inc.
 - b. Greenheck.
 - c. Industrial Louvers, Inc.
 - d. Ruskin Company; Tomkins PLC.
- B. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Basis-of-Design Product: The design for each louver is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 - 1. Use types and sizes to suit unit installation conditions.
 - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.

2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

- 1. Frame Type: Channel, unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
 - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
 - 2. Exterior Corners: Prefabricated corner units with mitered blades with concealed close-fitting splices and with fully-recessed mullions at corners.
- F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

- 1. Basis-of-Design: EHH-201 Drainable Aluminum Louver as manufactured by Greenheck
- 2. Louver Depth: 2 inches (100 mm)
- 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.060 inch (1.5 mm) for blades and 0.080 inch (2.0 mm) for frames.
- 4. Performance Requirements:
 - a. Free Area: Not less than 50%.
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area velocity.
 - c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core area intake velocity of 300 fpm (1.5 m/s).
- 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.

- 2. Finish: Same finish as louver frames to which louver screens are attached.
- 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louvers after assembly.

2.7 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603, except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.
 - 2. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
- B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089000

SECTION 122400 - SPRING ROLLER SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

1.2 RELATED SECTIONS

- A. Section 06 10 00 Rough Carpentry: Blocking for support of window shade hardware.
- B. Section 07 90 00 Joint Sealers: Sealants for perimeter of shade system.

1.3 REFERENCES

- A. NFPA 701-99 Fire Tests for Flame-Resistant Textiles and Films.
- B. GREENGUARD Environmental Institute Gold.
- C. US Green Building Council.
- D. ANSI/WCMA A100.1-2018

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330 [01 33 26] Submittal Procedures:
- B. Product Data: Manufacturer's data sheets on each product specified, including:
 - 1. Preparation instructions and recommendations.
 - 2. Installation and maintenance instructions.
 - 3. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 4. Storage and handling requirements and recommendations.
 - 5. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, two complete sets of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

- F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use.
- C. Mock-Up: Provide a mock-up of one of each type roller shade assembly specified for evaluation of mounting, appearance and accessories.
 - 1. Locate mock-up in window(s) designated by Architect.
 - 2. Do not proceed with remaining work until mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.
- B. Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.
- C. Label containers and shades according to Window Shade Schedule.
- D. Store products in manufacturer's unopened packaging until ready for installation.

1.7 SEQUENCING

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

A. Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

1.9 WARRANTY

A. Hardware and Shade Fabric: Draper's standard twenty-five year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Draper®z, Inc., which is located at: 411 S. Pearl P. O. Box 425; Spiceland, IN 47385-0425. ASD. Toll Free Tel: 800-238-7999; Tel: 765-987-7999; Fax: 866-637-5611; Web: www.draperinc.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUALLY OPERATED WINDOW SHADES

- A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation; Spring Roller-operated Shade as manufactured by Draper, Inc.
 - 1. Operation: Spring roller operating mechanism with metal roller containing heavy duty spring with positive locking mechanism permitting shade to be stopped at each half turn of roller. Provide cord clasp and braided cotton cord attached to bottom shade slat. Spring sized by manufacturer to accommodate shade size. Provide roller idler assembly of molded nylon and zinc-plated steel pin.
 - 2. Mounting:
 - a. Mounting brackets.
 - 3. Brackets: Plated stamped steel. Provide size compatible with roller size.
 - a. Mounted to ceiling.
 - b. Mounted to wall.
 - c. Mounted to jamb.
 - d. Finish: Clear anodized.
 - 4. Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Minimum roller diameter 1.5 inches. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.
 - 5. Shade slat:
 - a. Closed pocket elliptical slat: 1 inch (25 mm) aluminum elliptical slat inside of a 1-5/8 inch (41 mm) pocket with heat sealed ends.

2.3 FABRIC

- A. Room Darkening Fabrics
 - 1. Butler Printing & Laminating Inc. Blackout Fabrics Collection: 4-Ply Laminated Fiberglass base textile with 100% Blackout Opacity with minimum tensile strength of 240 pounds for warp and 960 pounds for fill. Fire rating: NFPA 701 1006-Test 1, California U.S. Title 19. Environmental Benefits: Certified to GREENGUARD® and GREENGUARD Gold® standards for low chemical emissions into indoor air during product usage. REACH and RoHS compliant Lead Free. Bacterial and fungal

resistance: ASTM E2180, ASTM G21. Washable and stain resistant. Same color both sides. Opaque, .015 inches thick, 12 oz/square yard. 5 year warranty

B. Color and pattern: As selected by Architect and Owner from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.
- C. Install cord in accordance with all safety standards. Cord length shall be installed such that the bottom of cord will be at 5'-0" above floor when the shade is in the open position. Coordinate with Owner.

3.4 TESTING AND DEMONSTRATION

- A. Test window shades to verify that operating mechanism and other operating components are functional. Correct deficiencies.
- B. Demonstrate operation of shades to Owner's designated representatives.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 SCHEDULES

A. Refer to Drawings for shade types and locations.

END OF SECTION

EAST HARTFORD PUBLIC SCHOOLS GOVERNOR WILLIAM PITKIN ELEMENTARY SCHOOL

EXTERIOR DOOR & WINDOW REPLACEMENT AND HVAC UPGRADES

303 HILLS STREET, EAST HARTFORD, CONNECTICUT 06118



Thomas Anderson - Superintendent James Rovezzi - Assistant Director of Facilities **ISSUED FOR BID: NOVEMBER 29, 2023**

ENVIRONMENTAL ENGINEER FUSS & O'NEILL, INC.

146 HARTFORD ROAD MANCHESTER, CONNECTICUT 06040 Phone: (860) 783-4673



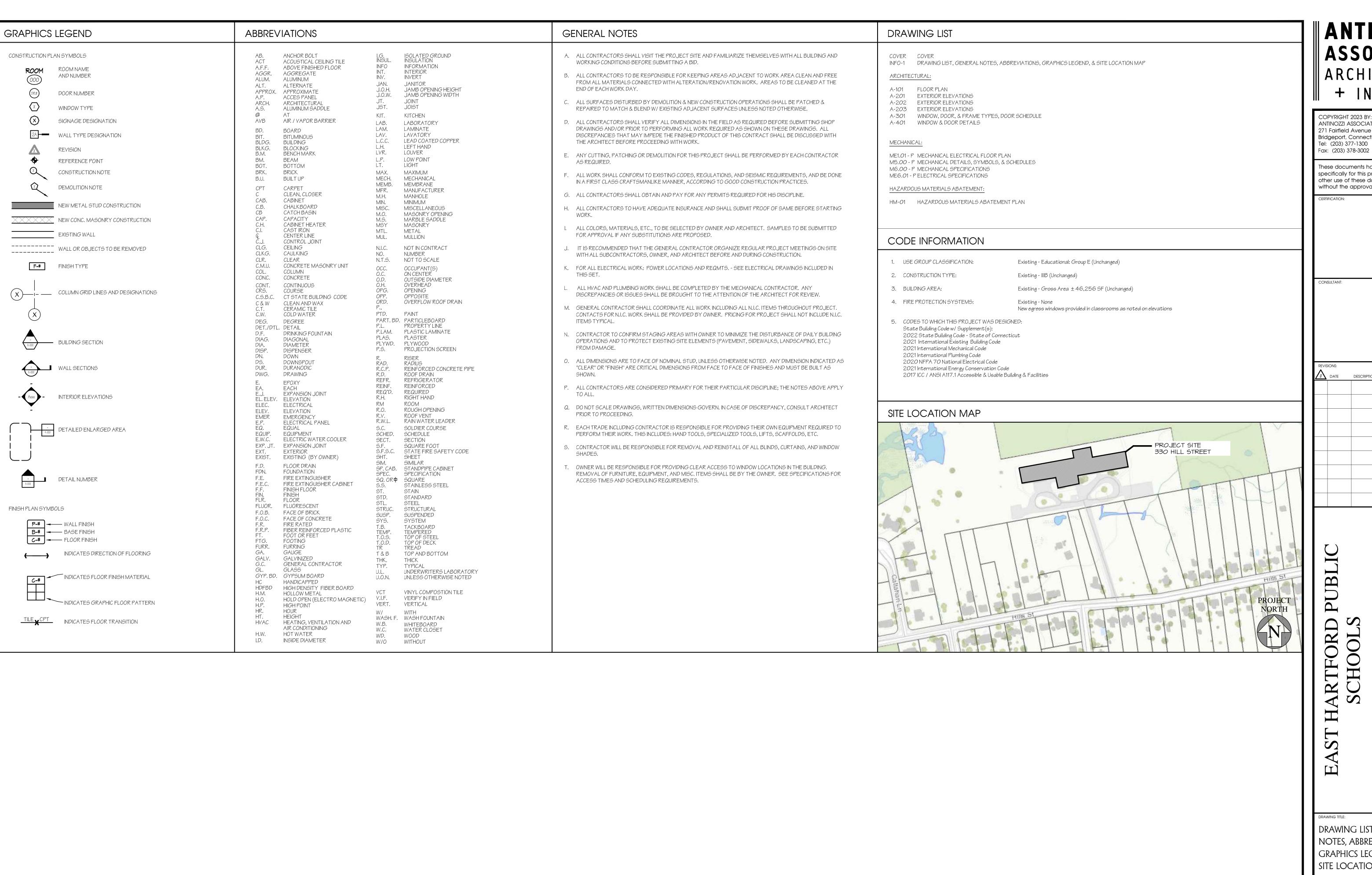
271 Fairfield Avenue Bridgeport, Connecticut 06604

TEL (203) 377-1300 FAX (203) 378-3002

www.antinozzi.com

M/E/P ENGINEER CONSULTING ENGINEERING SERVICES (CES)

> 811 MIDDLE STREET MIDDLETOWN, CONNECTICUT 06457 Phone: (860) 632-1682



ANTINOZZI ASSOCIATES ARCHITECTURE + INTERIORS

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DESCRIPTION

WILLIAM PITKIN I GOVERNOR EXTERIOR DC

Drawing List, General NOTES, ABBREVIATIONS, GRAPHICS LEGEND, SITE LOCATION MAP

as noted

NOVEMBER 29, 2023 | 22013

GENERAL DEMOLITION NOTES

SURFACES UNLESS OTHERWISE NOTED

- A. THESE NOTES ARE FOR INTENT PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL QUANTITIES OF ALL ITEMS AS REQUIRED TO COMPLETE THIS PROJECT AS SHOWN ON THE CONSTRUCTION DOCUMENTS.
- B. ALL SURFACES DISTURBED BY DEMOLITION & NEW CONSTRUCTION OPERATIONS MUST BE PATCHED & REPAIRED TO MATCH & BLEND W/ EXISTING ADJACENT
- C. ALL CUTTING, PATCHING & DEMOLITION REQUIRED BY ALL TRADES FOR THIS PROJECT IN EXISTING AREAS SHALL BE PERFORMED BY THE CONTRACTOR.
- D. DISCONNECT OR DISABLE ALL AFFECTED UTILITIES PRIOR TO COMMENCING WORK. ALL ABANDONED UTILITY LINES (PLUMBING, ELECTRICAL, DATA, ALARM) MUST CUT & CAPPED BELOW FLOOR LINE OR BEHIND WALL LINE. FLOOR OR WALL MUST BE FINISHED TO MATCH EXISTING ADJACENT SURFACES.
- E. CONTRACTOR TO CONFIRM STAGING AREAS WITH OWNER TO MINIMIZE THE DISTURBANCE OF DAILY BUILDING OPERATIONS AND TO PROTECT EXISTING SITE ELEMENTS (PAVEMENT, SIDEWALKS, LANDSCAPING, ETC.) FROM DAMAGE.
- F. REMOVE ALL EXISTING BLINDS/SHADES/CURTAINS AND BRACKETS AT ALL WINDOWS BEING REPLACED. TYPICAL.
- G. REMOVE ALL WINDOW AIR CONDITIONER UNITS, BRACKETS, AND ACCESSORIES COMPLETE. COORDINATE REMOVAL WITH OWNER. TURN OVER EXISTING AIR CONDITIONING UNITS TO OWNER.
- H. CAREFULLY REMOVE ANY EXISTING WIRING AND PLUGS AT WINDOW LOCATIONS AS REQUIRED FOR THE REMOVAL AND INSTALLATION OF WINDOWS. RE-INSTALL WIRING AND PLUGS ONCE NEW WINDOWS AND SILLS ARE INSTALLED. TYPICAL.
- I. REFER TO HAZARDOUS MATERIALS SHEETS FOR HAZARDOUS MATERIAL ABATEMENT AT DOOR AND WINDOW LOCATIONS.

DEMOLITION KEY NOTES

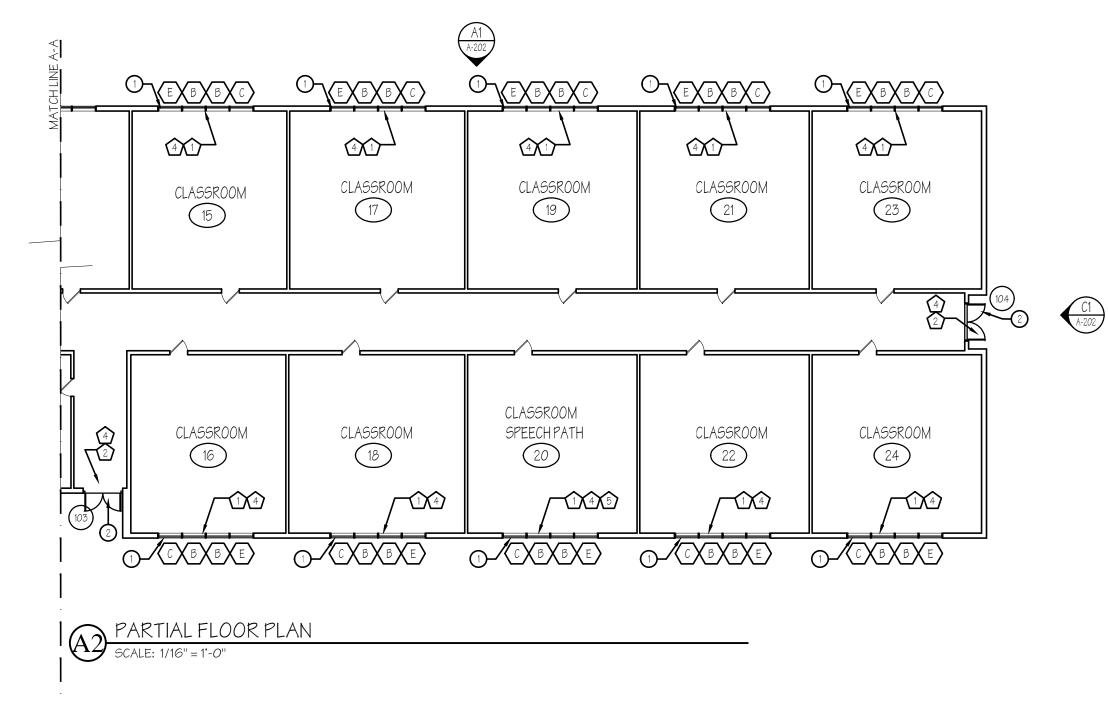
- REMOVE EXISTING ALUMINUM FRAME WINDOW ASSEMBLY, GLAZING, FASTENERS, BLOCKING, AND HARDWARE COMPLETE. REMOVE EXISTING SHADES/BLINDS AND ASSOCIATED HARDWARE COMPLETE. REMOVE EXISTING INTERIOR WINDOW SILL. CLEAN AND PREP EXISTING R.O. TO RECEIVE NEW WINDOW INSTALLATION IN THE SAME LOCATION.
- (2) REMOVE EXISTING DOOR, FRAME, SIDE-LITES, AND ASSOCIATED HARDWARE COMPLETE. CLEAN AND PREPEXISTING R.O. TO RECEIVE NEW FRAME AND DOOR INSTALLATION IN THE SAME LOCATION. EXISTING WIRING AND CONNECTIONS TO ENTRY DEVICES TO REMAIN FOR
- USE IN CONNECTION TO NEW DOORS. (3) CAREFULLY REMOVE EXISTING KILN DUCT FROM LOUVER. KILN DUCT TO BE RE-ATTACHED TO NEW DOOR LOUVER. COORDINATE WITH OWNER.
- CAREFULLY REMOVE LIMITED PORTION OF INTERIOR ACOUSTIC CEILING TILE AND ASSOCIATED GRID AS NEEDED FOR THE REMOVAL AND INSTALLATION OF DOORS, FRAMES, AND WINDOWS. RE-INSTALL ACOUSTIC CEILING AND GRID AFTER NEW DOOR AND FRAME INSTALLATION.
- REMOVE EXISTING AC WINDOW UNIT COMPLETELY. COORDINATE WITH OWNER.
- (6) EXISTING LOUVER VENT TO REMAIN. NOT IN SCOPE OF WORK.

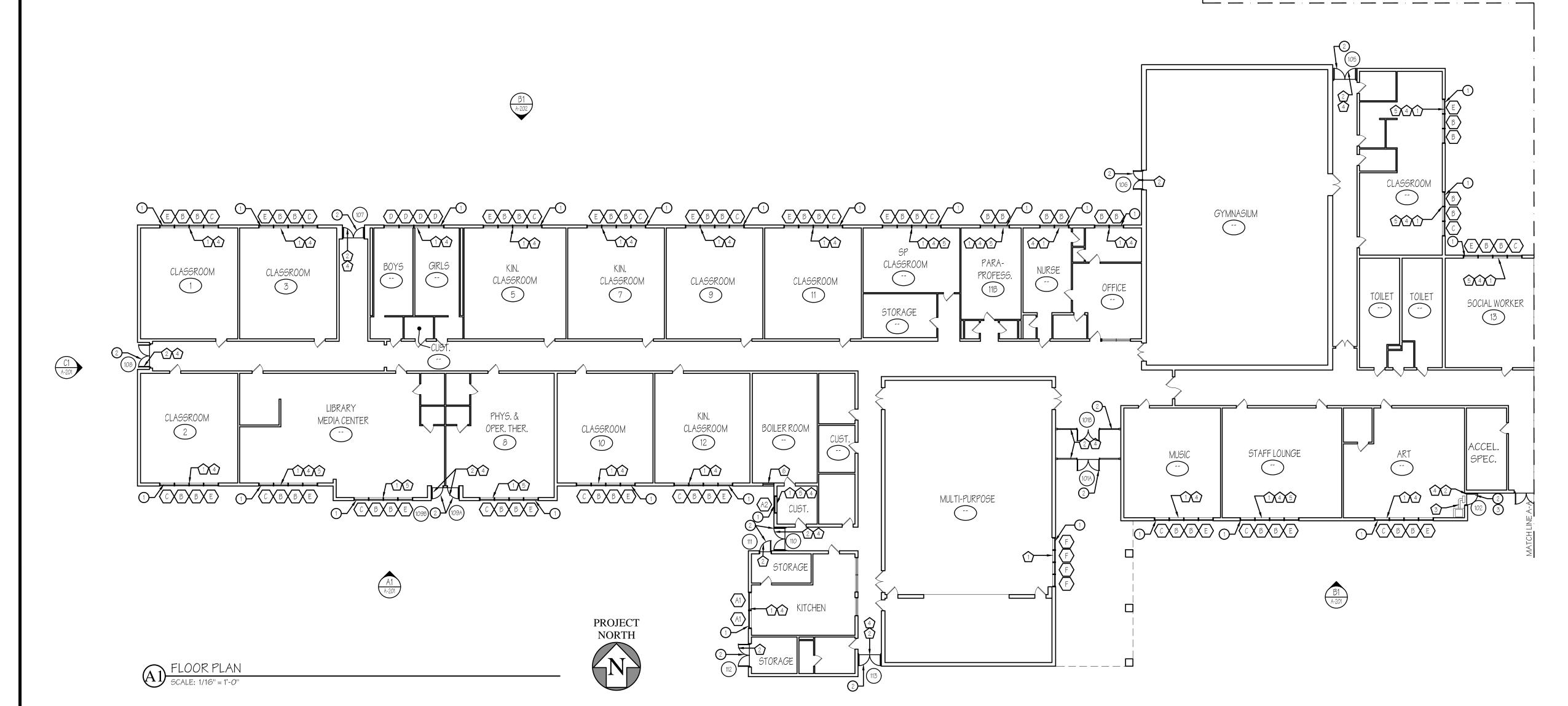
GENERAL CONSTRUCTION NOTES

- A. PATCH EXISTING FASTENER HOLES, VOIDS, AND CRACKS WITHIN THE EXISTING MASONRY OPENINGS FOLLOWING REMOVAL OF EXISTING WINDOWS. TYPICAL.
- B. PROTECT EXISTING METAL RADIANT HEAT UNIT ENCLOSURE BENEATH EXISTING WINDOWS. TYPICAL.
- C. ALL TOILET ROOMS SHALL HAVE OBSCURED GLAZING IN WINDOWS, TYPICAL.
- D. PROVIDE A LIMIT DEVICE FOR ALL OPERABLE WINDOWS. COORDINATE WITH OWNER.
- E. ALL WINDOWS SHALL HAVE PERMANENT VISIBLE NUMBERS AND/OR ROOM NAMES AFFIXED TO GLAZING. COORDINATE LOCATION AND NAMES/NUMBERS WITH OWNER.
- F. ALL DOORS SHALL HAVE PERMANENT VISIBLE NUMBERS AFFIXED. COORDINATE NUMBERS WITH OWNER.
- G. PROVIDE NEW SHADES PER SPECIFICATIONS AT ALL NEW WINDOWS, EXCEPT AT LAVATORIES AND BOILER ROOM.
- H. PROVIDE NEW FLOORING TO MATCH EXISTING AT DOOR THRESHOLD LOCATIONS WHERE NEW THRESHOLD DOES NOT COVER EXPOSED SUB-FLOOR. COORDINATE

CONSTRUCTION KEY NOTES

- 1 INSTALL WINDOW IN EXISTING OPENING. REFER TO BUILDING ELEVATIONS ON DRAWINGS A-201 A-203 FOR ADDITIONAL INFORMATION.
- 2 INSTALL DOOR IN EXISTING OPENING. REFER TO BUILDING ELEVATIONS ON DRAWINGS A-201 - A-203 FOR ADDITIONAL INFORMATION.
- (3) ATTACH EXISTING KILN DUCT TO NEW DOOR TRANSOM LOUVER.

