Oakdale Elementary School
Schematic Design Specifications
Dedham, Massachusetts
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Jonathan Levi Architects
266 Beacon Street
Boston, Massachusetts 02116

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SECTION 017400

CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. This Section includes requirements for the Contractor's implementation of waste management controls and systems for the duration of the Work.

B. Sustainable Design Intent: Refer to Section 018110 - SUSTAINABLE DESIGN REQUIREMENTS for LEED certification requirements.

1. Construction and Demolition Waste Management Planning: Develop a waste management plan, quantifying material diversion by either weight or volume to recycle and/or salvage non-hazardous construction and demolition debris.

a. Exclude excavated soil and land-clearing debris from calculations.
b. Diverted waste includes recycled, salvaged, reused, and donated materials.
c. Include materials destined for alternative daily cover (ADC) in the calculations as waste (not diversion).
d. Include wood waste converted to fuel (bio-fuel) in the calculations as diversion. Other types of waste-to-energy are not considered diversion for this credit.

2. Construction and Demolition Waste Management: For non-hazardous construction and demolition debris comply with **one** of the following paths, as directed by the LEED Checklist:

a. Divert at least 50 percent of total construction and demolition materials.
b. Divert at least 50 percent of all renovation and demolition waste AND generate no more than 10 pounds of waste per square foot of the building’s floor area from new construction activities.

C. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - GENERAL REQUIREMENTS for general submittal requirements.
2. Section 024100 - DEMOLITION for demolition, salvage, and reuse requirements.

1.3 INTENT

A. The Owner and Architect have established that this Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

1. With regard to these goals the Contractor shall develop, for the Architect's review, a Waste Management Plan (WMP) for this Project.

    a. Final Waste Management Plan shall be submitted for LEED certification.
    b. Include both demolition and construction waste management.

2. Each Subcontractor shall be responsible for segregating their own waste into different dumpsters as directed by the Contractor.
3. Source Separation, Definition: Source separated construction or demolition waste materials that are sorted into separate bins on the project site (aka on-site).

    a. This waste strategy often isolates waste materials targeted for reuse, donation, or recycling programs.
    b. Typically, sorted materials on-site include metals, wood, ceiling tiles, furniture, and concrete.

B. Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities, as defined by local authorities having jurisdiction.

C. Hazardous Wastes: Any unforeseen hazardous wastes shall be separated, stored, and disposed of according to local regulations and as directed by the Owner. Hazardous wastes shall not be included in diversion calculations.

1.4 SUBMITTALS

A. Construction and Demolition Waste Management Plan (WMP): Submit within 21 calendar days after receipt of Notice to Proceed, in a format acceptable to the Owner and in compliance with USGBC requirements. Demolition shall not begin until WMP has been approved.

1. Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that each material represents.
2. Construction and Demolition Handling Facilities:

    a. Indicate the name(s) of the facilities where construction and demolition waste will be delivered and the applicable tipping fees.
    b. Furnish Contractor’s statement of verification that facilities proposed for use are licensed for types of waste to be delivered and have sufficient capacity to receive waste from this project.
    c. Landfill Options: The name of the landfills where the non-recyclable Construction and Demolition waste will be taken to be disposed of, applicable tipping fees and the projected cost of disposing of the Project waste in landfills.
    d. Off-Site Sorting: The name of off-site sorting facilities to receive commingled demolition and construction debris collected in mixed materials containers on site.
        1) If sorted off-site identify the sorting facilities and how the materials will be processed

    e. Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

3. Material Handling Procedures, at Construction and Demolition Handling Facilities:

    a. Indicate annual recycling rates and material streams, as defined by local authorities having jurisdiction.

b. Specify which materials shall be source separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facilities will process the materials.