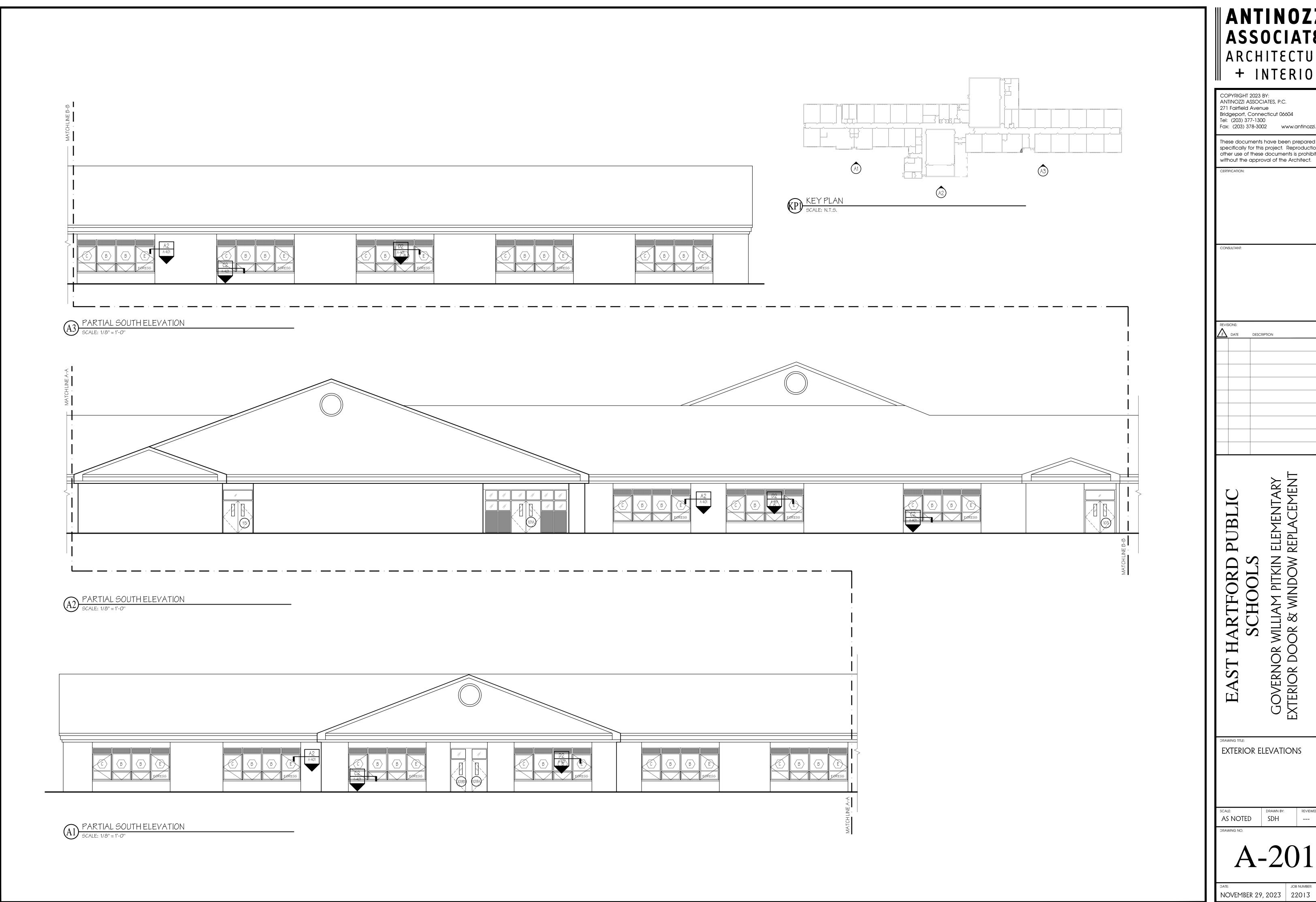




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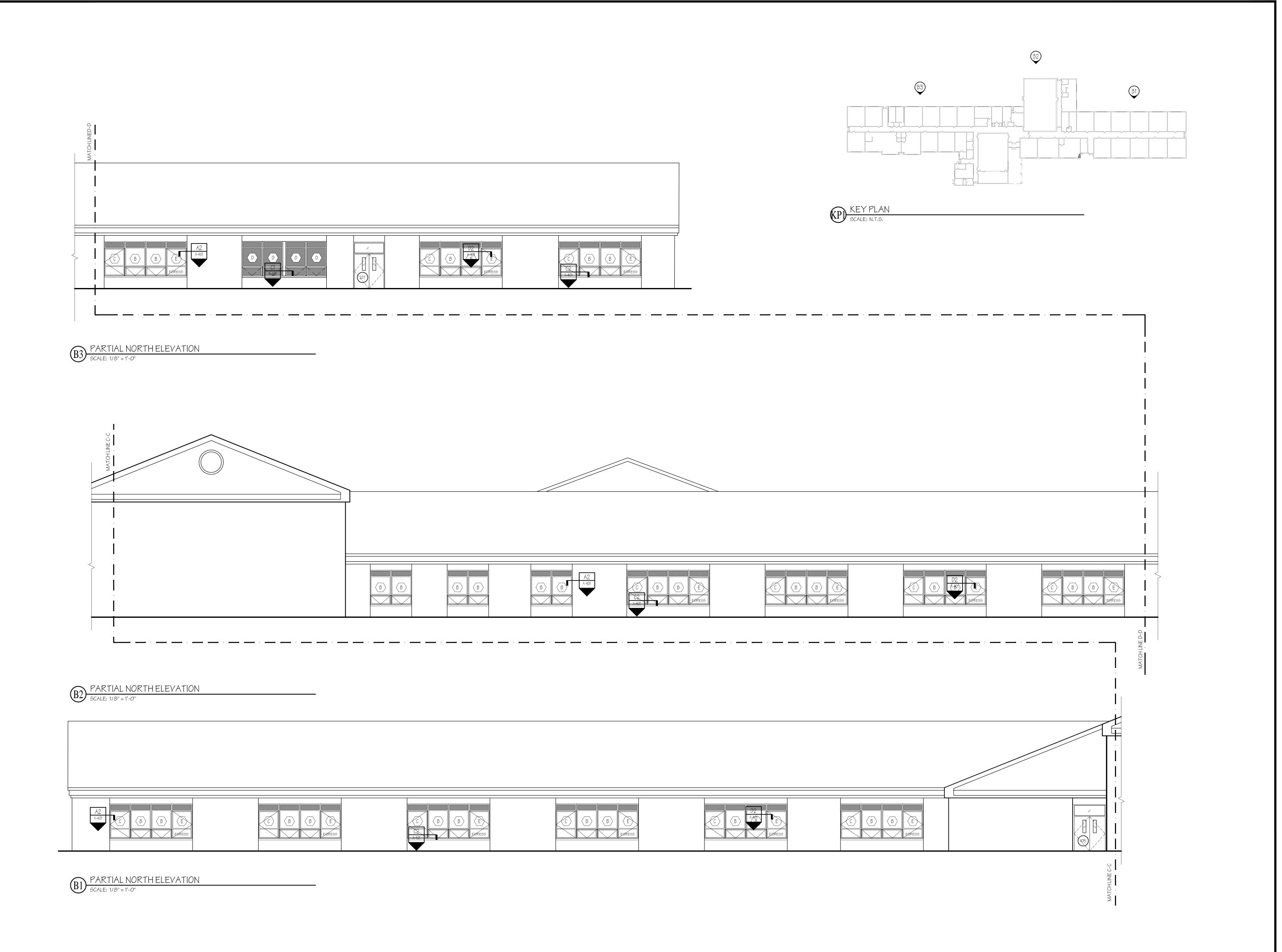
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EAST HARTFORD PUBLIC SCHOOLS	GOVERNOR WILLIAM PITKIN ELEMENTARY EXTERIOR DOOR & WINDOW REPLACEMENT	330 HILLS STREET. FAST HARTFORD, CONNECTICUT

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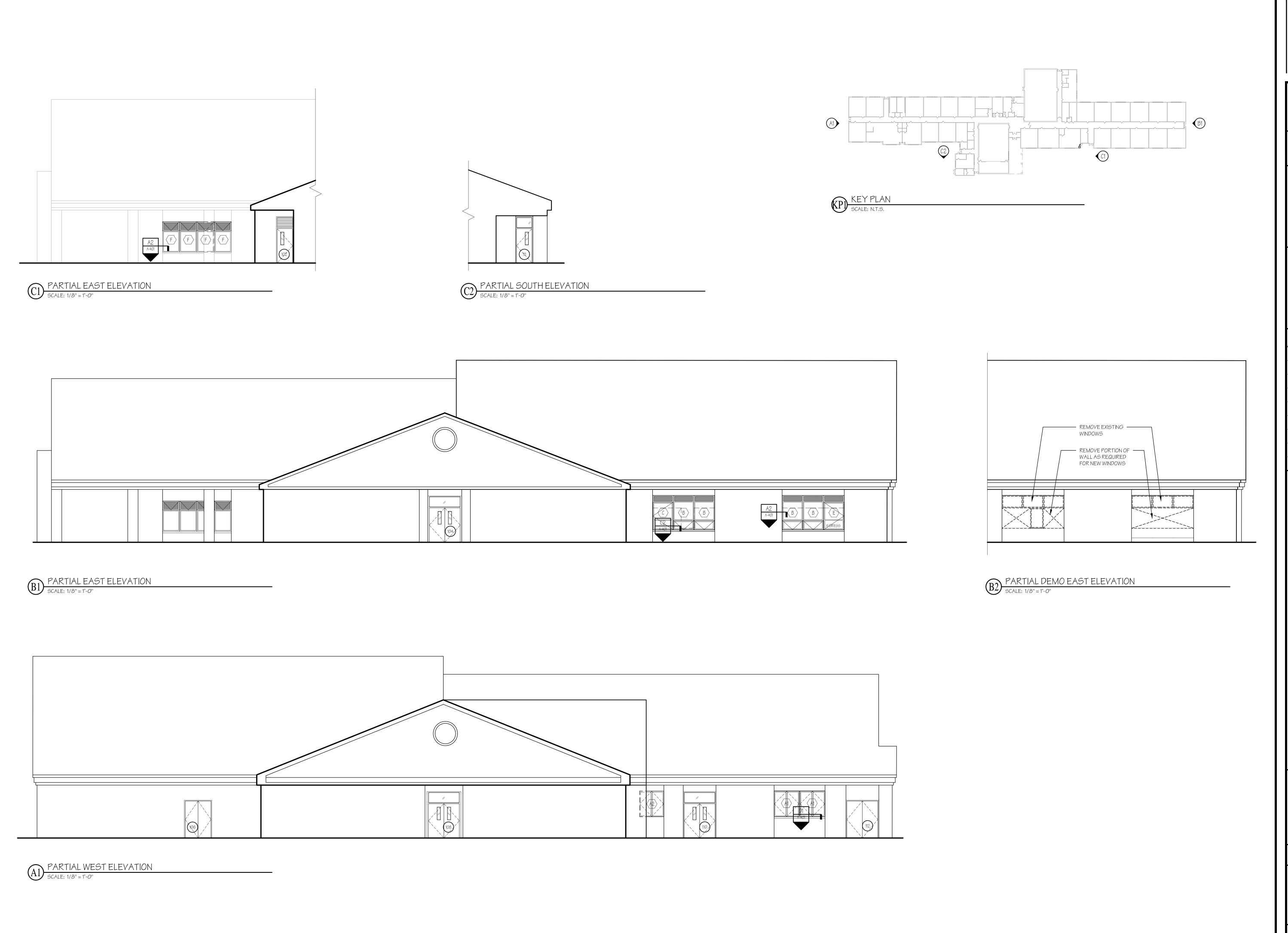


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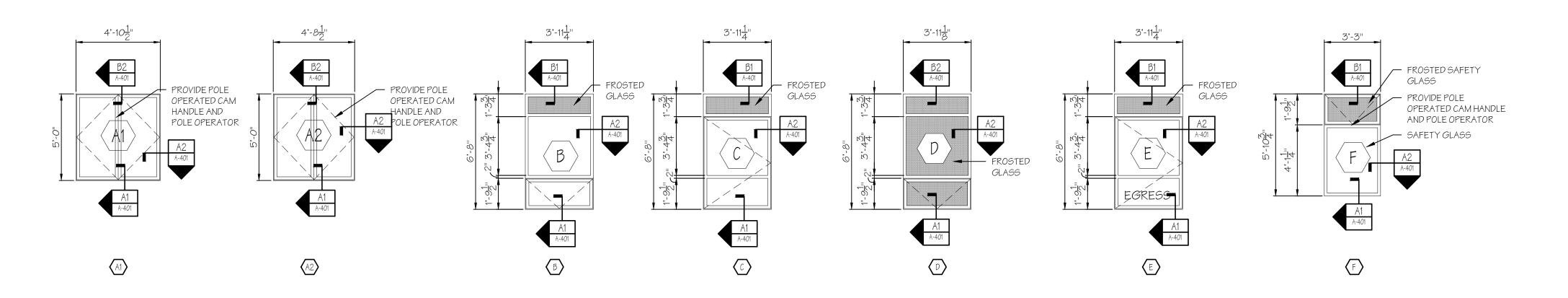
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EXTERIOR ELEVATIONS

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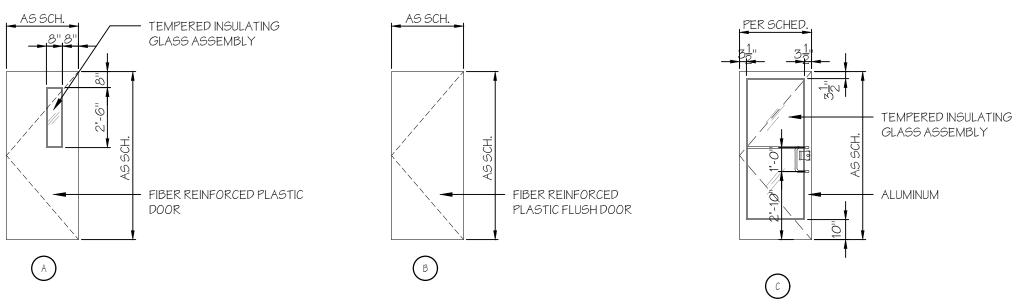
WINDOW ASSEMBLY NOTES

- 1. REMOVE ALL EXISTING WINDOW ASSEMBLIES SCHEDULED FOR REPLACEMENT -
- COMPLETE. 2. FIELD VERIFY ALL DIMENSIONS PRIOR TO STARTING WORK.
- 3. REMOVE WINDOW BLINDS, SHADES AND CURTAINS. INSTALL NEW SHADES AS SPECIFIED.
- 4. REMOVE AND REINSTALL ONE TYPICAL WINDOW TO EVALUATE EXISTING CONDITIONS WITH ARCHITECT AND BUILDING REPRESENTATIVE PRIOR TO ORDERING NEW WINDOWS.
- 5. ALL NEW BLOCKING TO BE PRESSURE TREATED.
- 6. PROVIDE SCREENS AT ALL OPERABLE WINDOW UNITS.
- 7. EXISTING GYPSUM BOARD TO BE PATCHED AND PAINTED AS REQUIRED FOR INSTALLATION OF NEW WINDOWS.
- 8. REMOVE AND RE-INSTALL SECURITY SYSTEM DEVICES AS REQUIRED.

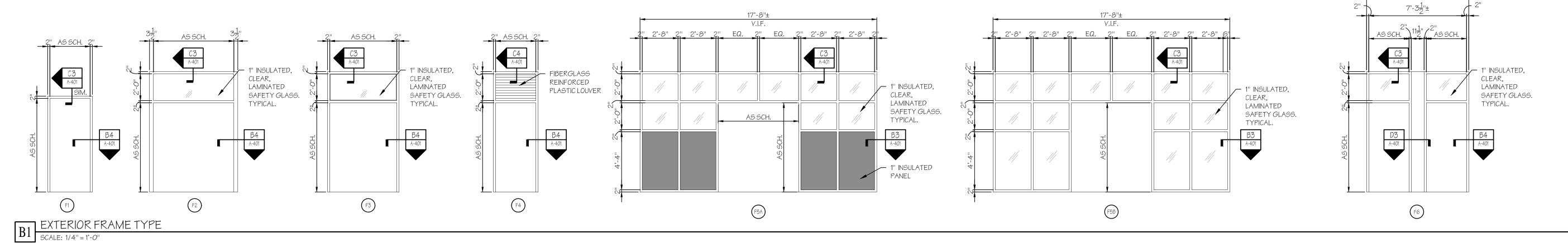
WINDOW IS INSTALLED.

- 9. SHIM WINDOW ASSEMBLIES AS REQUIRED WITHIN EXISTING OPENINGS. 10. TO ENSURE A WATERTIGHT SEAL AT EXTERIOR WINDOW UNIT HEAD AND JAMBS, BACK BED WITH SEALANT BEFORE THE WINDOW IS INSTALLED OR CAP SEAL AFTER THE
- 11. ALL WINDOWS TO HAVE PERMANENT, VISIBLE NUMBERS FOR EMERGENCY ACCESS ACCORDING TO LOCAL FIRST RESPONDER STANDARDS. MATCH EXISTING BUILDING
- STANDARD FOR SIGN TYPE.
- 12. LIMIT STOPS FOR OPERABLE WINDOWS SHALL BE 3 3/4"
- 13. WINDOWS SHALL BE DESIGNED TO MEET IBC 2021 CODE REQUIREMENTS FOR WIND LOADS. SEE SPECIFICATIONS. CONTRACTOR TO SUBMIT SIGNED AND SEALED BY CT PE SHOP DRAWINGS, CALCULATIONS, AND FASTENING PATTERNS. TYPICAL.

D1 ALUMINUM FRAME WINDOW TYPES SCALE: 1/4" = 1'-0"



EXTERIOR DOOR TYPE



GENERAL DOOR AND HARDWARE NOTES

- 1. REMOVE ALL EXISTING DOORS, FRAMES, & HARDWARE ASSEMBLIES SCHEDULED FOR
- REPLACEMENT COMPLETE.
- 2. FIELD VERIFY ALL DIMENSIONS PRIOR TO STARTING WORK. 3. ALL HARDWARE SHALL MEET ADA STANDARDS. G.C. SHALL PROVIDE ALL HARDWARE (U.O.N.) INCLUDING CONSTRUCTION CYLINDERS. FINAL CYLINDERS TO MATCH EXISTING
- BUILDING STANDARD COORDINATE WITH OWNER. 4. ALL NEW HARDWARE COMPONENTS MUST BE COMPATIBLE WITH EXISTING ELECTRONIC
- ACCESS SYSTEM.
- 5. ALL DOORS EXITING 100 OR MORE PERSONS SHALL HAVE PANIC EXIT DEVICES.
- 6. SEE SPECIFICATIONS FOR ADDITIONAL DOOR AND HARDWARE INFORMATION. 7. ALL REMOVABLE MULLIONS SHALL BE KEY OPERATED.
- 8. INSULATED SAFETY GLASS PANELS REQUIRED AT ALL EXTERIOR DOORS WITH GLAZING. 9. AT NON-FIRE-RATED EGRESS DOORS, CLOSERS SHALL BE ADJUSTABLE AND SET SO NO MORE THAN 5 POUNDS OF FORCE IS NEEDED TO OPEN OR CLOSE THE DOOR.
- 10. EXISTING GYPSUM BOARD TO BE PATCHED AND PAINTED AS REQUIRED FOR
- INSTALLATION OF NEW FRAMES AND DOORS.
- 11. REMOVE AND RE-INSTALL SECURITY SYSTEM DEVICES AS REQUIRED. 12. SHIM DOOR FRAME ASSEMBLIES AS REQUIRED WITHIN EXISTING OPENINGS.
- 13. TO ENSURE A WATERTIGHT SEAL AT EXTERIOR DOOR FRAME HEAD AND JAMBS, BACK BED WITH SEALANT BEFORE THE FRAME IS INSTALLED OR CAP SEAL AFTER THE FRAME IS INSTALLED.
- 14. ALL EXTERIOR DOOR OPENINGS TO HAVE PERMANENT, VISIBLE NUMBERS FOR EMERGENCY ACCESS ACCORDING TO LOCAL FIRST RESPONDER STANDARDS. MATCH EXISTING BUILDING STANDARD FOR SIGN TYPE.
- 15. ELECTRONIC HINGES AND HARDWARE SHALL ALL BE ON THE RIGHT SIDE (VIEWED FROM EXTERIOR).