4. Landfill Certification: Provide a statement of verification that the landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive the estimated waste from this project
5. Co-Mingled Materials: Co-mingled waste may be considered only one material stream unless the facility can provide project specific diversion rates for specific materials. Provide one or both of the following for co-mingled materials collected in mixed containers on site and sorted off-site:

    a. For Each Container: A detailed breakdown of the weight of each material after sorting, including materials diverted to landfills
    b. For Each Sorting Facility: A detailed annual average recycling rate for EACH facility where off-site sorting takes place.
        1) Additionally, provide documentation that the facility is State regulated.

6. Alternatives to Landfilling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:

    a. Cardboard and paper products.
    b. Clean dimensional wood. If means of diversion is Wood Derived Fuel (WDF) refer to submittal requirements below.
    c. Beverage containers and employee food containers.
    d. Concrete.
    e. Slurry wall materials.
    f. Bricks and masonry.
    g. Asphalt.
    h. Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
    i. Mechanical and electrical equipment.
    j. Building components which can be removed relatively intact from existing construction.
    k. Packaging materials, including cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, and plastic pails.
    l. Glass.
    m. Scraps from new gypsum wall board (drywall).
    n. Carpet and pad.
    o. Acoustical ceiling panels.
    p. Plastics, including plastic pails, polyethylene sheet, and bubble wrap.
    q. Rigid foam.

7. Meetings: A description of the regular meetings to be held to address waste management.
8. Materials Handling Procedures, at Project Site: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

    a. Indicate which material streams shall be source separated and which shall be commingled.

9. Transportation: A description of the means of transportation of 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 offsite sorting) and destination of materials.

B. Waste Management Progress Reports: Concurrent with each Application for Payment, submit a written Waste Management Progress Report in the same format as required for Final Report.

1. Provide updated LEED v4 Construction and Demolition Waste Calculator with each progress report.

C. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:

1. Material category, including source separated material streams.
2. Generation point of waste.
3. Total quantity of waste, by weight.
4. Quantity of waste salvaged, both estimated and actual.
5. Quantity of waste recycled, both estimated and actual.
6. Total quantity of waste diverted (salvaged plus recycled).
7. Total quantity of waste diverted (salvaged plus recycled) as a percentage of total waste.

D. Other Submittals:

1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, and/or receipts.
4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, and/or receipts.
5. 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.
6. Specific LEED v4 Submittals:

    a. Provide completed LEED v4 Construction and Demolition Waste Calculator.
    b. Provide final report detailing waste streams generated, including tipping slips, disposal rates, and diversion rates.

E. Commingling Waste Vendor Submittals: Provide annual report from local or state government authority and summary attachment of diverted materials with the average annual recycling rate. Figures in the summary must be derived from the annual reports in concise clear language.

1. Commingling waste shall be considered one material stream.
2. Provide tipping invoices for commingled waste and the following:

    a. Vendor’s most recent annual report from local or state government authority.
    b. Vendor’s annual report summary attachment of diverted materials in tonnage, with the average annual recycling rate and percent ADC.

3. If Wood Derived Fuel (WDF) was listed as a diverted material in the above, vendors shall furnish a letter from the biomass plant stating their DOE operating permit number and that WDF was received from vendor, for the same year as the annual report.

1.5 CONTRACTORS

A. Contractor may subcontract work of this Section to a sub-contractor specializing in recycling and salvaging of construction waste.

B. Acoustical Ceiling Panel Recycling: Demolition and construction waste pulpable mineral fiber ceiling panels may be recycled by Armstrong World Industries and US Gypsum. Contact Armstrong at 1-877-ARMSTRONG (1-877-276-7876) or www.armstrongceilings.com/recycling or contact USG at 1-800-USG-4YOU (1-800-874-4968 x2) or www.usgdesignstudio.com, to coordinate recycling efforts, apply for product approvals, and receive reclamation procedure requirements.

C. Carpet Recycling: Demolition and construction waste carpet and carpet padding may be recycled by Carpet America Recovery Effort (CARE). Visit www.carpetrecovery.org to locate carpet reclaimers in local project area and reclamation procedure requirements.