																						000)R	SC	HE	DUI	LE																						
		DO	OOR							FRAME																						HAR	DWAF	Œ											/	ABBRE	EVIATIONS		
DOORNO.			НЕІОНТ	DOOR TYPE DOOR MATERIAL	SOOR FINISH	ER AMETYPE	XXXIII	FRAME MATERIAL	-KAME FINISH	JAMB DETAIL (SEE FRAME TYPE U.O.N.)	HEAD DETAIL (SEE FRAME TYPE U.O.N.)		FIRE CATINO		XIT HARDWAR	PANIC KELEASE LATCH A POSITIVE LATCHING	ATIC CLOSE		Š	FVFR HANDLES		TACTILE WARNING ON HANDLE	THRESHO	PUSH/PULL HARDWARE	PASSAGE LATCH SET	LOCKSET (CLASSROOM)	LOCKSEI (PRIVACY)	CKSEI (SIOKI	COKKSET (OFFICE)	CONCEALED EDGE FULL	DEADLOCK	BALLISTIC RATED DOORS, GLASS, AND FRAME	TOMATIC DOOR OPENER	HINGES	CONTINUOUS HINGE	CONCEALED HINGES	ELECTRIC STRIKE	ELECTRO MAGNETIC LOCK (FAIL SAFE)	2	IE DOC	OVERHEAD DOOR STOP	WALL MOUNTED DOOR STOP	ELECTRIC CARD READER	DPIFC	APPLE (ACCEDUINE ALUMINOM) H H W S S S S N H O		ALUMINUM FIBER REINFO GALVANIZED GLASS HOLLOW MET WOOD SIMILAR STAINLESS S STAIN STEEL METAL PAINT FACTORY COMM	AL	
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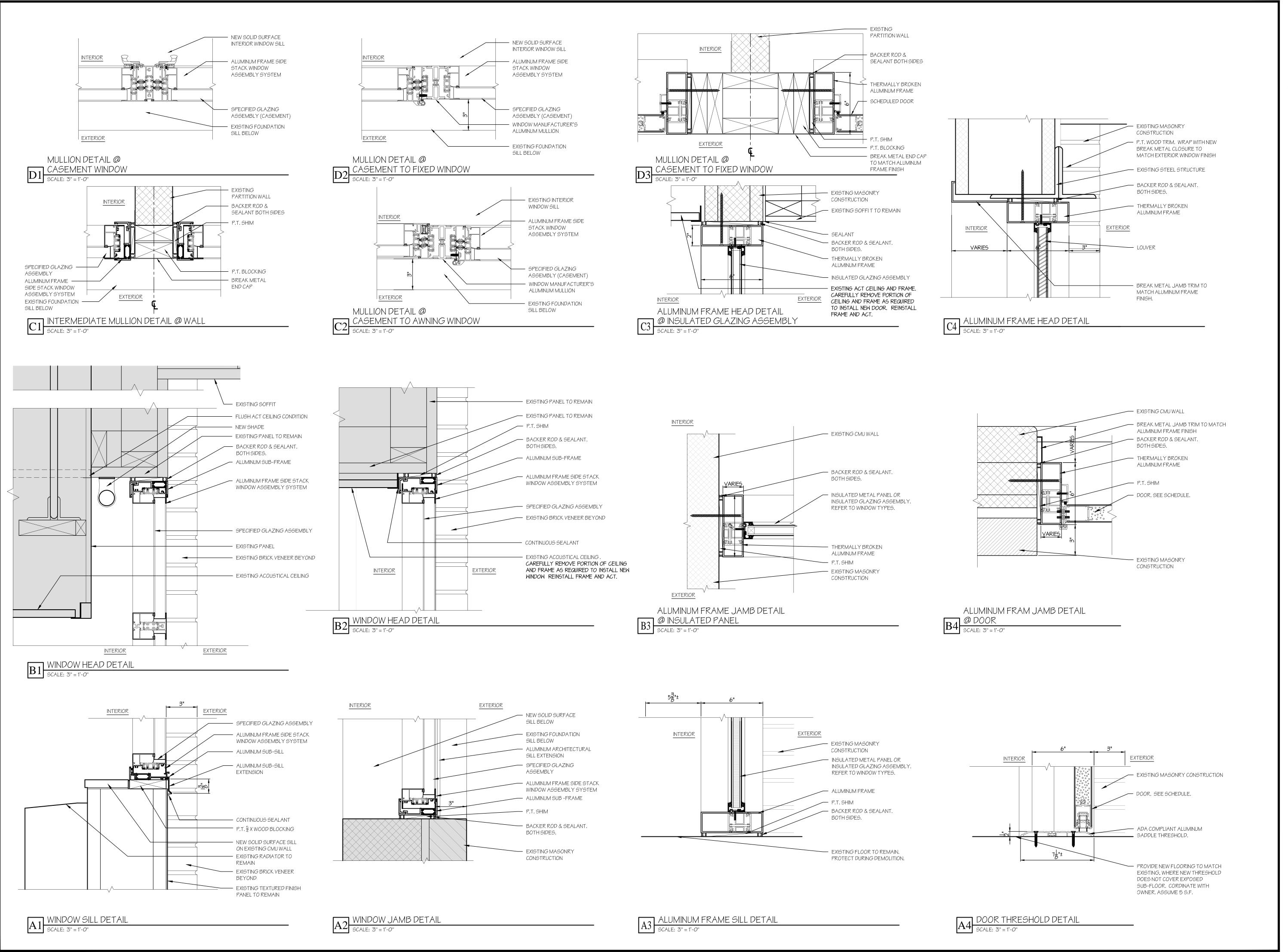
REVIS	NOVIC.	
#	DATE	DESCRIPTION
	01-27-23	ADDENDUM AND RFI INFORMATION INCORPORATED INTO CD'S

GOVERNO XTERIOR

WINDOW TYPES & Frame Elevations SCHEDULES

AS NOTED

NOVEMBER 29, 2023 | 22013



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REVISIONS:

DATE DESCRIPTION

SCHOOLS

NOR WILLIAM PITKIN ELEMENTARY

R DOOR & WINDOW REPLACEMENT

EAST

GOVERNO

EXTERIOR I

SCALE: DRAWN BY: REVI AS NOTED SDH PA DRAWING NO.

A-401

NOVEMBER 29, 2023 22013

	Location: BOILER ROOM Supply From: EXISTING Mounting: Surface Enclosure: Type 1				Volts: hases: Wires:	3	8 Wye		ı		A.I.C. Rating: 10 KAIC Bus Material: CU Bus Rating: 400 A ICB Rating / MLO: 400A MCB				
СКТ	Circuit Description	Trip	Poles	,	A	E	3	(Poles	Trip	Circuit Description	скт		
1	EXISTING LOAD	50 A	3	0.00	0.00					3	80 A	EXISTING LOAD	2		
3						0.00	0.00						4		
5								0.00	0.00				6		
7	EXISTING LOAD	20 A	2	0.00	0.00					3	80 A	EXISTING LOAD	8		
9						0.00	0.00						10		
11	EXISTING LOAD	40 A	3					0.00	0.00				12		
13				0.00	0.00					3	80 A	EXISTING LOAD	14		
15						0.00	0.00						16		
17	EXISTING LOAD	40 A	3					0.00	0.00				18		
19				0.00	0.00					3	60 A	EXISTING LOAD	20		
21						0.00	0.00						22		
23	CU-1	40 A	2					3.00	0.00				24		
25				3.00	0.00					2	20 A	EXISTING LOAD	26		
27	HP-1 / HP-2	20 A	2			0.09	0.00						28		
29								0.09	0.00	1	20 A	EXISTING LOAD	30		
31	SPACE		1		0.00					2	20 A	EXISTING LOAD	32		
33	SPACE		1				0.00						34		
35	SPACE		1						0.00	1	20 A	EXISTING LOAD	36		
37	SPACE		1		0.00					1	20 A	EXISTING LOAD	38		
39	SPACE		1							1		SPACE	40		
41	SPACE		1							1		SPACE	42		
		Phase	Load:	3.00	kVA	0.09	kVA	3.09	kVA						
		Phase			7 A	3.0		29.							
lotes:			Load: Amps:	6.17 17.	kVA			I		1					

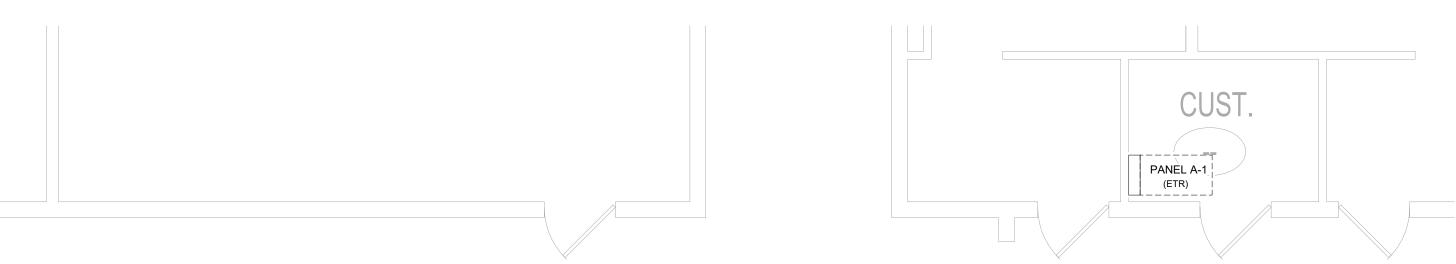
	Location: CUST. Supply From: EXISTING Mounting: Surface Enclosure: Type 1					Volts: hases: Wires:	_	8 Wye				A.I.C. Rating: 10 KAIC Bus Material: CU Bus Rating: 225 A Rating / MLO: MLO	
СКТ	Circuit Description	Trip	Poles	,	4	E	3	C	;	Poles	Trip	Circuit Description	СКТ
1	EXISTING LOAD	20 A	1	0.00	0.00					1	20 A	EXISTING LOAD	2
3	EXISTING LOAD	20 A	1			0.00	0.00			1	20 A	EXISTING LOAD	4
5	EXISTING LOAD	20 A	1					0.00	0.00	1	20 A	EXISTING LOAD	6
7	EXISTING LOAD	20 A	1	0.00	0.00					1	20 A	EXISTING LOAD	8
9	EXISTING LOAD	20 A	1			0.00	0.00			1	20 A	EXISTING LOAD	10
11	EXISTING LOAD	20 A	1					0.00	0.00	1	20 A	EXISTING LOAD	12
13	EXISTING LOAD	20 A	1	0.00	0.00					1	20 A	EXISTING LOAD	14
15	EXISTING LOAD	20 A	1			0.00	0.00			1	20 A	EXISTING LOAD	16
17	EXISTING LOAD	20 A	1					0.00					18
19	CU-1 OUTDOOR RECEPTACLE	20 A	1	0.18									20
21										1		SPACE	22
23										1		SPACE	24
25	SPACE		1							1		SPACE	26
27	SPACE		1							1		SPACE	28
29	SPACE		1					-		1		SPACE	30
		Phase	Load:		kVA	0.00	kVA	0.00	kVA				
		Phase			5 A	0	Α	0	A				
			Load:		kVA								
Notes:		Total	Amps:	0.8	5 A								

- REFER TO DRAWING M5.00 FOR EQUIPMENT SCHEDULE AND DRAWING M5.00 FOR EQUIPMENT SYMBOLS, LEGENDS, AND ABBREVIATIONS.
- PROVIDE FIRE STOPPING AND SMOKE BARRIER SEALING OF ALL PENETRATIONS THROUGH FIRE WALLS OR SMOKE BARRIERS AS REQUIRED. REFER TO ARCHITECTURAL FLOOR PLANS AND CODE SHEETS FOR WALLS.
- PROVIDE 1" CONDENSATE PIPE FROM EACH HEAT PUMP (HP). CONDENSATE SHALL SPILL TO GRADE AND BE TERMINATED 12" ABOVE GRADE.
- 4. SEE SCHEDULE ON M5.00 FOR REFRIGERANT PIPE SIZES.
- 5. FINAL THERMOSTAT LOCATIONS TO BE APPROVED BY OWNER PRIOR TO INSTALLATION.

KEYNOTES - MECHANICAL

Key Value GRADE MOUNTED CONDENSING UNIT, PROVIDE HOUSEKEEPING PAD AND SUPER STANDS TO ELEVATE UNIT MINIMUM 12" ABOVE GRADE. COORDINATE FINAL LOCATION WITH OWNER PRIOR TO INSTALLATION. 1-1/4" CONDENSATE DRAIN TO SPILL TO GRADE. TERMINATE 12" ABOVE GRADE.

	ELECTRICAL SYMBOLS
SYMBOL	DESCRIPTION
	SURFACE MOUNTED PANELBOARD
	HOMERUN TO PANELBOARD
 GFI	DUPLEX RECEPTACLE WITH GROUND FAULT CIRCUIT INTERRUPTION
₩P	DUPLEX RECEPTACLE WITH WEATHERPROOF COVER

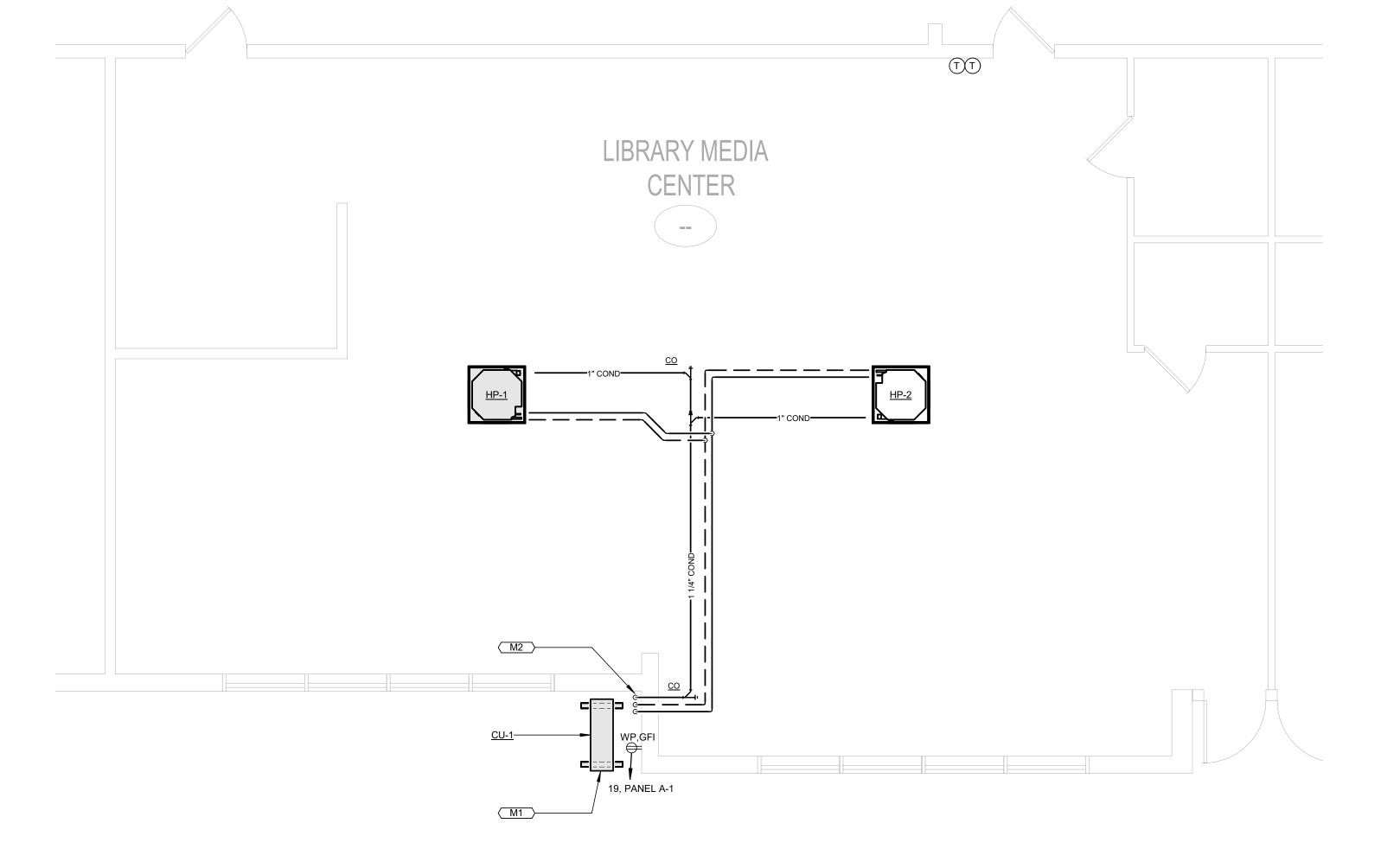


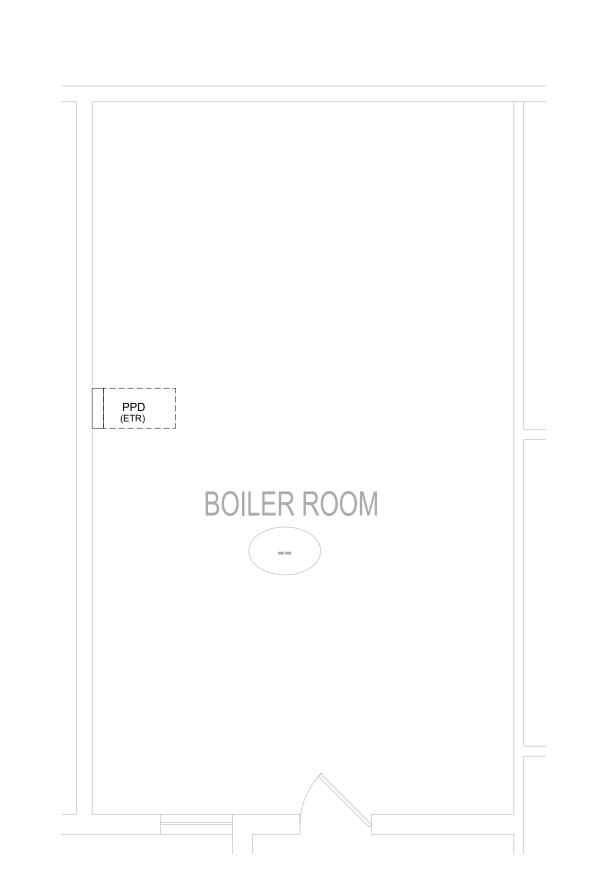
						M	ОТО	R / EQI	UIPM	ENT CI	RCUIT S	CHEDULE			
FOLUDATAT	OCDD	DANIEL			LOAD			LOCAL		MOTOR STA	RTER	MIDING	DEMARKO		
EQUIPMENT	OCPD	PANEL	HP	MCA	KW	PH	VOLT	DISC. SW	SIZE	TYPE LOCATION	WIRING	REMARKS			
HP-1	20A-2P	PANEL PPD	-	0.54	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	WIRE HP-1 AND HP-2 TOGETHER TO A 20A-2P CIRCUIT BREAKER IN PANEL INDICATED		
HP-2	20A-2P	PANEL PPD	-	0.54	-	1	208	30A-2P	-	SPC	-	2#12, #12G, 3/4"C	WIRE HP-1 AND HP-2 TOGETHER TO A 20A-2P CIRCUIT BREAKER IN PANEL INDICATED		
CU-1	40A-2P	PANEL PPD	-	36	-	1	208	60A-2P	-	SPC	-	2#8, #10G, 1"C	-		
OFNEDAL NOTEO									-	•			-		

- GENERAL NOTES:

 1. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE AND SHALL BE LOCATED AT EQUIPMENT LOCATION UNLESS OTHERWISE NOTED. ABBREVIATIONS:

 - ADDREVIATIONS.
 MAN: MANUAL STARTER (TOGGLE SWITCH WITH THERMAL OVERLOADS)
 DIV.23: EQUIPMENT FURNISHED BY DIVISION 23 HVAC CONTRACTOR
 SPC: SINGLE POINT CONNECTION (STARTERS INTEGRAL TO EQUIPMENT). COORDINATE EXACT POINT OF CONNECTION IN FIELD. OVERCURRENT PROTECTION DEVICES (OCPD) SHALL BE MOLDED CASE CIRCUIT BREAKERS UNLESS NOTED WITH AN "F" FOR FUSE.
- DISCONNECT SWITCHES AND STARTERS SHALL BE NEMA 3R RATED WHEN LOCATED OUTSIDE.
- REFER TO MECHANICAL PLANS FOR EXACT LOCATIONS OF EQUIPMENT. 6. STARTERS SHALL BE SQUARE D CLASS 8536 OR APPROVED EQUAL.





3 PITKIN MECHANICAL MAIN LEVEL FLOOR PLAN - BOILER ROOM
1/4" = 1'-0"



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EAST HARTFORD PUBLIC

MECHANICAL **ELECTRICAL** FLOOR PLAN

ME1.01-P

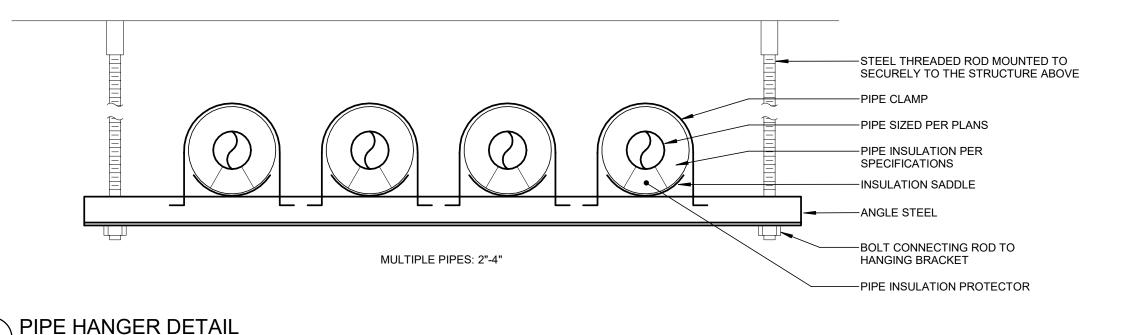
22013

29 NOV. 2023

1 PITKIN MECHANICAL MAIN LEVEL FLOOR PLAN - AREA A

				VARIA	BLE RE	FRIGE	RANT	FLOW	(VRF)	COMP	RESS	OR UNI	T SCH	IEDULI	Ē					
	GENERAL			PHYSICAL				Р	ERFORMAN	CE				ELEC	TRICAL			REM	ARKS	
			COMPF	RESSORS				COOLING		HEA	TING	SOUND								
TAG	MANUFACTURER	MODEL	INVERTER	CONSTANT	WEIGHT (LBS)	NOMINAL TONS	MBH	EER	SEER	МВН	COP	PRESS. (dBA)	MCA	МОР	VOLTAGE	PHASE	TYPE	RATINGS	FEATURES	INSTALL
CU-1	MITSUBISHI	MXZ-SM48NAMHZ-U1	1	-	278	4.0	48.0	13.1	23.0	54.0	4.0	54	36.0	44	208	1	1	1,2	1	-
	REMARKS	- TYPE		•	RE	MARKS - RA	TINGS	•			REMA	RKS - FEATU	RES				REMAR	KS - INSTALL		•
	RECOVERY (SIMULTAN LING) HEAT PUMP, SCRO		R-410A		MBH AT 70	0°F EDB, 67°I 0°F EDB, 47°F LEVELS PER	ODB, 43°F	OWB.	1.	HEATING TO	O 2.3°F ODE	3			1					

					VRI	F FAN	COIL S	CHED	ULE								
		GENERAL					PERFO	RMANCE				ELECTRICAI	L		REM	ARKS	
						NET	NET	F	AN	SOUND							
TAG	MANUFACTURER	MODEL	LOCATION	COMP. UNIT	NOMINAL TONS	COOLING MBH	HEATING MBH	CFM	ESP (IN WG)	PRESS. (dBA)	MCA	VOLTAGE	PHASE	TYPE	RATINGS	FEATURES	INSTALL
HP-1	MITSUBISHI	PLFY-EP24NEMU-ER1	SEE FLOOR PLAN	CU-1	2.00	24.0	27.0	812	-	34	0.54	208	1	1	1	1	1
HP-2	MITSUBISHI	PLFY-EP24NEMU-ER1	SEE FLOOR PLAN	CU-1	2.00	24.0	27.0	812	-	34	0.54	208	1	1	1	1	1
	REMARKS -	- TYPE		REMARKS	- RATINGS	•			REMARK	(S - FEATUR	ES			REN	IARKS - INS	TALL	
1. CEILII	NG CASSETTE		COOLING MBH HEATING MBH					BLUE DIAM	/ITH CONDE OND (ADVAN I RESERVOII	NCED) MINI	CONDENSA		REFRIGE		PIPING BET	QUID AND 5/8 WEEN FAN C	



GENERAL NOTES

- GENERAL NOTES, SYMBOLS AND DETAILS ARE APPLICABLE TO DRAWINGS WITHIN DIVISION
- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AND AS REQUIRED BY CODES.
- DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO INDICATE CAPACITY, SIZE, APPROXIMATE LOCATION AND GENERAL ARRANGEMENT. COORDINATE LOCATIONS OF
- COORDINATE ROOF AND WALL PENETRATIONS WITH WORK OF OTHER SECTIONS AND WITH FLASHING REQUIREMENTS. COORDINATE SLAB PENETRATIONS WITH WORK OF OTHER
- RUN DUCTS AND PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE NOTED.
- INSTALL SENSORS (TEMPERATURE, HUMIDITY, CO2, THERMOSTATS) AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY ARCHITECT. MOUNTING HEIGHT AFF SHALL COMPLY WITH ADA AND SHALL BE MOUNTED LEVEL WITH ADJACENT SWITCHES (IE LIGHT SWITCHES).
- COORDINATE WORK OF THIS SECTION WITH THAT OF OTHER SECTIONS AND WITH ALL TRADES INVOLVED. PROVIDE OFFSETS IN PIPING AND DUCTS (INCLUDING DIVIDED DUCTS) AND TRANSITIONS AROUND OBSTRUCTIONS.
- NOT ALL ACCESS DOORS HAVE BEEN SHOWN ON THE PLANS. PROVIDE ACCESS PANELS THROUGH BUILDING ASSEMBLIES TO SERVICE AND MAINTAIN EQUIPMENT UNLESS SUCH EQUIPMENT IS INSTALLED IN EXPOSED LOCATIONS OR ABOVE LAY-IN CEILINGS. COORDINATE THE LOCATION OF ACCESS DOORS AND PANELS AND VERIFY THE QUANTITY, SIZE, AND LOCATIONS AFTER THE SYSTEMS AND EQUIPMENT REQUIRING ACCESS HAVE BEEN INSTALLED AND PRIOR TO THE CLOSURE OF THE AFFECTED CEILINGS AND BUILDING ASSEMBLIES. SUBMIT ACCESS PANEL LOCATIONS FOR REVIEW.
- AT SUBSTANTIAL COMPLETION, THE FOLLOWING ITEMS, NEW OR EXISTING, SHALL BE FULLY AND REASONABLY ACCESSIBLE: HVAC CONTROL BOXES, JUNCTION BOXES, VALVES, DDC CONTROL BOXES, ELECTRICAL PANELS, FILTERS, BELTS, WATER COILS, DISCONNECT SWITCHES AND ELEMENTS OF EQUIPMENT REQUIRING MAINTENANCE. "FULLY AND REASONABLY ACCESSIBLE" SHALL BE DEFINED AS NATIONAL ELECTRIC CODE REQUIRED CLEARANCE FOR POWERED EQUIPMENT AND CAPABLE OF BEING ACCESSED OR SERVICED WITHOUT REMOVING, MODIFYING OR DISTORTING OTHER COMPONENTS OF THE WORK. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCE FOR ALL EQUIPMENT.
- 0. SUPPORT EQUIPMENT, PIPING, AND DUCTWORK FROM BUILDING STRUCTURE OR WITH STEEL SUPPORTS AND PLATFORMS AS REQUIRED. PROVIDE VIBRATION ISOLATION FOR ROTATING EQUIPMENT, DUCTWORK, AND PIPING IN ACCORDANCE WITH THE SPECIFICATIONS.
- 1. ROOF CURB AND RAIL HEIGHTS INDICATED ARE THE DIMENSIONS BETWEEN THE ROOF SURFACE AND THE TOPS OF THE CURBS AND RAILS. WHERE THE ROOF IS PITCHED, CONSTRUCT CURBS AND RAILS SUCH THAT THE BOTTOM PITCHES WITH THE ROOF AND THE
- 12. CONTROL WIRING METHODS SHALL COMPLY WITH NEC, AND DIVISION 26 SPECIFICATIONS.
- 13. VERIFY EQUIPMENT CONNECTIONS WITH MANUFACTURER'S DRAWINGS. VERIFY AND PROVIDE FITTINGS TO TRANSITION TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE DIMENSIONS BEFORE FABRICATION.
- 14. PERFORM PRESSURE AND LEAKAGE TESTS BEFORE INSULATING DUCTWORK AND PIPING
- 5. COORDINATE AND PROVIDE HOUSEKEEPING PADS FOR FLOOR-MOUNTED MECHANICAL EQUIPMENT. HOUSEKEEPING PADS SHALL BE REINFORCED CONCRETE WITH 1" CHAMFERED EDGES, 6" THICK, WITH MINIMUM CLEARANCE OF 6" FROM EQUIPMENT BASE TO EDGE OF PAD. INCREASE DEPTH WHERE REQUIRED FOR PROPER INSTALLATION OF EQUIPMENT, INCLUDING BUT NOT LIMITED TO CONDENSING BOILERS (TO ALLOW PROPER INSTALLATION OF NEUTRALIZATION EQUIPMENT AND GRAVITY DISCHARGE TO FLOOR DRAIN OR CONDENSATE PUMP) AND AHU (TO ALLOW INSTALLATION OF CONDENSATE TRAP).
- 16. MAINTAIN 6'-8" CLEARANCE TO THE UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ROUTES IN MECHANICAL ROOMS. MAINTAIN 3'-0" WIDE MEANS OF EGRESS IN MECHANICAL ROOMS.
- 7. MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND, AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT, SHALL BE FURNISHED BY THE
- 18. AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT AND ROOFTOP UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET WITH P-TRAP, P TRAP ARRANGEMENT SHALL BE BASED ON THE UNIT (NEGATIVE OR POSITIVE PRESSURE).
- 19. INSTALL UNITS WITH CLEARANCE FOR SERVICE AS REQUIRED BY THE MANUFACTURER.

CONTROLS LEGEND
DESCRIPTION
THERMOSTAT - STAND ALONE
TEMPERATURE SENSOR

	TAG SYMBOLS
EQUIPMENT	TAG-#

FIRESTOPPING GENERAL NOTES

PROVIDE FIRE STOPPING AND SMOKE BARRIER SEALING OF PENETRATIONS THROUGH FIRE OR SMOKE WALLS, BARRIERS AND PARTITIONS AS REQUIRED TO MAINTAIN RATING. REFER TO ARCHITECTURAL FLOOR PLANS AND CODE SHEETS FOR WALL RATINGS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

VRF GENERAL NOTES

- VRF GENERAL NOTES:

 1. MANUFACTURER MUST BE CERTIFIED, LISTED, AND LABELED PER AHRI 1230.
- MANUFACTURER MUST MEET MINIMUM EFFICIENCIES AND PERFORMANCE EQUAL TO OR
- GREATER THAN THE BASIS OF DESIGN. SUBMITTED PERFORMANCE DATA MUST BE FULLY DE-RATED FOR ALL COMPONENTS AND
- CONNECTION RATIO, DESIGN CONDITIONS (TEMPERATURE DB/WB), AND COIL COATINGS. PROVIDE ALL CONTROL WIRING NECESSARY FROM THE OUTDOOR UNIT, INDOOR UNIT, CONTROLLER/THERMOSTAT, AND CONTROLS ASSOCIATED WITH THE SYSTEM IN ORDER TO

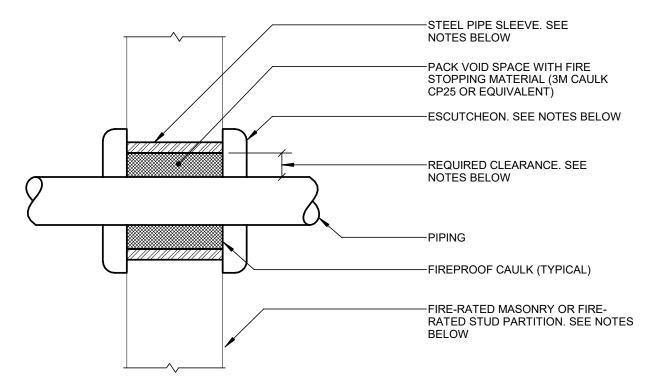
ACCESSORIES, INCLUDING BUT NOT LIMITED TO LINE LENGTH, VERTICAL SEPARATION,

- BE FULLY OPERATIONAL. SYSTEM SHALL BE PROVIDED WITH A MANUFACTURER-ASSISTED START-UP. REFER TO
- INSTALLING CONTRACTORS MUST ATTEND THE REQUIRED VRF INSTALLATION TRAINING BY
- THE MANUFACTURER.
- PROVIDE BACNET COMMUNICATION TO INTEGRATE WITH THE BMS CONTROL SYSTEM
- VRF OUTDOOR UNITS NOTES:

 1. MANUFACTURER MUST PROVIDE HEATING DURING OIL EQUALIZATION AND DEFROST
- LOCATE CONDENSING UNITS WITH 18-INCH SEPARATION BETWEEN CONDENSING UNIT MODULES FOR IMPROVED SERVICEABILITY.
- VRF UNITS SHALL BE PROVIDED WITH FACTORY-INSTALLED, INTEGRATED CONDENSATE PUMPS. IF NOT POSSIBLE (I.E. WALL MOUNTED UNITS), CONTRACTOR SHALL PROVIDE REMOTE CONDENSATE PUMP FOR EACH UNIT NOT INCLUDING AN INTEGRAL CONDENSATE
- VRF UNITS SHALL HAVE AN INTEGRATED OVERFLOW SWITCH.

SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

- <u>VRF PIPING INSTALLATION NOTES (R410A):</u>
 1. REFRIGERANT PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC; REFER TO THE VRF PIPING DIAGRAM FOR MORE INFORMATION.
- ALL PIPING SIZES SHOWN SHALL BE COORDINATED WITH VRF MANUFACTURER REGARDLESS OF THE SIZE INDICATED ON DRAWINGS.
- PROVIDE REFRIGERATION BALL VALVES WITH CHARGING PORTS DOWNSTREAM OF BRANCH SELECTOR BOX FOR SERVICE.
- FOR REFRIGERANT PIPE SIZES, CONSULT THE MANUFACTURER; REFRIGERANT PIPE RISERS INCLUDED IN DRAWINGS SHALL BE REVIEWED AND CONFIRMED BY THE MANUFACTURER PRIOR TO PURCHASING EQUIPMENT.
- CONTRACTOR SHALL TRIPLE EVACUATE SYSTEM PIPING THROUGH THE INDOOR UNITS. . SEAL REFRIGERATION PIPING UNTIL READY TO BRAZE – ONLY USE CLEAN PIPING FREE OF



- PIPE SLEEVES
 A. PIPE SLEEVES THROUGH FIRE-RATED MASONRY PARTITIONS OR FOUNDATION WALLS SHALL
- BE SCHEDULE 40 BLACK STEEL WITH MAXIMUM OF 1/2" CLEARANCE BETWEEN SLEEVE AND PIPE. SLEEVE SHALL BE EQUAL IN LENGTH TO DEPTH OF PARTITION OR WALL.

 B. PIPE SLEEVES THROUGH FIRE-RATED STUD PARTITIONS SHALL BE #18 GAUGE GALVANIZED STEEL WITH MAXIMUM OF 1" CLEARANCE BETWEEN SLEEVE AND PIPE. SLEEVE SHALL BE EQUAL IN LENGTH TO DEPTH OF PARTITION.
- ESCUTCHEONS

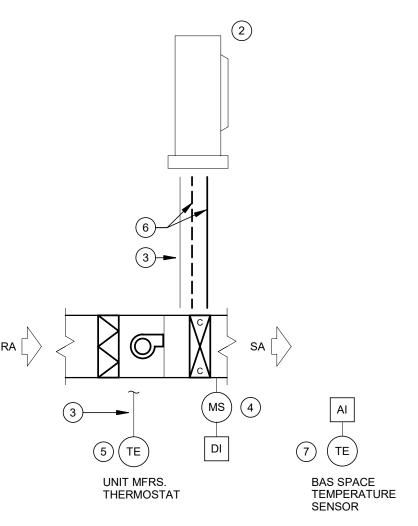
 A. ESCUTCHEONS IN FINISHED SPACES SHALL BE ANODIZED ALUMINUM OR CHROME-PLATED
- B. ESCUTCHEONS IN UNFINISHED SPACES SHALL BE PLAIN BRASS, ALUMINUM, GALVANIZED
- STEEL OR CAST IRON. C. ESCUTCHEONS SHALL BE HELD IN PLACE BY INTERNAL SPRING TENSION OR SET SCREW.

2 PIPE PENETRATION OF FIRE-RATED WALL DETAIL NTS

	DUCTWORK LEGEND
SYMBOL	DESCRIPTION
12"ø 9	ROUND DUCTWORK
$\otimes \square \lor$	ROUND SUPPLY DUCTWORK TOWARDS (UP IN PLAN)
$\boxtimes \square $	ROUND SUPPLY DUCTWORK AWAY (DOWN IN PLAN)
$\otimes \square $	ROUND EXHAUST DUCTWORK TOWARDS (UP IN PLAN)
\otimes	ROUND EXHAUST DUCTWORK AWAY (DOWN IN PLAN)

	PIPING LEGEND
SYMBOL - SINGLE LINE	DESCRIPTION
o	ELBOW UP
——⇒	ELBOW DOWN
\longleftarrow	TEE TOWARDS (UP IN PLAN)
``	TEE AWAY (DOWN IN PLAN)
`` ⊃	DROP AND RUN
<u></u>	CLEANOUT
├ RS	REFRIGERANT SUCTION
├── RL	REFRIGERANT LIQUID
├── RG 	REFRIGERANT GAS
}	REFRIGERANT LINE SET PIPING FROM REFRIGERANT BRANCH CONTROLLER

DX SPLIT SYSTEM - SMALL CAPACITY



KEYNOTES

- (1) PACKAGED INDOOR EVAPORATOR UNIT
- (2) OUTDOOR CONDENSING UNIT
- 3) PROVIDE WIRING IN ACCORDANCE WITH UNIT MANUFACTURER'S INSTALLATION GUIDELINES
- (4) PLENUM RATED, UL508 CONDENSATE OVERFLOW SWITCH MOUNTED IN PRIMARY DRAIN PAN. SWITCH SHALL BE WIRED TO DE-ENERGIZE UNIT UPON DETECTION OF OF RISING WATER (BLOCKED DRAIN) AND
- (5) LOCAL WALL-MOUNTED THERMOSAT
- 6 REFRIGERANT LIQUID AND SUCTION LINES SIZED PER

1. PROVIDE AC UNIT WITH MANUFACTURER'S STANDARD STAND-ALONE CONTROLS AND THERMOSTAT.

1. IF UL508 CONDENSATE OVERFLOW SWITCH SENSES RISING WATER

- 2. PROVIDE SPACE TEMPERATURE SENSOR FOR BAS MONITORING. SAFETIES AND ALARMS
- (BLOCKED DRAIN), THE UNIT SHALL DEACTIVATE. 2. IF SPACE TEMPERATURE RISES ABOVE 80 DEG. F (ADJUSTABLE) AN ALARM
- SHALL BE GENERATED THROUGH THE BAS OPERATION
- CONTROLS SHALL ACTIVATE UNIT IN COOLING TO MAINTAIN SETPOINT.