PART 2 - PRODUCTS [Not Used]

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. General: Implement Waste Management Plan as approved by the Architect. Provide containers, storage, signage, transportation, and other items as required to implement WMP for the entire duration of the Contract.

1. Deliver waste directly to construction and demolition handling facilities. Do not deliver to transfer stations.

B. Commingling Waste: Commingling waste at the job site may be allowed, provided that the following conditions are met:

1. Commingled materials shall be included in the Waste Management Plan (WMP).
2. Additional commingled materials must be pre-approved by the Architect via WMP addenda, prior to tipping on the job site.

C. Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

D. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.

E. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

F. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return. Recycling and waste bin areas are to be

kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Architect.

1. Commingling: Waste commingling shall be approved prior to jobsite tipping, per requirements of this Section.

END OF SECTION

SECTION 018110

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain USGBC "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) certification.

1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of the LEED Project checklist, with certification level target, is attached at the end of this Section for information only.

    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on aspects of Project that are not part of the Work of the Contract.

4. A copy of the LEED Product Data Submittals Form is attached at the end of this Section.
5. Definitions included in the "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) Reference Guide and online amendments apply to this Section.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - SUMMARY for general submittal procedures; for temporary heating and cooling requirements; construction photography; and for operations and maintenance data.
2. Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
3. Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.
4. Section 019100 - GENERAL COMMISSIONING REQUIREMENTS.
5. Divisions 01 through 49 Sections for LEED requirements specific to the work of each of these Sections. Requirements may or may not include reference to LEED.

1.3 DEFINITIONS

A. Bio-Based Materials: Materials that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM D 6866 and be legally harvested, as defined by the exporting and receiving country.

B. CDPH Standard Method v1.2: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v1.2–2017, for the emissions testing and requirements of products and materials.

C. Chain-of-Custody (COC): A procedure that tracks a product form the point of harvest or extraction to its end use, including all successive stage of processing, transformation, manufacturing, a distribution.

D. Chain-of-Custody Certificates: Certificates signed by manufacturers and fabricators certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

E. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

F. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer’s product and the product’s supply chain.

G. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.

1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
2. Industry-Wide (Generic) EPD: Provide products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
3. Product-Specific Type III EPD: A product with a third-party certification, including external verification, in which the manufacturer is explicated recognized by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

H. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers’ products as postconsumer waste at the end of the products’ useful life.

I. Health Product Declaration Open Standard (HPD): A standard format for reporting product content and associated health information for building products and materials.

J. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction."

K. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.

L. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

M. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.

N. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following six categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone creation; nonrenewable resource depletion.

O. Passive (As Related to MEP): Not part of the active portions of the Mechanical, Electrical, and Plumbing systems, for example piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, showerheads, and lamp housings.

P. Recycled Content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

Q. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.

R. Volatile Organic Compounds (VOC) Emissions Test: Refer to CDPH Standard Method definition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted USGBC's final review of LEED certification.

1. Provide documentation required by LEED and LEED review.

B. Provide materials and procedures necessary to obtain LEED prerequisites and credits required in this Section. Other Sections may specify requirements that contribute to LEED prerequisites and credits. Refer to other sections for additional materials and procedures necessary to obtain LEED prerequisites and credits.

C. Respond to questions and requests for additional information from Architect and the USGBC regarding LEED credits until the USGBC has made its determination on the project's LEED certification application.

D. LEED Online Submittals: Upload LEED documentation submittal data directly to USGBC project "LEED Online" website. Complete online forms at least bi-weekly and as necessary to document LEED credits for submittals required in this Section.

E. LEED Conference: Schedule and conduct a conference at a time convenient to Owner and Architect within 21 days prior to commencement of the work. Advise Architect, Owner's Commissioning Authority, and Owner's Project Manager of scheduled meeting dates.