ACCESS DOOR ADJUSTABLE ABOVE FINISHED FLOOR ALTERNATE ACCESS PANEL AIR PRESSURE DROP BMS **BRITISH THERMAL UNIT** BTU / HOUR BOD BOP **BOTTOM OF DUCT** BOTTOM OF PIPE CAP COP CUBIC FEET PER MINUTE CUFT CUBIC FEET DRY BULB TEMPERATURE DDC DIA DN DIRECT DIGITAL CONTROL DIAMETER DIRECT EXPANSION EXHAUST AIR ENTERING DRY BULB **ENERGY EFFICIENCY RATIO** ELEC ELECTRICAL ER EXISTING TO BE RELOCATED ESP ETR EXTERNAL STATIC PRESSURE EXISTING TO REMAIN EWB

ENTERING WET BULB DEGREES FAHRENHEIT FEET WATER GAUGE

FLA FPM HP FEET PER MINUTE HORSEPOWER HSPF

LDB

LWB

MCA

MIN NIC NTS

OAT

PSIG QTY

RPM

TSP

IN WG GENERATE [A LOCAL BUZZER ALARM] [AN ALARM THROUGH THÉ BAS]. KW

- (7) PROVIDE BAS SPACE TEMPERATURE SENSOR FOR MONITORING

SEQUENCE OF OPERATION

- 1. IF SPACE TEMPERATURE RISES ABOVE SETPOINT, THE UNIT'S PACKAGED
- 2. IF SPACE TEMPERATURE DROPS BELOW SETPOINT, THE UNIT'S PACKAGED CONTROLS SHALL ACTIVATE UNIT IN HEATING TO MAINTAIN SETPOINT.

GENERAL ABBREVIATIONS AUTHORITY HAVING JURISDICTION BUILDING AUTOMATION SYSTEM BUILDING MANAGEMENT SYSTEM COEFFICIENT OF PERFORMANCE ENTERING AIR TEMPERATURE (DRY BULB) ENTERING WATER TEMPERATURE FULL LOAD AMPS HEATING SEASON PERFORMANCE FACTOR HEATING, VENTILATION AND AIR CONDITIONING INCHES WATER GAUGE KILOWATTS LOUVER LEAVING AIR TEMPERATURE LEAVING DRY BULB LEAVING WET BULB MAXIMUM MECH MBH **MECHANICAL** THOUSANDS OF BTU / HOUR MINIMUM CIRCUIT AMPACITY MINIMUM NOT IN CONTRACT NOT TO SCALE OUTSIDE AIR TEMPERATURE OUTER DIAMETER POUNDS PER SQUARE INCH GAUGE QUANTITY RETURN AIR REVOLUTIONS PER MINUTE SUPPLY AIR SEASONAL ENERGY EFFICIENCY RATIO STATIC PRESSURE STATIC PRESSURE DROP SQFT / S SQUARE FEET **TEMPERATURE** TOTAL STATIC PRESSURE TSTAT TYP THERMOSTAT TYPICAL WITH WITHOUT WET BULB WATER COLUMN

EQUIPMENT ABBREVIATIONS

HEAT PUMP

MECHANICAL

ANTINOZZI ASSOCIATES

ARCHITECTURE & INTERIORS

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CERTIFICATION:

#\ DATE DESCRIPTION

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Bridgeport, Connecticut 06604

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DRAWING NO. M5.00-P

REVIEWED BY:

JOB NUMBER:

22013 29 NOV. 2023

23 00 00 - GENERAL

A. THESE SPECIFICATIONS ARE APPLICABLE TO ALL PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS UNLESS NOTED OTHERWISE. REVIEW THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL, PLUMBING DRAWINGS FOR NOTES, DIMENSIONS, ETC., AND COORDINATE WITH OTHER TRADES INVOLVED. THE WORK REQUIREMENTS DESCRIBED WITHIN DIVISION 20 SPECIFICATION SECTION "COMMON MECHANICAL / ELECTRICAL REQUIREMENTS" FORM COMPLIMENTARY REQUIREMENTS TO THE SCOPE OF WORK CONTAINED WITHIN DIVISION 23.

B. DESCRIPTION

- 1. THIS PROJECT COMPRISES ALTERATIONS AND RENOVATIONS TO THE EXISTING BUILDING THE EXISTING BUILDING IS CURRENTLY OCCUPIED AND THE PROJECT SHALL PROCEED IN A MANNER THAT MINIMIZES ANY INCONVENIENCE TO THE BUILDING OCCUPANTS.
- 2. SCOPE OF WORK CONSISTS OF INSTALLATION OF MATERIALS TO BE FURNISHED UNDER THE CONTRACT DOCUMENTS AND WITHOUT LIMITING GENERALITY THEREOF CONSISTS OF FURNISHING LABOR, MATERIALS, EQUIPMENT, HOISTING, TRANSPORTATION, RIGGING, STAGING, APPURTENANCES, AND SERVICES NECESSARY AND/OR INCIDENTAL TO PROPERLY COMPLETE ALL WORK AS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN.

C. DEFINITIONS: THE FOLLOWING DEFINITIONS APPLY TO THIS CONTRACT

- 1. FURNISH: THE TERM "FURNISH" MEANS TO "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS"
- INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING CLEANING, AND SIMILAR OPERATIONS.
- 3. PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE."
- 4. REMOVE: THE TERM "REMOVE" MEANS TO DISCONNECT FROM ITS PRESENT POSITION, REMOVE FROM THE PREMISES AND TO DISPOSE OF IN A LEGAL MANNER."
- SUBSTITUTIONS: "SUBSTITUTIONS" ARE REQUESTS FOR CHANGES IN PRODUCTS, MATERIALS AND/OR METHODS OF CONSTRUCTION AS PROPOSED BY THE CONTRACTOR AFTER AWARD OF THE CONTRACT."

D. DRAWINGS

- DRAWINGS ARE DIAGRAMMATIC. THE FINAL PLACEMENT OF EQUIPMENT OR DEVICES IN THE FIELD MAY NOT DIRECTLY CORRESPOND TO THAT WHICH IS SHOWN ON THE DRAWINGS. THOUGH SOME OFFSETS & TRANSITIONS MAY BE SHOWN IN PIPING & SHEET METAL TO HELP. INDICATE THE PHYSICAL RELATIONSHIP BETWEEN THEM. IT IS NOT THE INTENT OF THE DRAWINGS TO SHOW ALL PIPING & SHEET METAL OFFSETS & TRANSITIONS REQUIRED. THE CONTRACTOR SHALL FULLY COORDINATE THE WORK AND PROVIDE ALL MATERIALS. EQUIPMENT AND LABOR NECESSARY TO COMPLETE THE WORK OUTLINED ON THESE CONTRACT DOCUMENTS. IF A CONFLICT IN POSITIONING OCCURS THE CONTRACTOR IS TO NOTIFY THE ENGINEER IMMEDIATELY TO ASCERTAIN WHAT THE INTENT WAS BY THE DESIGN
- E. CODES AND STANDARDS: WORK SHALL CONFORM TO THE CURRENT EDITIONS OF THE
- SHEET METAL SMACNA STANDARDS INTERNATIONAL MECHANICAL CODE
- INTERNATIONAL ENERGY CONSERVATION CODE
- INTERNATIONAL EXISTING BUILDING CODE
- 5. ALL OTHER APPLICABLE STATE AND LOCAL CODES AND ORDINANCESOWNER STANDARDS AND BASE BUILDING SPECIFICATIONS AND STANDARDS.

PERMITS AND FEES:

1. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS; AND PAY ALL GOVERNMENT AND STATE SALES TAXES AND FEES WHERE APPLICABLE, AND OTHER COSTS. INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK, FILE ALL NECESSARY DRAWINGS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL GOVERNMENTAL AND STATE DEPARTMENTS HAVING JURISDICTION, OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR HIS WORK, AND DELIVER A COPY TO THE OWNER AND ENGINEER BEFORE REQUEST FOR ACCEPTANCE AND

G. EXISTING SYSTEMS AND EQUIPMENT

FINAL PAYMENT FOR THE WORK

- CONNECT WORK TO VARIOUS EXISTING SYSTEMS AS INDICATED ON THE DRAWINGS. WORK SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM CONDITIONS. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED AS WELL AS WITH EXISTING SYSTEMS, THE STRUCTURE, AND OTHER OBSTRUCTIONS.
- 2. PROVIDE THE FOLLOWING SERVICES ON ALL EXISTING HVAC EQUIPMENT INDICATED TO
- a. CALIBRATE CONTROLS

H. SURVEY AND MEASUREMENTS

- THIS PROJECT INVOLVES CONSTRUCTION INSIDE AN EXISTING STRUCTURE. CONTRACTORS BY SUBMITTING A BID, SHALL BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITION OF THE BUILDING AS IT INFLUENCES THE WORK DESCRIBED. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY IDENTIFIED BY EXPERIENCED OBSERVERS.
- 2. DO NOT SCALE DRAWINGS. SCALE INDICATED ON DRAWINGS IS FOR ESTABLISHING REFERENCE POINTS ONLY. ACTUAL FIELD CONDITIONS SHALL GIVERN ALL DIMENSIONS.
- PRIOR TO ORDERING ANY MATERIALS AND EQUIPMENT, THOROUGHLY REVIEW THE SITE CONDITIONS TO DETERMINE IF ADEQUATE CLEARANCES AND ACCESS IS ALLOWED TO INSTALL THE COMPONENTS. ORDER EQUIPMENT BROKEN DOWN AS NECESSARY TO ALLOW FOR PROPER RIGGING THROUGH THE PROJECT AREA. PROVIDE ALL NECESSARY ALTERATIONS TO THE STRUCTURE OF THE BUILDING AS NECESSARY TO RIG THE EQUIPMENT
- 4. CONTRACTORS SHALL VERIFY, LAYOUT AND BE RESPONSIBLE FOR ALL MEASUREMENTS OF ALL EXISTING CONDITIONS BEFORE COMMENCING WORK AND SHALL NOTIFY ARCHITECT AND/OR ENGINEER IF A CONDITION EXISTS THAT PREVENTS THE CONTRACTOR FROM ACCOMPLISHING THE INTENT OF THE DRAWINGS.

SUBMITTALS AND SHOP DRAWINGS

- 1. SUBMIT FOR REVIEW, ELECTRONIC SHOP DRAWINGS IN SEARCHABLE PDF FORMAT FOR THE B. ANY DEMOLITION SHALL BE COORDINATED WITH OWNER, ARCHITECT, G.C.. AND ENGINEER
- a. SUBMITTAL DATA FOR ALL MATERIAL AND EQUIPMENT. CLEARLY IDENTIFY DEVIATIONS OF THE SUBMITTED PRODUCTS FROM THE DESIGN.
- b. DUCTWORK AND PIPING SHOP DRAWINGS: DRAWN TO ACCURATE SCALE OF 1/4"=1'0" HIGHLIGHT, ENCIRCLE, OR OTHERWISE INDICATE DEVIATIONS FROM THE CONTRACT DOCUMENTS. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD INFORMATION AS THE BASIS OF SHOP DRAWINGS. STANDARD INFORMATION PREPARED WITHOUT SPECIFIC REFERENCE TO THE PROJECT IS NOT CONSIDERED SHOP DRAWINGS
- c. CONTROLS SHOP DRAWINGS: INCLUDE EQUIPMENT AND SYSTEM CONTROL SCHEMATICS, SEQUENCES OF OPERATIONS, LOGIC DIAGRAMS AND SYSTEM COMPONENTS INCLUDING DETAILS OF TIE-IN TO EXISTING BUILDING CONTROL MANAGEMENT SYSTEM
- DO NOT USE SHOP DRAWINGS WITHOUT AN APPROPRIATE FINAL STAMP INDICATING ACTION TAKEN IN CONNECTION WITH CONSTRUCTION.
- 3. DO NOT ORDER ANY MATERIALS OR EQUIPMENT PRIOR TO RECEIVING FINAL APPROVED
- 4. SCHEDULE AT LEAST TEN WORKING DAYS EXCLUSIVE OF TRANSMITTAL TIME, FOR SUBMITTAL REVIEW

J. AS-BUILT DRAWINGS

. MAINTAIN ONE SET OF PRINTS ON THE SITE AND NOTE ALL CHANGES OR DEVIATIONS FROM THE ORIGINAL DESIGN THEREON. AT THE COMPLETION OF THE PROJECT, INCORPORATE ALL CHANGES INTO RECORD AS-BUILT DRAWINGS IN ELECTRONIC FORMAT AND SUBMIT FOR

K. OPERATION AND MAINTENANCE

- 1. UPON COMPLETION OF ALL WORK AND TESTS, THE CONTRACTOR SHALL INSTRUCT THE OWNER OR THE OWNER'S REPRESENTATIVE IN THE OPERATION, ADJUSTMENT AND MAINTENANCE OF ALL EQUIPMENT FURNISHED. THE CONTRACTOR SHALL GIVE AT LEAST SEVEN (7) DAYS NOTICE TO THE OWNER AND THE ENGINEER IN ADVANCE OF THIS PERIOD
- 2. THE CONTRACTOR SHALL PREPARE THREE (3) COPIES OF A COMPLETE OPERATION AND MAINTENANCE MANUAL, BOUND IN BOOKLET FORM. ORGANIZE OPERATING AND MAINTENANCE DATA INTO SUITABLE SETS OF MANAGEABLE SIZE. BIND PROPERLY INDEXED DATA IN INDIVIDUAL HEAVY-DUTY 3-RING VINYL-COVERED BINDERS, WITH POCKET FOLDERS FOR FOLDED SHEET INFORMATION AND DESIGNATION PARTITIONS WITH IDENTIFICATION TABS. MARK APPROPRIATE IDENTIFICATION ON FRONT AND SPINE OF EACH BINDER.
- 3. OPERATION AND MAINTENANCE MANUAL SHALL INCLUDE THE FOLLOWING:
- MANUFACTURER'S PRINTED OPERATING AND MAINTENANCE PROCEDURES.
- b. MAINTENANCE PROCEDURES FOR ROUTINE PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING
- c. COPIES OF WARRANTIES.
- d. APPROVED SHOP DRAWINGS AND PRODUCT DATA
 - e. BALANCE REPORTS.
 - INCLUDE IN THE MANUAL, A TABULATED EQUIPMENT SCHEDULE FOR ALL EQUIPMENT SCHEDULE SHALL INCLUDE PERTINENT DATA SUCH AS: MAKE, MODEL NUMBER, SERIAL NUMBER, VOLTAGE, NORMAL OPERATING CURRENT, BELT SIZE, FILTER QUANTITIES AND SIZES, BEARING NUMBER, ETC. SCHEDULE SHALL INCLUDE MAINTENANCE TO BE DONE AND FREQUENCY.
- 4. MAINTENANCE AND INSTRUCTION MANUALS SHALL BE SUBMITTED TO THE OWNER AT THE SAME TIME AS THE SEVEN (7) DAY NOTICE IS GIVEN PRIOR TO THE INSTRUCTION PERIOD.

- ALL WORK AREAS SHALL BE LEFT AS CLEAN AS NEW. CLEAN INTERNALS OF ALL DUCTWORK AND AIR HANDLING UNITS AND REPLACE FILTERS AFTERWARDS.
- 2. DUCTWORK: DUCTS SHALL BE THOROUGHLY CLEANED SO THAT NO DIRT OR DUST SHALL BE DISCHARGED FROM DIFFUSERS, REGISTERS, OR GRILLES, WHEN SYSTEM IS OPERATED.
- PIPING: AFTER CONDENSATE PIPING HAS BEEN PRESSURE TESTED AND APPROVED FOR TIGHTNESS, CLEAN AND FLUSH PIPING.
- 4. EQUIPMENT: AFTER COMPLETION OF PROJECT, CLEAN THE EXTERIOR SURFACE OF EQUIPMENT INCLUDED IN THIS SECTION, INCLUDING REMOVAL OF CONCRETE RESIDUE.
- WORK AREA: AFTER COMPLETION OF PROJECT, REMOVE ALL CONSTRUCTION DEBRIS TEMPORARY FACILITIES AND EQUIPMENT FROM WORK AREA. CLEAN WORK AREA TO PERMIT
- M. GUARANTEE
- N. GUARANTEE WORK OF THESE CONTRACT DOCUMENTS IN WRITING FOR NOT LESS THAN ONE (1) YEAR FROM DATE OF FINAL NOTICE OF ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD, PROMPT AND TO OWNER'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE WITHIN CONTRACT PRICE.MEANS AND METHODS ALL TRADES
- 1. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- 2. DO NOT BURN WASTE MATERIALS. DO NOT BURY DEBRIS OR EXCESS MATERIALS ON THE OWNER'S PROPERTY. DO NOT DISCHARGE VOLATILE, HARMFUL OR DANGEROUS MATERIALS NTO DRAINAGE SYSTEMS. REMOVE AND DISPOSE OF ALL WASTE MATERIALS, PACKAGING MATERIAL, SKIDS ETC. FROM THE SITE AND DISPOSE OF IN A LAWFUL MANNER IN ACCORDANCE WITH MUNICIPAL, STATE AND FEDERAL REGULATIONS.
- 3. MATERIALS AND EQUIPMENT SHALL BE UL LISTED WHERE STANDARD HAS BEEN ESTABLISHED.
- 4. CAREFULLY INSPECT ALL BUILDING ELEMENTS PRIOR TO CUTTING OR DRILLING INTO WALL, FLOORS OR CEILINGS. PATCH AND PAINT SURFACES DISTURBED BY WORK UNDER THIS CONTRACT AS REQUIRED TO RESTORE THEM TO THEIR ORIGINAL CONDITION.
- 5. SCAFFOLDING, RIGGING, HOISTING: THE CONTRACTOR SHALL FURNISH ALL SCAFFOLDING, RIGGING, HOISTING AND SERVICES NECESSARY FOR ERECTION AND DELIVERY INTO THE PREMISES ANY EQUIPMENT AND APPARATUS FURNISHED UNDER THIS DIVISION. REMOVE SAME FROM PREMISES WHEN NO LONGER REQUIRED.
- EXCAVATION AND BACKFILLING: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE SIZES, DEPTHS, FILL AND BEDDING REQUIREMENTS AND ANY OTHER EXCAVATION WORK REQUIRED UNDER THESE SPECIFICATIONS
- WATERPROOFING: WHERE ANY WORK PIERCES WATERPROOFING. INCLUDING WATERPROOF CONCRETE, ROOFS, EXTERIOR WALL AND FLOORS IN WET AREAS, THE METHOD OF INSTALLATION SHALL BE REVIEWED BY THE ENGINEER BEFORE WORK IS DONE. THE CONTRACTOR SHALL FURNISH ALL NECESSARY SLEEVES. CAULKING AND FLASHING REQUIRED TO MAKE OPENINGS ABSOLUTELY WATERTIGHT.
- 8. PROVIDE FIRESTOPPING AROUND ALL FIRE PROTECTION, PLUMBING, MECHANICAL AND ELECTRICAL PENETRATIONS THROUGH FIRE RATED PARTITIONS. PROVIDE ASSESTOS FREE FIRESTOPPING SYSTEM CAPABLE OF MAINTAINING AN EFFECTIVE BARRIER AGAINST FLAME AND GASES. SYSTEM SHALL BE UL LISTED AND COMPLY WITH ASTM E 814.
- 9. PROVIDE ACCESS PANELS IN WALLS, FLOORS AND GYPSUM WALL BOARD CEILINGS TO ALLOW ACCESS TO: DAMPERS, HEATERS, VALVES, VARIABLE AIR VOLUME BOXES, FAN BOXES AND OTHER APPARATUS AND EQUIPMENT REQUIRING PERIODIC SERVICE AND INSPECTION. NOT ALL ACCESS PANELS ARE INDICATED ON THE PLANS. REVIEW ARCHITECTURAL AND MECHANICAL PLANS TO DETERMINE THE LOCATION AND QUANTITY OF ACCESS PANELS REQUIRED. COORDINATE TYPE AND LOCATION WITH ARCHITECTURAL

23 05 05 - DEMOLITION

- A. REFER TO DRAWINGS FOR GENERAL DESCRIPTION OF AREAS REQUIRING DEMOLITION.
- REFER TO GENERAL CONTRACTOR'S/CONSTRUCTION MANAGER'S INSTRUCTIONS FOR EXISTING EQUIPMENT AND MATERIALS THAT SHALL REMAIN THE PROPERTY OF THE OWNER.
- D. WHERE IT IS NOTED THAT ITEMS OF VALUE ARE NOT TO BE RETURNED TO THE OWNER, THE ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. STORAGE OR SALE OF ITEMS ON THE PROJECT SITE IS PROHIBITED. ITEMS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF
- PROTECTION: ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING/SITE DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGE TO THE CONDITION BEFORE BEING DAMAGED TO THE SATISFACTION OF THE ARCHITECT AND OWNER. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST.
- F. UTILITIES:
- MAINTAIN UTILITIES EXCEPT THOSE REQUIRING REMOVAL OR RELOCATION. KEEP UTILITIES IN SERVICE AND PROTECT FROM DAMAGE. DO NOT INTERRUPT UTILITIES SERVING IN-USE AREAS WITHOUT FIRST OBTAINING PERMISSION FROM THE UTILITY COMPANY AND THE
- 2. COORDINATE ALL INTERRUPTIONS OF SERVICES AND LIMITATIONS OF ACCESS WITH THE OWNER NO LESS THAN 5 DAYS PRIOR TO THE INTERRUPTION.
- 3. PROVIDE TEMPORARY SERVICES AS REQUIRED. SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTION OF NEW WORK SHALL BE COORDINATED IN ADVANCE WITH THE CONSTRUCTION MANAGER AND BUILDING OWNER.
- DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.

1. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP PIPING WITH SAME OR

COMPATIBLE PIPING MATERIAL

AND MAKE FOUIPMENT OPERATIONAL

- 2. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT.
- EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE. CLEAN. AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT.
- 4. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT AND DELIVER TO OWNER.
- H. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY.

- G. DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
- 1. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL
- 2. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT 3. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE, CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT,
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23 05 13 - MOTORS, STARTERS AND WIRING

AND MAKE EQUIPMENT OPERATIONAL

- A. PROVIDE MOTORS AND CONTROLS, AND FURNISH STARTERS FOR HVAC EQUIPMENT, EXCEPT UNITS SERVED BY MCC PROVIDED UNDER ELECTRICAL SECTION. PROVIDE CONTROL AND OTHER RELATED WIRING INCLUDING INTERLOCKS. ALL MOTORS SHALL TO BE PREMIUM EFFICIENCY. ALL THREE PHASE MOTORS SHALL BE RATED FOR INVERTER DUTY SERVICE.
- 3. STARTERS THAT REQUIRE INTERLOCKS OR REMOTE CONTROL SHALL BE MAGNETIC WITH HAND-OFF-AUTOMATIC SWITCH (FAST-SLOW-OFF-AUTO FOR TWO SPEED MOTORS) IN COVER. STARTERS SHALL BE BY SINGLE MANUFACTURER: CUTLER-HAMMER, CLARK, ARROW HART OR

23 05 17 - SLEEVES AND PENETRATIONS

A. GENERAL REQUIREMENTS

- 1. LAY OUT PENETRATION AND SLEEVE OPENINGS IN ADVANCE. COORDINATE WORK CAREFULLY WITH ARCHITECTURAL AND STRUCTURAL WORK. PROVIDE CORE DRILLING OF EXISTING CONSTRUCTION WHERE REQUIRED. SUBMIT PROPOSED LOCATIONS FOR REVIEW PRIOR TO CORE DRILLING.
- 2. MAINTAIN FIRE RATING OF WALLS, PARTITIONS, CEILINGS, AND FLOORS AT PENETRATIONS. SEAL PENETRATIONS WITH APPROVED FIRESTOP MATERIALS.
- 3. SLEEVES FOR INSULATED PIPE AND DUCT IN NON-FIRE RATED CONSTRUCTION SHALL ACCOMMODATE CONTINUOUS INSULATION WITHOUT COMPRESSION

- 1. PROVIDE HOT-DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS AND CONCRETE FLOOR AND ROOF SLABS.
- 2. PROVIDE 26 GAUGE GALVANIZED STEEL SLEEVES THROUGH PARTITIONS AND NON-FIRE-RATED CONSTRUCTION.
- 3. PROVIDE MECHANICAL SLEEVE SEALS CONSISTING OF INTERLOCKING MODULES AT EXTERIOR PIPE PENETRATIONS.
- 4. PROVIDE ADJUSTABLE ESCUTCHEONS ON EXPOSED PIPING THAT PASSES THROUGH FINISHED FLOORS, WALLS AND CEILINGS. ESCUTCHEONS SHALL BE CHROMIUM-PLATED CAST BRASS, SIZED TO COVER SLEEVE OPENING AND TO ACCOMMODATE PIPE AND INSULATION.

23 05 29 - HANGERS AND SUPPORTS

- A. PROVIDE PIPE STANDS, SUPPORTS, HANGERS AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK REQUIRED BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES. STRUCTURAL STEEL SUPPORTS, HANGERS, ETC. SHALL BE ANGLE IRON, STEEL CHANNEL OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. ALL SUPPORTS, HANGERS, BRACKETS, ETC., SHALL BE AS APPROVED BY THE ENGINEER.
- B. ALL HANGERS SHALL BE GALVANIZED.
- C. ATTACH HANGERS AND SUPPORTS DIRECTLY ONTO THE STRUCTURE BY FIRST REMOVING EXISTING FIRE PROOFING AND AFTER SECURING THE ATTACHMENT, REPAIRING THE FIRE PROOFING TO ITS ORIGINAL CONDITION, CONTINUOUSLY OVER THE ATTACHMENT.
- D. FOR EXPANSION BOLTS/SHIELDS USE RED HEAD, HILTI OR WEJ-IT SELF DRILLING OR STEEL SHIELD, LOAD RATED. DO NOT USE DRILLED ANCHORS IN POST TENSION SLABS WITHOUT APPROVAL OF OWNER. DO NOT CUT REINFORCING STEEL WITH DRILLED INSERTS.
- E. SUPPORT ALL GALVANIZED DUCTWORK WITH GALVANIZED HANGERS AND MOUNTS AS REQUIRED BY SMACNA (8 FT SPACING). DO NOT SUPPORT RISERS FROM SLEEVES IN SLABS.

23 05 53 - PIPE AND DUCT IDENTIFICATION

- A. PIPING SHALL BE LABELED WITH PREPRINTED SELF-ADHESIVE, PREMIUM GRADE VINYL, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.
- B. VALVES SHALL BE TAGGED WITH STAMPED OR ENGRAVED BRASS VALVE TAGS. INSTALL TAGS ON VALVES AND CONTROL DEVICES IN PIPING SYSTEMS, EXCEPT CHECK VALVES: VALVES WITHIN FACTORY-FABRICATED EQUIPMENT UNITS; SHUTOFF VALVES; FAUCETS; CONVENIENCE AND LAWN-WATERING HOSE CONNECTIONS; AND HVAC TERMINAL DEVICES AND SIMILAR ROUGHING-IN CONNECTIONS OF END-USE FIXTURES AND UNITS. LIST TAGGED VALVES IN A
- MACHINERY SUCH AS HP's. ETC.. SHALL BE LABELED WITH PLASTIC LABELS WITH ENGRAVED EQUIPMENT NUMBER CORRESPONDING TO DRAWING SCHEDULE NUMBERS.

23 05 93 - TESTING ADJUSTING AND BALANCING

- A. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR START-UP, TESTING AND BALANCING OF MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN IN SCHEDULES, AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY INSPECTORS, OWNERS AND ARCHITECT
- B. PROVIDE THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING (TAB) AGENCY TO PROVIDE TAB SERVICES FOR THE MECHANICAL SYSTEMS. THE TAB AGENCY SHALL BE CERTIFIED BY NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) OR THE ASSOCIATED AIR BALANCE COUNCIL (AABC) IN THOSE TESTING AND BALANCING DISCIPLINES REQUIRED FOR THIS PROJECT. THE TAB AGENCY SHALL HAVE AT LEAST ONE PROFESSIONAL ENGINEER REGISTERED IN THE STATE IN WHICH THE SERVICES ARE TO BE PERFORMED AND CERTIFIED BY NEBB OR AABC AS A TEST AND BALANCE ENGINEER.
- PRIOR TO TESTING, ADJUSTING, AND BALANCING, THE MECHANICAL CONTRACTOR SHALL VERIFY THAT THE SYSTEMS HAVE BEEN INSTALLED AND ARE OPERATING AS SPECIFIED. APPROVED SHOP DRAWINGS, AS BUILT DRAWINGS, AND ALL OTHER DATA REQUIRED FOR EACH SYSTEM AND/OR COMPONENT TO BE TESTED SHALL BE MADE AVAILABLE AT THE JOB SITE DURING THE ENTIRE TAB EFFORT. THE OWNER SHALL BE NOTIFIED IN WRITING OF ALL EQUIPMENT, COMPONENTS, OR BALANCING DEVICES, THAT ARE DAMAGED, INCORRECTLY INSTALLED, OR MISSING, AS WELL AS ANY DESIGN DEFICIENCIES THAT WILL PREVENT PROPER TESTING, ADJUSTING, AND BALANCING. TESTING, ADJUSTING, AND BALANCING SHALL NOT COMMENCE UNTIL APPROVED BY THE OWNER.
- PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM IDENTIFIED, IN ACCORDANCE WITH THE DETAILED PROCEDURES OUTLINED IN EITHER NEBB: "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR AABC: "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE." THE TAB AGENCY SHALL TEST, ADJUST, AND BALANCE THE FOLLOWING MECHANICAL SYSTEMS:
 - ALL AIR HANDLING EQUIPMENT

LOCATION AFTER TESTING IS COMPLETE.

- . ALL HYDRONIC SYSTEMS 3. VERIFY OPERATION OF ALL TEMPERATURE CONTROL SYSTEMS
- SUBMIT TESTING, ADJUSTING, AND BALANCING REPORTS BEARING THE SEAL AND SIGNATURE OF THE TAB PROFESSIONAL ENGINEER. PREPARE A REPORT OF RECOMMENDATIONS FOR CORRECTING UNSATISFACTORY MECHANICAL PERFORMANCES WHEN A SYSTEM CANNOT BE SUCCESSFULLY BALANCED
- START UP ALL SYSTEMS, PRESSURE TEST DUCTWORK AND PIPING, AND BALANCE SYSTEMS INCLUDING, BUT NOT LIMITED TO, ALL NEW AND EXISTING REGISTERS, GRILLES, DIFFUSERS, TERMINAL UNITS, FANS, ETC. WITHIN THE AREA OF WORK TO PERFORMANCE DATA SHOWN ON PLANS, SCHEDULES, AND AS SPECIFIED.
- G. DO NOT COVER OR CONCEAL WORK BEFORE TESTING AND INSPECTION AND OBTAINING
- LEAKS, DAMAGE AND DEFECTS DISCOVERED OR RESULTING FROM STARTUP, TESTING, AND BALANCING SHALL BE REPAIRED OR REPLACED TO LIKE-NEW CONDITION WITH ACCEPTABLE MATERIALS. TEST SHALL BE CONTINUED UNTIL SYSTEM OPERATES WITHOUT ADJUSTMENT OR
- I. REPORT ON REPORTING FORMS, SUBMITTED TO ARCHITECT FOR APPROVAL IN ADVANCE. J. SUBMIT PROCEDURES, RECORDING FORMS, AND TEST EQUIPMENT FOR REVIEW PRIOR TO
- BALANCING REPORTS TO ARCHITECT FOR APPROVAL. K. FURNISH ALL TEST MEDIUMS AND DISPOSE OF ALL TEST MEDIUMS AT AN APPROVED OFF-SITE

BALANCING, AS DESCRIBED IN SPECIFICATIONS. SUBMIT ELECTRONIC COPY OF TESTING AND

. NOTE REQUIREMENT ABOVE FOR CFM AND STATIC PRESSURE READINGS PRIOR TO DEMOLITION. M. THE BALANCING CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL DIRECTIONAL ADJUSTMENT OF ALL LINEAR DIFFUSERS AS INDICATED ON PLANS. IF NO DIRECTIONAL FLOW IS INDICATED INTERIOR LINEAR DIFFUSERS SHALL BE DIRECTED HORIZONTALLY AND PERIMETER LINEAR DIFFUSER SHALL BE DIRECTED VERTICALLY, IF PERIMETER LINEAR DIFFUSERS HAVE MULTIPLE SLOTS THE PERIMETER SLOT DIRECTED VERTICALLY, AND THE INTERIOR SLOT DIRECTED HORIZONTALLY TOWARDS THE INTERIOR SPACE.

23 07 13 - HVAC INSULATION

- A. GENERAL REQUIREMENTS
- 1. INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVE AND SEALANT COUNCIL STANDARDS AND SMACNA. INSTALL INSULATION, MASTICS, ADHESIVES, COATINGS, COVERS, WEATHER-PROTECTION AND OTHER WORK IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ASTM E-84 FIRE HAZARD RATINGS SHALL BE 25 FLAME SPREAD, 50
- INSULATION AND VAPOR BARRIER SHALL BE CONTINUOUS AROUND ENTIRE PERIMETER OF DUCTS DUCTS SUPPORTED BY METAL STRAPS SHALL HAVE INSULATION ENCOMPASSING STRAPS, WHERE STRAPS PENETRATE AT TOP OF DUCT TIGHTLY SEAL AROUND STRAP WITH INSULATING TAPE. DUCTS SUPPORTED BY TRAPEZE TYPE HANGERS UNDER DUCTS SHALL HAVE 6 LB. DENSITY RIGID INSULATION PROVIDED BETWEEN DUCT AND HANGER, INSULATION SHALL BE SAME THICKNESS AND VAPOR BARRIER AS SPECIFIED FOR SPECIFIC DUCT TYPE. RIGID INSULATION SECTION SHALL BE FULL WIDTH OF DUCT AND MINIMUM 12"
- LONG. TAPE AND SEAL ALL SEAMS WHERE RIGID INSULATION MEETS OTHER INSULATION. 3. FITTINGS. VALVES AND FLANGES SHALL BE INSULATED WITH SAME MATERIAL AND TO SAME
- 4. FOR STRAINERS AND OTHER VALVES OR FITTINGS WHICH NEED MAINTENANCE, PROVIDE PREFORMED REMOVABLE INSULATION SECTION.

B. PRODUCTS AND APPLICATIONS

1. REFRIGERANT LINE AND CONDENSATE DRAIN LINE INSULATION SHALL BE 1 INCH THICK FLEXIBLE ELASTOMERIC. ACCEPTABLE MANUFACTURERS: ARMACELL OR K-FLEX.

THICKNESS AS ADJOINING PIPE INSULATION, WITH PRESENT SECTIONS.

2. CONDENSATE DRAIN LINE INSULATION SHALL BE 1 INCH THICK FLEXIBLE ELASTOMERIC. ACCEPTABLE MANUFACTURERS: ARMACELL OR K-FLEX.

23 09 00 - INSTRUMENTATION AND CONTROLS

- A. PROVIDE COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS (ATC). CONTROL SYSTEM SHALL BE CAPABLE OF PERFORMING ALL SEQUENCES OF OPERATION SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS. INDIVIDUAL CONTROL COMPONENTS MAY NOT BE SHOWN ON CONTRACT DOCUMENTS, BUT THE CONTRACTOR SHALL SUPPLY ALL COMPONENTS. AND CONTROL WIRING NECESSARY FOR A COMPLETE OPERABLE SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SYSTEM COMPONENTS, WHETHER THE ELECTRICAL OR OTHER WORK IS SUBCONTRACTED OR NOT.
- B. INSTALL THERMOSTATS AT MOUNTING HEIGHTS ABOVE FINISHED FLOOR IN ACCORDANCE WITH 'ADA" REQUIREMENTS, OR AS DIRECTED OTHERWISE BY ARCHITECT.
- C. ALL SAFETY SWITCHES AND CUT OUTS SHALL BE FIELD CALIBRATED AND SET PRIOR TO START-
- D. ALL CONTROL WIRING SHALL COMPLY WITH THE REQUIREMENTS OF THE ELECTRICAL SPECIFICATIONS.
- E. SUBMIT TO ARCHITECT A POINT-TO-POINT WIRING DIAGRAM AND AIR PIPING LAYOUT SHOWING MANUFACTURERS AND MODEL NUMBERS OF ALL CONTROL COMPONENTS. INCLUDE WRITTEN DESCRIPTION OF SYSTEM OPERATION.
- F. WIRING BETWEEN FIRE ALARM SYSTEM AND TEMPERATURE CONTROL SYSTEM, EXCEPT FOR DUCT MOUNTED SMOKE DETECTORS, SHALL BE BY MECHANICAL CONTRACTOR. G. ROOM THERMOSTAT SENSORS AND TRANSMITTERS IN PUBLIC AREAS SHALL HAVE METAL

THERMOSTATS SHALL HAVE AN ADJUSTABLE DEADBAND.

H. LOCAL CONTROLLERS, RELAYS, SWITCHES, AND OTHER CONTROL COMPONENTS SHALL BE MOUNTED ON ENCLOSED CONTROL PANELS WITH HINGE-LOCK DOOR MOUNTED NEXT TO SYSTEM CONTROLLED. TEMPERATURE SETTINGS, ADJUSTMENTS AND CALIBRATIONS SHALL BE MADE AT SYSTEM CONTROL PANEL. PANEL SHALL HAVE CANOPY LIGHT AND ON-OFF SWITCH.

COVER WITH TAMPER PROOF SCREWS AND CONCEALED ADJUSTMENT. THERMOSTATS FOR

PRIVATE OFFICES SHALL HAVE EXPOSED DIAL FOR SETPOINT ADJUSTMENT. HEATING/COOLING

<u>23 21 00 - PIPING</u>

- A. GENERAL REQUIREMENTS
 - PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS INDICATED IN SCHEDULE OF PIPE AND FITTING MATERIALS. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.
- B. SCHEDULE OF PIPE AND FITTING MATERIALS
- CONDENSATE DRAIN (INCLUDING PUMPED CONDENSATE): 125 PSI WORKING PRESSURE. TYPE L COPPER WITH SOLDERED COPPER JOINTS.
- 2. REFRIGERANT PIPING: TYPE ACR COPPER

C. VALVES AND STRAINERS

VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. VALVES SHALL BE AS MANUFACTURED BY APOLLO, CRANE, HAMMOND, JENKINS, STOCKHOLM OR MILWAUKEE.

23 81 00 - DECENTRALIZED UNITARY HVAC EQUIPMENT

- A. SPLIT SYSTEM AIR CONDITIONERS
 - PROVIDE COMPLETE DX SYSTEM OF TYPES, SIZES, AND CAPACITIES SHOWN ON SCHEDULES. SYSTEM SHALL CONSIST OF MATCHING AIR COOLED CONDENSING UNITS, COMPRESSORS, PIPING, CONTROLS, WIRING, AND OTHER ACCESSORIES AND APPURTENANCES NECESSARY TO PROVIDE FULLY AUTOMATICALLY FUNCTIONING SYSTEM. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK OR DAIKIN.
- 2. DX AIR CONDITIONING SYSTEM SHALL BE CAPABLE OF STARTING AND OPERATING DOWN TO 0°F AMBIENT. LOW AMBIENT OPERATION SHALL BE ACCOMPLISHED BY VARYING THE SPEED OF CONDENSER FAN BASED ON SENSING OF HEAD PRESSURE II REFRIGERANT LIQUID LINE, BY MODULATING DAMPER IN CONDENSER FAN DISCHARGE BASED ON REFRIGERANT HEAD PRESSURE SENSING, OR BY FLOODING THE CONDENSER COIL WITH LIQUID REFRIGERANT TO MAINTAIN THE DESIRED CONDENSER PRESSURE. PROVIDE TIME DELAY RELAY FOR TIMED BYPASS OF THE LOW PRESSURE SWITCH OR OTHER MEANS TO START CONDENSING UNIT AT 0°F WITHOUT NUISANCE SAFETY TRIP UNITS. WHEN SPECIFIED, HOT GAS BYPASS IS TO BE PRE-PIPED INTEGRAL TO THE UNIT.
- PROVIDE REFRIGERANT PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND AC UNIT. PROVIDE ALL NECESSARY AUXILIARIES AND APPURTENANCES. REFRIGERANT PIPING SHALL BE ACR COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS. REFRIGERANTS SHALL BE R-410A.



ARCHITECTURE & INTERIORS

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#\ DATE DESCRIPTION

MECHANICAL

NTS

DRAWING NO.

DRAWN BY:

TPG

JOB NUMBER: 29 NOV. 2023

22013

REVIEWED BY:

SECTION 26 04 00 - GENERAL CONDITIONS FOR ELECTRICAL TRADES

- 1. THIS PROJECT COMPRISES ALTERATIONS AND RENOVATIONS TO THE EXISTING BUILDING. THE EXISTING BUILDING IS CURRENTLY OCCUPIED AND THE PROJECT WILL PROCEED IN A
- MANNER WHICH WILL MINIMIZE ANY INCONVENIENCE TO THE BUILDING OCCUPANTS. SCOPE OF WORK CONSISTS OF INSTALLATION OF MATERIALS TO BE FURNISHED UNDER THE CONTRACT DOCUMENTS AND WITHOUT LIMITING GENERALITY THEREOF CONSISTS OF FURNISHING LABOR, MATERIALS, EQUIPMENT, HOISTING, PLANT, TRANSPORTATION, RIGGING STAGING, APPURTENANCES, AND SERVICES NECESSARY AND/OR INCIDENTAL TO PROPERLY COMPLETE ALL WORK AS SHOWN ON THE DRAWINGS AND AS DESCRIBED HEREIN.

B. DEFINITIONS:

- 1. FURNISH: THE TERM "FURNISH" MEANS TO "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS."
- INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS."
- 3. PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.
- 4. REMOVE: THE TERM REMOVE MEANS TO DISCONNECT FROM ITS PRESENT POSITION; REMOVE FROM THE PREMISES AND TO DISPOSE OF IN A LEGAL MANNER."
- SUBSTITUTIONS: "SUBSTITUTIONS" ARE REQUESTS FOR CHANGES IN PRODUCTS, MATERIALS AND METHODS OF CONSTRUCTION AS PROPOSED BY THE CONTRACTOR AFTER AWARD OF

C. EQUIPMENT EQUIVALENTS AND SUBSTITUTIONS:

- CERTAIN MANUFACTURERS OF MATERIAL, APPARATUS OR APPLIANCES ARE INDICATED IN THE DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. THESE ITEMS HAVE BEEN USED AS THE BASIS OF DESIGN, AND AS A CONVENIENCE IN FIXING THE MINIMUM STANDARD OF WORKMANSHIP, FINISH AND DESIGN THAT IS REQUIRED. IF THE CONTRACTORS USES AN "APPROVED EQUAL" ALTERNATIVE TO THE BASIS OF DESIGN, AND IF THE FEATURES OF THAT ALTERNATIVE HAVE AN IMPACT ON OTHER COMPONENTS OF THE PROJECT. THE CONTRACTOR SHALL INCLUDE THE NECESSARY ADJUSTMENTS IN THOSE COMPONENTS. WHETHER FOR ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, FIRE PROTECTION, OR ANY OTHER ELEMENTS, PLUS ANY ADJUSTMENTS FOR DIFFERENCE IN PERFORMANCE
- 2. EQUIPMENT, MATERIAL OR DEVICES SUBMITTED FOR REVIEW AS AN "EQUIVALENT" SHALL MEET THE FOLLOWING REQUIREMENTS:
- A. THE EQUIVALENT SHALL HAVE THE SAME CONSTRUCTION FEATURES SUCH AS, BUT NOT
- a. MATERIAL THICKNESS, GAUGE, WEIGHT, DENSITY, ETC. WELDED RIVETED BOLTED FTC. CONSTRUCTION
- FINISH, UNDERCOATING, CORROSION PROTECTION THE EQUIVALENT SHALL PERFORM WITH THE SAME OR BETTER OPERATING EFFICIENCY. THE EQUIVALENT SHALL BE LOCALLY REPRESENTED BY THE MANUFACTURER FOR SERVICE, PARTS AND TECHNICAL INFORMATION.
- D. THE EQUIVALENT SHALL BEAR THE SAME LABELS OF PERFORMANCE CERTIFICATION AS IS APPLICABLE TO THE SPECIFIED ITEM, SUCH AS UL OR NEMA LABELS OR DLC QUALIFICATIONS.

- . PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO COMPLETE THE WORK OUTLINED ON THESE CONTRACT DOCUMENTS. THE CONTRACTOR IS TO NOTE THAT THESE DOCUMENTS ARE DIAGRAMMATIC ONLY AND THAT FINAL PLACEMENT OF EQUIPMENT OR DEVICES IN THE FIELD MAY NOT DIRECTLY CORRESPOND TO THAT WHICH IS SHOWN ON THE DRAWINGS. IF A CONFLICT IN POSITIONING OCCURS THE CONTRACTOR IS TO NOTIFY THE ENGINEER IMMEDIATELY TO ASCERTAIN WHAT THE INTENT WAS BY THE DESIGN
- PROFFSSIONAL 2. WHERE VARIANCES OCCUR BETWEEN THE DRAWINGS AND SPECIFICATIONS OR WITHIN EITHER OF THE DOCUMENTS, THE ITEM OR ARRANGEMENT OF BETTER QUALITY, HIGHER RATING, OR HIGHER VALUE SHALL BE INCLUDED IN THE CONTRACT PRICE. THE OWNER AND ENGINEER SHALL DECIDE ON THE ITEM AND THE MANNER IN WHICH THE WORK SHALL BE

E. SURVEY AND MEASUREMENTS:

- . PRIOR TO SUBMITTING BID, VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK TO BE PERFORMED. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY IDENTIFIED BY EXPERIENCED OBSERVERS. INCLUDE IN THE BID ALL DEMOLITION WORK REQUIRED.
- 2. DO NOT SCALE DRAWINGS. SCALE INDICATED ON DRAWINGS IS FOR ESTABLISHING REFERENCE POINTS ONLY. ACTUAL FIELD CONDITIONS SHALL GOVERN ALL DIMENSIONS
- 3 PRIOR TO ORDERING ANY MATERIALS AND FOLIRMENT. THOROLIGHLY REVIEW THE SITE CONDITIONS TO DETERMINE IF ADEQUATE CLEARANCES AND ACCESS IS ALLOWED TO INSTALL THE COMPONENTS. ORDER EQUIPMENT BROKEN DOWN AS NECESSARY TO ALLOW FOR PROPER RIGGING THROUGH THE PROJECT AREA. PROVIDE ALL NECESSARY ALTERATIONS TO THE STRUCTURE OF THE BUILDING AS NECESSARY TO RIG THE EQUIPMENT
- 4. ARRANGE INSTALLATION TO PROVIDE ACCESS TO EQUIPMENT FOR EASY MAINTENANCE AND
- F. CODES AND STANDARDS: ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE MOST RECENTLY ADOPTED EDITIONS OF THE FOLLOWING CODES AND STANDARDS, INCLUDING ALL JURISDICTIONAL REVISIONS:
- STATE BUILDING CODE INCLUDING ALL SUPPLEMENTS. STATE FIRE SAFETY CODE INCLUDING ALL SUPPLEMENTS.
- STATE FIRE PREVENTION CODE INCLUDING ALL SUPPLEMENTS. THE INTERNATIONAL BUILDING CODE
- THE INTERNATIONAL EXISTING BUILDING CODE THE INTERNATIONAL FIRE CODE
- THE INTERNATIONAL MECHANICAL CODE THE INTERNATIONAL PLUMBING CODE
- . THE INTERNATIONAL ENERGY CONSERVATION CODE
- 10. NFPA 1: FIRE CODE 11. NFPA 70: NATIONAL ELECTRICAL CODE
- 12. NEPA 72: NATIONAL FIRE ALARM AND SIGNALING CODE
- 13. NECA 1: STANDARD FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION NETA ATS.

G. PERMITS AND FEES:

1. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS; AND PAY ALL GOVERNMENT AND STATE SALES TAXES AND FEES WHERE APPLICABLE, AND OTHER COSTS, FILE ALL NECESSARY DRAWINGS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL GOVERNMENTAL AND STATE DEPARTMENTS HAVING JURISDICTION, OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR HIS WORK, AND DELIVER A COPY TO THE OWNER AND ENGINEER BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.

H. AS-BUILT DRAWINGS:

- PREPARE AS-BUILT DRAWINGS TO A SCALE TO MATCH THE CONTRACT DOCUMENT FLOOR PLANS; DETAILING THE ACTUAL INSTALLATION OF MAJOR ELEMENTS, COMPONENTS, AND SYSTEMS OF MECHANICAL FOUIPMENT AND MATERIALS. WHERE SHOP DRAWINGS ARE USED. RECORD A CROSS-REFERENCE AT THE CORRESPONDING LOCATION ON THE AS-BUILT DRAWINGS. GIVE PARTICULAR ATTENTION TO CONCEALED ELEMENTS THAT WOULD BE DIFFICULT TO MEASURE AND RECORD AT A LATER DATE.
- 2. MARK NEW INFORMATION THAT IS IMPORTANT TO THE OWNER, BUT WAS NOT SHOWN ON CONTRACT DRAWINGS OR SHOP DRAWINGS.
- NOTE RELATED CHANGE ORDER NUMBERS WHERE APPLICABLE.
- FINAL RECORD DOCUMENTS SHALL BE PREPARED IN THE LATEST AUTOCAD VERSION AND DIGITAL MEDIA FOR ALL DRAWINGS AND A CLEAN SET OF REPRODUCIBLE PAPER COPIES SHALL BE TURNED OVER TO THE OWNER AT THE COMPLETION OF THE WORK.

K. OPERATIONS AND MAINTENANCE MANUALS

- 1. THE CONTRACTOR SHALL PREPARE (1) PDF COPY AND (3) HARD COPIES OF A COMPLETE MAINTENANCE AND OPERATING INSTRUCTIONS MANUAL, BOUND IN BOOKLET FORM. ORGANIZE OPERATING AND MAINTENANCE DATA INTO SUITABLE SETS OF MANAGEABLE SIZE. BIND PROPERLY INDEXED DATA IN INDIVIDUAL HEAVY-DUTY, 3-RING, VINYL-COVERED BINDERS, WITH POCKET FOLDERS FOR FOLDED SHEET INFORMATION. MARK APPROPRIATE IDENTIFICATION ON FRONT AND SPINE OF EACH BINDER. MANUAL SHALL INCLUDE THE FOLLOWING:
 - A. DESCRIPTION OF FUNCTION, NORMAL OPERATING CHARACTERISTICS AND LIMITATIONS, PERFORMANCE CURVES, ENGINEERING DATA AND TESTS, AND COMPLETE NOMENCI ATURE AND COMMERCIAL NUMBERS OF REPLACEMENT PARTS
 - B. MANUFACTURER'S PRINTED OPERATING PROCEDURES TO INCLUDE START-UP, BREAK-IN, AND ROUTINE AND NORMAL OPERATING INSTRUCTIONS; REGULATION, CONTROL, STOPPING, SHUTDOWN, AND EMERGENCY INSTRUCTIONS; AND SUMMER AND WINTER OPERATING INSTRUCTIONS
- C. MAINTENANCE PROCEDURES FOR ROUTINE PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING; DISASSEMBLY, REPAIR, AND REASSEMBLY; ALIGNING AND
- ADJUSTING INSTRUCTIONS SERVICING INSTRUCTIONS AND LUBRICATION CHARTS AND SCHEDULES. EMERGENCY INSTRUCTIONS.
- SPARE PARTS LIST. G. COPIES OF WARRANTIES.
- H. WIRING DIAGRAMS RECOMMENDED "TURN AROUND" CYCLES.
- INSPECTION PROCEDURES. K. APPROVED SHOP DRAWINGS AND PRODUCT DATA.

EQUIPMENT START-UP REPORTS. . WARRANTIES

1. ALL EQUIPMENT PROVIDED IN THIS PROJECT SHALL CARRY A MANUFACTURER'S WARRANTY FOR NO LESS THAN ONE (1) YEAR FROM DATE OF BENEFICIAL USE - UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.

M. MISCELLANEOUS REQUIREMENTS:

- THE CONTRACTOR SHALL COORDINATE ALL INTERRUPTIONS OF SERVICES AND LIMITATIONS OF ACCESS WITH THE OWNER NO LESS THAN (5) DAYS PRIOR TO THE INTERRUPTION. 2. OBTAIN IN OWNER'S NAME WRITTEN EQUIPMENT AND MATERIAL WARRANTIES OFFERED IN MANUFACTURER'S PUBLISHED PRODUCT DATA WITHOUT EXCLUSION OR LIMITATION.
- 3. GUARANTEE WORK OF THESE CONTRACT DOCUMENTS IN WRITING FOR NOT LESS THAN ONE 1) YEAR FROM DATE OF BENEFICIAL LISE. REPAIR OR REPLACE DEFECTIVE MATERIALS. EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD,
- PROMPT AND TO OWNER'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE WITHIN CONTRACT PRICE. 4. SUBMIT TO THE OWNER AN OFFICIAL CERTIFICATE OF INSURANCE FOR THEIR RECORDS.

SECTION 26 05 19 - ELECTRICAL POWER CONDUCTORS AND CABLES

- A. COORDINATION:
- A. COORDINATE SIZES OF RACEWAYS, BOXES, AND EQUIPMENT ENCLOSURES INSTALLED UNDER OTHER SECTIONS WITH THE ACTUAL CONDUCTORS TO BE INSTALLED, INCLUDING ADJUSTMENTS FOR CONDUCTOR SIZES INCREASED FOR VOLTAGE DROP. 3. COORDINATE WITH ELECTRICAL EQUIPMENT INSTALLED UNDER OTHER SECTIONS TO

PROVIDE TERMINATIONS SUITABLE FOR USE WITH THE CONDUCTORS TO BE INSTALLED.

- B. PROVIDE SINGLE CONDUCTOR BUILDING WIRE INSTALLED IN SUITABLE RACEWAY UNLESS OTHERWISE INDICATED, PERMITTED OR REQUIRED.
- CONDUCTOR SIZES AND AMPACITIES SHOWN ARE BASED ON COPPER. MINIMUM CONDUCTOR SIZES:
- A. BRANCH CIRCUITS: 12 AWG a. 20A, 120V CIRCUITS LONGER THAN 150 FEET - #10 AWG MINIMUM AND SIZED FOR VOLTAGE DROP.
- CONTROL CIRCUITS: 14 AWG. E. CONDUCTORS NO. 10 AWG AND SMALLER DIAMETER SHALL BE SOLID ANNEALED COPPER. EXCEPT THAT CONDUCTORS FOR REMOTE CONTROL, ALARM, AND SIGNAL CIRCUITS, CLASSES 1,
- 2. AND 3. SHALL BE STRANDED UNLESS SPECIFICALLY INDICATED OTHERWISE. CONDUCTORS NO. 8 AWG AND LARGER DIAMETER SHALL BE STRANDED ANNEALED COPPER.
- UNLESS SPECIFIED OR INDICATED OTHERWISE OR REQUIRED BY NFPA 70, POWER AND LIGHTING WIRES SHALL BE 600-VOLT, TYPE THWN/THHN OR THWN/THWN-2 ANNEALED COPPER, CONTROL AND SIGNAL CIRCUITS SHALL BE TYPE TW, THW, OR TF ANNEALED COPPER. UNDERGROUND CONDUCTORS SHALL BE TYPE XHHW-2. H. MAKE ALL SPLICES IN ACCESSIBLE LOCATIONS. MAKE SPLICES IN CONDUCTORS NO. 10 AWG AND
- SMALLER DIAMETER WITH INSULATED. SPRING WIRE CONNECTORS WITH PLASTIC, CAPS. MAKE SPLICES IN CONDUCTORS NO. 8 AWG AND LARGER DIAMETER WITH, SOLDERLESS PRESSURE CONNECTORS WITH INSULATING COVERS. MAKE SPLICES IN CONDUCTORS NO. 6 AND LARGER WITH PRESSURE CONNECTORS OR SPLIT BOLT CONNECTORS. MAKE WIRE TERMINATIONS USING CRIMPED TERMINALS FOR CONDUCTORS NO. 10 AND SMALLER. MAKE WIRE TERMINATIONS FOR CONDUCTORS NO. 8 AND LARGER USING MECHANICAL OR
- PRESSURE CONNECTORS. PROVIDE SUITABLE REDUCERS WHERE OVERSIZED CONDUCTORS ARE LARGER THAN THE EQUIPMENT TERMINATION. PHASE CONDUCTORS SHALL BE IDENTIFIED BY COLOR CODING. THE COLOR OF THE INSULATION ON PHASES A. B. AND C RESPECTIVELY (FOR THREE PHASE) OR PHASES A AND B RESPECTIVELY
- (FOR SINGLE PHASE) OF DIFFERENT VOLTAGE SYSTEMS SHALL BE AS FOLLOWS: A. 120/208 VOLT, THREE PHASE: BLACK, RED, AND BLUE. K. UNLESS OTHERWISE INDICATED, THE WIRING METHOD SHALL CONSIST OF THE INSTALLATION OF INSULATED CONDUCTORS INSTALLED IN ELECTRICAL METALLIC AND/OR WIREMOLD RACEWAY.
- METALLIC-ARMORED TYPE MC CABLES, WHERE ALLOWED, SHALL INCLUDE 600V INSULATION RATING. TYPE THHN/THWN-2 COPPER CONDUCTORS. DEDICATED NEUTRAL CONDUCTOR AND STEEL INTERLOCKING ARMOR. USES PERMITTED: A. WHERE CONCEALED IN HOLLOW STUD WALLS, ABOVE ACCESSIBLE CEILINGS, AND UNDER
- RAISED FLOOR FOR BRANCH CIRCUITS UP TO 20A. B. EXCEPTION: PROVIDE SINGLE CONDUCTOR BUILDING WIRING IN RACEWAY FOR CIRCUIT
- HOMERUN FROM FIRST DEVICE IN SPACE TO PANELBOARD. M. PROVIDE INSULATED, GREEN EQUIPMENT GROUNDING CONDUCTOR IN FEEDER AND BRANCH CIRCUITS, INSTALLED IN CONDUIT OR RACEWAYS, INCLUDING LIGHTING CIRCUITS. GROUNDING CONDUCTOR SHALL BE SEPARATE FROM ELECTRICAL SYSTEM NEUTRAL CONDUCTOR.

SECTION 26 05 26 - GROUNDING AND BONDING

- A. GROUNDING SHALL BE COMPLETED IN ACCORDANCE WITH NFPA 70. GROUND EXPOSED. NON-CURRENT-CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT. METALLIC RACEWAY SYSTEMS, GROUNDING CONDUCTOR IN METALLIC AND NONMETALLIC RACEWAYS, AND NEUTRAL CONDUCTOR OF WIRING SYSTEMS. WHERE GROUND FAULT PROTECTION IS EMPLOYED, ENSURE THAT CONNECTION OF GROUND AND NEUTRAL DOES NOT INTERFERE WITH CORRECT OPERATION OF FAULT PROTECTION.
- WHERE CONDUCTOR SIZE IS NOT INDICATED. SIZE TO COMPLY WITH NFPA 70. USE INSULATED COPPER CONDUCTORS UNLESS OTHERWISE INDICATED. USE BARE COPPER

UNDERGROUND, CONCEALED OR OTHERWISE INACCESSIBLE CONNECTIONS.

CONDUCTORS WHERE INSTALLED UNDERGROUND OR ENCASED IN CONCRETE. USE LISTED MECHANICAL CONNECTORS, COMPRESSION CONNECTORS OR EXOTHERMIC WELDED CONNECTIONS FOR ACCESSIBLE CONNECTIONS. USE EXOTHERMIC WELDED CONNECTIONS FOR

SECTION 26 05 29 - HANGERS AND SUPPORTS

PROVIDE ALL REQUIRED HANGERS, SUPPORTS, ANCHORS, FASTENERS, FITTINGS, ACCESSORIES AND HARDWARE NECESSARY FOR THE COMPLETE INSTALLATION OF THE ELECTRICAL WORK. B. HANGERS AND SUPPORTS SHALL MEET ASTM STANDARDS FOR COATINGS, NECA 1 STANDARDS FOR WORKMANSHIP, NFPA 70, AND UL 5B FOR STRUT-TYPE CHANNEL RACEWAY AND FITTINGS.

SELECT IN ACCORDANCE WITH MANUFACTURER'S APPLICATION CRITERIA AS REQUIRED FOR THE

LOAD TO BE SUPPORTED D. STEEL COMPONENTS: USE CORROSION RESISTANT MATERIALS SUITABLE FOR THE ENVIRONMENT WHERE INSTALLED. USE ZINC-PLATED STEEL FOR INDOOR DRY LOCATIONS. USE GALVANIZED STEEL, STAINLESS STEEL, FIBERGLASS OR APPROVED EQUIVALENT FOR OUTDOOR, DAMP AND WET LOCATION INSTALLATIONS.

C. WHERE SUPPORT AND ATTACHMENT COMPONENT TYPES AND SIZES ARE NOT INDICATED,

- CONDUIT AND CABLE SUPPORTS: CONDUIT STRAPS: ONE-HOLE OR TWO-HOLE, ZINC PLATED.
- CONDUIT CLAMPS: BOLTED TYPE. METAL CHANNEL (STRUT) FRAMING SYSTEMS: FACTORY FABRICATED CONTINUOUS SLOTTED METAL CHANNEL AND ASSOCIATED FITTINGS, ACCESSORIES, AND HARDWARE FOR FIELD-ASSEMBLY OF SUPPORTS. ALL LOCATIONS: USE 12 GA. GALVANIZED STEEL.
- G. HANGER RODS: CONTINUOUS THREADING. ZINC-PLATED STEEL H. USE OF POWER-ACTUATED FASTENERS REQUIRES APPROVAL OF ARCHITECT AND STRUCTURAL ENGINEER. I. UNLESS SPECIFICALLY INDICATED, DO NOT SUPPORT ANY ELECTRICAL COMPONENT FROM THE
- J. PLASTIC AND LEAD ANCHORS ARE NOT PERMITTED.

SECTION 26 05 33 - RACEWAY AND BOXES

- A. PROVIDE A COMPLETE WIRING SYSTEM OF RACEWAYS AND BOXES LOCATED AS INDICATED ON DRAWINGS AND AT LOCATIONS AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND COMPLIANCE WITH REGULATORY REQUIREMENTS. LOCATIONS INDICATED ON DRAWINGS ARE APPROXIMATE UNLESS DIMENSIONED.
- STANDARDS: MATERIALS SHALL COMPLY WITH ANSI C80. NEMA AND UL REQUIREMENTS AS APPLICABLE FOR TYPE AND MATERIAL MINIMUM CONDUIT SIZE, UNLESS OTHERWISE NOTED: INTERIOR - 3/4", EXTERIOR EXPOSED 3/4".
-). CONDUIT APPLICATIONS: EMBEDDED WITHIN SLAB: FLOOR BOX SLAB-ON-GRADE APPLICATIONS ONLY. CONCEALED IN MASONRY WALLS: USE EMT WITH FLUSH MOUNTED MASONRY BOXES.
- CONCEALED IN HOLLOW STUD WALLS: USE EMT CONDUIT OR MC CABLE (WHERE ALLOWED). PROVIDE FLUSH SHEET-METAL BOXES.
- D. INTERIOR DAMP OR WET LOCATIONS: USE RIGID METAL CONDUIT, INTERMEDIATE METAL CONDUIT OR SCHEDULE 40 PVC CONDUIT. PROVIDE CAST METAL OR NONMETALLIC OUTLET, JUNCTION AND PULL BOXES. E. EXPOSED, INTERIOR DRY LOCATIONS: USE EMT CONDUIT.
- F. EXPOSED FINISHED LOCATIONS: PROVIDE SURFACE METAL RACEWAY AND FITTINGS. UNLESS SPECIFIED ON DRAWINGS, REQUIRES DESIGN TEAM APPROVAL. COORDINATE ALL VERTICAL RUNS OF SURFACE RACEWAY WITH ARCHITECT PRIOR TO INSTALLATION. G. CONNECTIONS TO VIBRATING EQUIPMENT: DRY LOCATIONS - USE FLEXIBLE METAL CONDUIT
- OR MC CABLE; DAMP, WET OR CORROSIVE LOCATIONS USE LIQUIDTIGHT FLEXIBLE METAL CONDUIT: MAXIMUM LENGTH 6 FEET.
- A. EMT COMPLY WITH NEMA FB 1 AND UL 514B. STEEL WITH COMPRESSION FITTINGS IN DAMP OR WET LOCATIONS, SET SCREW TYPE ELSEWHERE. B. RIGID METAL CONDUIT - COMPLY WITH ANSI C80.1 AND UL 6. THREADED STEEL OR
- MALLEABLE IRON. USE FITTING LISTED AND LABELED AS COMPLYING WITH UL 514B IN HAZARDOUS LOCATIONS. C. FLEXIBLE METAL CONDUIT - COMPLY WITH NEMA FB 1 AND UL 514B. USE STEEL FITTINGS. D. LIQUIDTIGHT FLEXIBLE METAL CONDUIT - COMPLY WITH NEMA FB 1 AND UL 514B. USE STEEL
- E. SURFACE METAL RACEWAY PROVIDE FITTINGS FROM SAME MANUFACTURER AS SURFACE RACEWAY. INCLUDE ALL REQUIRED ELBOWS, COUPLINGS MOUNTING CLIPS, COVERS, END
- FITTINGS AND DEVICE MOUNTING BRACKETS. F. BOXES: WHERE A BOX SIZE IS NOT INDICATED, SIZE TO COMPLY WITH NFPA 70, BUT NOT LESS THAN APPLICABLE MINIMUM SIZE SPECIFIED.
- A. USE SHEET METAL STEEL BOXES IN DRY LOCATIONS. B. USE CAST IRON OR CAST ALUMINUM BOXES WITH THREADED HUBS WHERE EXPOSED RIGID METAL CONDUIT IS USED.
- USE NONMETALLIC BOXES WHERE EXPOSED RIGID PVC CONDUIT IS USED USE SUITABLE CONCRETE TYPE BOXES WHERE FLUSH-MOUNTED IN CONCRETE.
- E. USE SUITABLE MASONRY TYPE BOXES WHERE FLUSH-MOUNTED IN MASONRY WALLS. USE RAISED COVERS SUITABLE FOR TYPE OF WALL CONSTRUCTION AND DEVICE
- CONFIGURATION WHERE REQUIRED. G. USE MULTI-GANG BOXES OF SINGLE-PIECE CONSTRUCTION, DO NOT USE FIELD CONNECTED H. MINIMUM BOX SIZE, UNLESS OTHERWISE INDICATED: WIRING DEVICE - 4 INCH SQUARE BY
- 1-1/2" DEEP: COMMUNICATIONS SYSTEM OUTLET 4 INCH SQUARE BY 2-1/8" DEEP. G CABINETS AND ENCLOSURES: COMPLY WITH NEMA 250, UL 50 AND UL 50E OR UL 508A.
- USE NEMA TYPE 1, PAINTED STEEL FOR INDOOR CLEAN, DRY LOCATIONS. B. USE NEMA TYPE 3R, PAINTED STEEL FOR OUTDOOR AND WET LOCATIONS. PROVIDE SCREW COVER ENCLOSURES FOR PULL AND JUNCTION BOXES.
- MECHANICAL SLEEVE SEALS: MODULAR MECHANICAL TYPE, WITH INTERLOCKING RUBBER LINKS SHAPED TO CONTINUOUSLY FILL ANULAR SPACE BETWEEN OBJECTS AND SLEEVE, CONNECTED WITH BOLTS AND PRESSURE PLATES TO PROVIDE A WATERTIGHT SEAL AND ELECTRICAL

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

- A. PROVIDE LAMINATED ACRYLIC OR NON-CONDUCTIVE PHENOLIC WITH BEVELED EDGES. NAMEPLATES FOR EACH EQUIPMENT ENCLOSURE, RELAY, SWITCH, AND DEVICE. NAMEPLATES SHALL BE, 1/8" THICK, WHITE WITH BLACK CENTER CORE, MATTE FINISH SURFACE, BEVELED EDGES, SQUARE CORNERS. ACCURATELY ALIGN LETTERING AND ENGRAVE INTO THE CORE. MINIMUM SIZE OF NAMEPLATES SHALL BE 1" BY 2-1/2". LETTERING SHALL BE A MINIMUM OF 1/4"
- HIGH NORMAL BLOCK STYLE. B. PROVIDE WIRE AND CABLE MARKERS OR IDENTIFICATION LABELS TO IDENTIFY CIRCUIT NUMBER AT EACH SOURCE LOCATION; WITHIN BOXES WHERE MORE THAN ONE CIRCUIT IS PRESENT; WITHIN EQUIPMENT ENCLOSURES WHERE CONDUCTORS ENTER AND EXIT THE ENCLOSURE; AND IN CABLE TRAYS (MAXIMUM 20 FT. INTERVALS). PROVIDE WRAP-AROUND SELF-ADHESIVE VINYL CLOTH, WRAP-AROUND SELF-ADHESIVE VINYL SELF-LAMINATING, HEAT-SHRINK SLEEVE, PLASTIC SLEEVE, PLASTIC CLIP-ON, OR VINYL SPLIT SLEEVE TYPE MARKERS SUITABLE FOR THE CONDUCTOR OR CABLE TO BE IDENTIFIED
- PROVIDE VOLTAGE MARKERS TO IDENTIFY HIGHEST VOLTAGE PRESENT FOR ACCESSIBLE CONDUITS (MAXIMUM 20 FT. INTERVALS).
- D. PROVIDE PRE-LABELED, SNAP AROUND PIPE MARKERS ON ALL CONDUITS. MARKERS SHALL COMPLY WITH ANSI A 13.1-1988 STANDARDS AND INDICATED VOLTAGE.
- E. WARNING LABELS: USE FACTORY PRE-PRINTED OR MACHINE-PRINTED SELF-ADHESIVE POLYESTER OR SELF-ADHESIVE VINYL LABELS; UV, CHEMICAL, WATER, HEAT AND ABRASION
- CLEAN SURFACES TO RECEIVE ADHESIVE PRODUCTS ACCORDING TO MANUFACTURERS INSTRUCTIONS.
- INSTALL IDENTIFICATION PRODUCTS TO BE PLAINLY VISIBLE FOR EXAMINATION, ADJUSTMENT SERVICING AND MAINTENANCE. H. INSTALL IDENTIFICATION PRODUCTS CENTERED, LEVEL AND PARALLEL WITH LINES OF ITEM BEING IDENTIFIED.
- SECTION 26 27 26 WIRING DEVICES

A. RECEPTACLES:

- A. SELF-GROUNDING COMPLYING WITH NEMA WD 1 AND NEMA WD 6 AND LISTED COMPLYING WITH UI 498
- B. SINGLE AND DUPLEX RECEPTACLES SHALL BE RATED 20 AMPERES, 125 VOLTS, TWO-POLE, THREE-WIRE, GROUNDING TYPE WITH POLARIZED PARALLEL SLOTS. C. COLOR OF BODIES SHALL BE SELECTED BY THE ARCHITECT.
- RECEPTACLE SHALL BE SIDE-WIRED OR BACK-WIRED WITH TWO SCREWS PER TERMINAL. THE THIRD GROUNDING POLE SHALL BE CONNECTED TO THE METAL MOUNTING YOKE. F. RECEPTACLES WITH GROUND FAULT CIRCUIT INTERRUPTERS SHALL HAVE THE CURRENT
- RATING AS INDICATED, AND SHALL BE UL 943, CLASS A TYPE UNLESS OTHERWISE SHOWN. F. GROUND FAULT CIRCUIT PROTECTION SHALL BE PROVIDED AS REQUIRED BY NFPA 70 OR AS INDICATED ON THE DRAWINGS. G. MOUNT RECEPTACLES AND DATA OUTLETS 18" ABOVE FINISHED FLOOR, AND OTHER DEVICES

AS INDICATED. MEASURE MOUNTING HEIGHTS OF WIRING DEVICES AND OUTLETS TO TOP OF

- DEVICE OR OUTLET. H. PROVIDE TAMPER RESISTANT RECEPTACLES WHERE INDICATED ON DRAWINGS. B. DEVICE PLATES
- A. DEVICE PLATES SHALL BE ONE-PIECE TYPE AND SHALL BE PROVIDED FOR RECEPTACLES, **OUTLETS. SWITCHES AND FITTINGS** B. PLATES ON UNFINISHED WALLS AND ON FITTINGS SHALL BE GALVANIZED SHEET STEEL
- FINISH SELECTION BY ARCHITECT. D. PLATES SHALL BE INSTALLED WITH ALL FOUR EDGES IN CONTINUOUS CONTACT WITH FINISHED WALL SURFACES WITHOUT THE USE OF MATS OR SIMILAR DEVICES. PLASTER
- FILLINGS WILL NOT BE PERMITTED. E. PLATES INSTALLED IN WET LOCATIONS SHALL BE GASKETED AND PROVIDED WITH A HINGED, GASKETED COVER, UNLESS OTHERWISE SPECIFIED.

SECTION 26 20 00 -ELECTRICAL DISTRIBUTION

- A. GENERAL REQUIREMENTS FOR EQUIPMENT UNDER THIS SECTION MANUFACTURERS:
 - A. SQUARE D B. SIEMENS

CIRCUIT/ AIC RATING.

- C. EATON ARR
- 2. ENCLOSURE (UNLESS OTHERWISE INDICATED ON PLANS OR SCHEDULES): A. TYPE 1 (INDOOR, DRY LOCATIONS) B. TYPE 3R (OUTDOOR, WET LOCATIONS).
- B. DISCONNECT SWITCHES PRODUCT DESCRIPTION: HEAVY-DUTY, NEMA KS 1, ENCLOSED LOAD INTERRUPTER KNIFE SWITCH. HANDLE LOCKABLE IN "OFF" POSITION.
- 2. ENCLOSURE: NEMA KS 1, TO MEET CONDITIONS. FABRICATE ENCLOSURE FROM STEEL FINISHED WITH MANUFACTURER'S STANDARD GRAY
- PROVIDE WITH (2) SETS OF AUXILIARY CONTACTS
- FURNISH SWITCHES WITH ENTIRELY COPPER CURRENT CARRYING PARTS. SWITCH VOLTAGE, PHASE AND AMPERAGE RATINGS AS INDICATED ON DRAWINGS.
- WHERE SPECIFIED AS FUSED DISCONNECT SWITCHES, PROVIDE WITH DUAL-ELEMENT, TIME DELAY, CLASS RK1 FUSES. FUSE RATINGS AND QUANTITIES AS INDICATED ON DRAWINGS. FUSES SHALL BE MANUFACTURED BY BUSSMAN, GOULD SHAWMUT OR LITTELFUSE. FURNISH
- (3) SPARE FUSES OF EACH TYPE. C. PANÈLBOARD & DISCONNECT SWITCH INSTALLATION STANDARDS . MOUNT DISCONNECTING SWITCHES SO HEIGHT OF OPERATING HANDLE AT ITS HIGHEST
- POSITION IS MAXIMUM 78 INCHES ABOVE FLOOR. 2. ARRANGE EQUIPMENT TO PROVIDE MINIMUM CLEARANCES IN ACCORDANCE WITH
- MANUFACTURER'S INSTRUCTIONS AND NFPA 70. 3. INSTALL A PERMANENT LABEL INDICATING THE PANELBOARD OR TRANSFORMER WHERE THE
- POWER SUPPLY TO THE DEVICE ORIGINATES. 4. PROVIDE WITH MANUFACTURER'S STANDARD ARC FLASH LABEL. D. NEW CIRCUIT BREAKERS IN EXISTING PANELBOARDS SHALL MATCH EXISTING STYLE AND SHORT



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ELECTRICAL SPECIFICATIONS

NTS

DRAWING NO.

DRAWN BY: TPG

29 NOV. 2023

JOB NUMBER: 22013

REVIEWED BY:

- 1. THE HAZARDOUS MATERIALS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF ALL EXISTING CONDITIONS AND QUANTITIES, AND FOR NOTIFYING THE CONSULTANT OF ANY DISCREPANCIES PRIOR TO FINALIZING BID
- 2. RENOVATION AREAS REPRESENTED ON THIS DRAWING ARE TO BETTER AID IN THE IDENTIFICATION OF AREAS REQUIRING ABATEMENT. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR RENOVATION INFORMATION.
- 3. SHADING OR HATCHING REPRESENTED ON THIS DRAWING IS TO BETTER AID IN THE IDENTIFICATION OF AREAS REQUIRING ABATEMENT. THE HAZARDOUS MATERIALS ABATEMENT CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND/OR QUANTITIES PRIOR TO FINALIZING BID.
- 4. PLEASE ALSO REFER TO ALL RELATED SPECIFICATION DOCUMENTS FOR ADDITIONAL REQUIREMENTS:
 - A. UNIT PRICES SECTION 01 22 00.

 B. ASBESTOS ABATEMENT SECTION 02 82 13
 - B. ASBESTOS ABATEMENT SECTION 02-82-13
 C. LEAD-BASED PAINT AWARENESS SECTION 02-83-19
 - D. PRESUMED POLYCHLORINATED BIPHENYL BULK PRODUCT ABATEMENT SECTION 02 84 34
- E. HAZARDOUS MATERIALS ABATEMENT DRAWING HM-01

 F. ARCHITECTURAL ELEVATION DRAWINGS

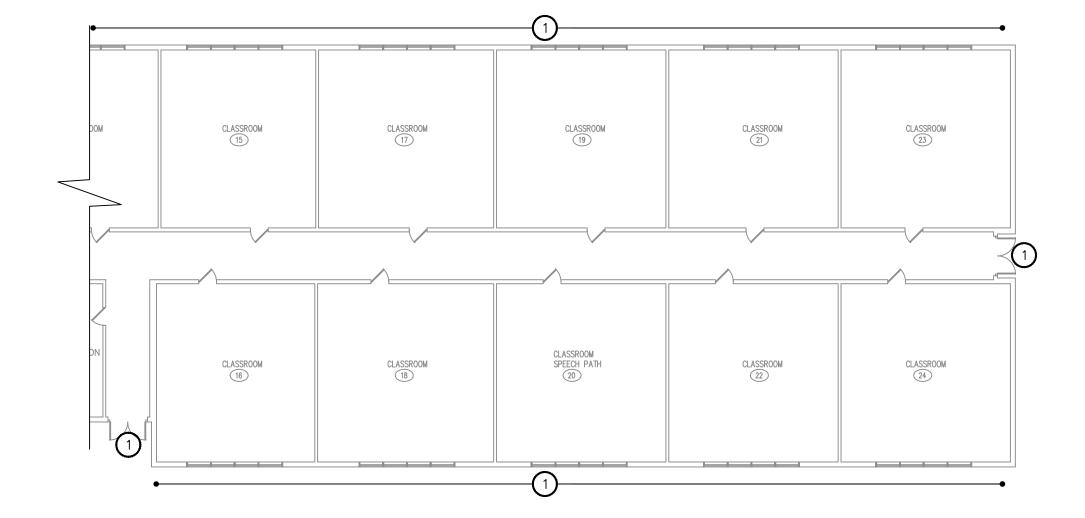
KEYNOTE

ASBESTOS ABATEMENT NOTES

WINDOW AND DOOR OPENINGS SHALL BE SEALED ON THE INSIDE WITH CRITICAL BARRIERS AND WINDOWS/DOORS REMOVED FROM THE EXTERIOR WITHIN AN ASBESTOS AND PCB REGULATED WORK AREA. CAFETERIA WINDOWS AND ANY WORK THAT WILL DISTURB THE PAINTED STEEL BEAM ABOVE WINDOWS SHALL ALSO BE CONDUCTED WITHIN A LEAD RRP REGULATED WORK AREA COMPLYING WITH THE EPA'S RRP RULE (40 CFR 745.80 THROUGH 92). WORK INCLUDES REMOVING OF THE WINDOW\DOOR FRAMES AND WINDOW SASH\DOOR WINDOWS FOR DISPOSAL AS ACM & PCB BULK PRODUCT WASTE. THE WINDOW AND DOOR OPENINGS SHALL BE REMOVED OF ALL SUSPECT ACM TO INCLUDE. BUT NOT LIMITED TO CAULK, ADHESIVES, SEALANTS VAPOR BARRIER ADHESIVES AND FLASHING MATERIALS TO A CLEAN SUBSTRATE. THE CAULKING AND GLAZING COMPOUND ARE ALSO PRESUMED > 50PPM PCB BULK PRODUCT WASTE. CAULK, GLAZING COMPOUND, SEALANTS, FLASHING AND ALL ADJACENT CONTAMINATED COMPONENTS SHALL BE PACKAGED, STORED, AND DISPOSED OF AS ASBESTOS AND > 50PPM PCB BULK PRODUCT WASTE. THE WASTE STREAM FROM THE CAFETERIA WINDOW REMOVAL SHALL ALSO BE CONSIDERED RCRA LEAD WASTE UNTIL TCLP SAMPLING PROVES OTHERWISE. WORK SHALL BE COORDINATED WITH THE CM TO ALLOW PROPER TIMING BETWEEN WINDOW REMOVAL AND REPLACEMENT. THE CONTRACTOR IS RESPONSIBLE FOR SECURING AND WEATHERPROOFING THE OPENINGS AT THE COMPLETION OF EACH SHIFT WHEN OPENINGS ARE MADE BY WINDOW REMOVAL. THE SCOPE OF WORK INCLUDES REMOVAL AND DISPOSAL AS ACM THE TWO TRANSOM WINDOWS COVERED WITH ASBESTOS CEMENT PANELS AND THE ASBESTOS CEMENT PANELS OVER ALL WINDOWS AND DOORS IF THE WINDOWS CAN NOT BE REMOVED AND REPLACED WITHOUT DISTURBING OR DAMAGING THE PANELS.

ADD ALTERNATE WORK

MOISTURE/VAPOR BARRIER DAMP PROOFING BEHIND BRICK FACADE ASSUMED TO BE PRESENT & ACM. BEFORE WALLS ARE PENETRATED FOR UTILITIES / DHVAC LINE SETS OR FOR ANY OTHER REASON, THE ABATEMENT CONTRACTOR SHALL OPEN THE WALL TO PROVIDE ACCESS FOR THE CONSULTANT TO INSPECT AND SAMPLE ANY VAPOR BARRIER / DAMP PROOFING MATERIALS BEHIND THE BRICK FACADE. IF ACM IS IDENTIFIED WITHIN THE WALL, OR IF ASBESTOS CEMENT SOFFITS OR WALL PANELS REQUIRE CORING, OR OTHER PENETRATIONS/DISTURBANCE OF <3 SQUARE FEET, SUCH WORK SHALL BE CONDUCTED BY THE ASBESTOS ABATEMENT CONTRACTOR WITHIN A REGULATE AREA FROM THE EXTERIOR, USING ENGINEERING CONTROLS TO PREVENT MAKING DUST.







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REVISIONS:

DATE DESCRIPTION

ELEMENTARY REPLACEMENT

R WILLIAM PITKIN ELEMEN BOOR & WINDOW REPLA(

GOVERNOR WIL EXTERIOR DOOR

HAZARDOUS
MATERIALS
ABATEMENT DRAWING

SCALE: DRAWN BY:
AS NOTED

MNG NO.

 date:
 JOB NUMBER:

 SEPTEMBER 2023
 22013