1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner's Project Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: LEED goals for the project, Contractor's action plans, and discussion of targeted LEED Prerequisites and Credits.
3. Minutes: Record and distribute minutes to attendees and other entities with responsibilities for obtaining LEED Credits.

1.5 ACTION SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

1. Submit each LEED submittal simultaneously with applicable product submittal.

B. LEED Documentation Submittals:

1. General, LEED v4 Product Data Submittal Reporting Form: Project submittals must be accompanied by a completed LEED v4 Product Data Submittal Reporting Form, which

follows this Section. Submittal packages must also include highlighted documentation supporting the sustainability claims made on the LEED v4 Product Data Submittal Reporting Form.

a. Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

2. Heat Island Reduction: Product data for roof and non-roof hardscape products indicating compliance with solar reflectance index (SRI) and solar reflectance (SR) requirements.
3. Optimize Energy Performance: Product data for appliances and equipment that are the responsibility of the contractor. Eligible appliances and equipment must be Energy Star rated. Include rated power in submittal documentation.
4. Building-Level Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of building energy-consumption performance.
5. Advanced Energy Metering: Meter Product cut sheets that include the following information: recording interval, ability to record consumption and demand, data transmission capability, data collection system description, storage capacity, and remote data retrieval capability.
6. Construction and Demolition Waste Management: Comply with submittal requirements of Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
7. Building Product Disclosure and Optimization: Environmental Product Declarations complying with LEED requirements.
8. Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices.

a. Extended Producer Responsibility: Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
b. Bio-Based Materials: Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
c. Certified Wood: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
d. Materials Reuse: Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
e. Recycled Content: Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.

9. Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

a. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting, including but not limited to the following:

1) Manufacturer Inventory.
2) Health Product Declaration.
3) Cradle to Cradle certifications.
4) Declare product labels.
5) UL Product Lens certifications.
6) ANSI/BIFMA e3 Furniture Sustainability Standard.

10. Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

    a. Reports showing a compliant material ingredient optimization report or action plan.

11. Indoor Air Quality: Comply with submittal requirements of Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.
12. Low-Emitting Materials: Product data, indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials, for the following materials:

    a. Paints and coatings.
    b. Adhesives and sealants.
    c. Flooring.
    d. Products containing composite wood or agrifiber products or wood glues.
    e. Thermal and acoustic insulation.
    f. Wall panels.
    g. Ceiling products.
    h. Furniture.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For LEED coordinator.

B. Project Materials Cost Data: Provide statement indicating total cost and shop labor for materials used for Project. Costs exclude site labor, overhead, and profit. Include breakout of costs for the following categories of items:

1. Wood construction materials.
2. Furniture.
3. Passive plumbing materials.
4. Passive mechanical (HVAC) materials.
5. Passive electrical materials.
6. Earthwork and exterior improvements, hard costs.

C. LEED Action Plan Components: Provide preliminary submittals within 21 days of date established for commencement of the Work indicating how the following requirements will be met:

1. Waste management plan, complying with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
2. Indoor air quality plan, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Waste reduction progress reports complying with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.
2. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD).
3. Building Product Disclosure and Optimization, Sourcing of Raw Materials.

    a. General: Manufacturing locations.
    b. Option 2:

        1) Extended producer responsibility.
        2) Bio-based materials.
        3) Certified wood products.
        4) Materials reuse.
        5) Recycled content.

4. Building Product Disclosure and Optimization, Material Ingredients.
5. Low Emitting Materials.

    a. Low Emitting Materials Tracking Sheet monitoring the project’s progress towards targeted LEED Indoor Environmental Quality Credits. Tracking Sheet to be presented at construction meetings.

6. Indoor air quality, during construction, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.
7. Indoor air quality assessment, complying with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

1.7 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated. Contractor to determine a combination of credit options best suited for achieving credits required.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

B. Unauthorized Products: Materials and products required for work of this section shall not contain asbestos, lead, mercury, polychlorinated biphenyls (PCBs), or other hazardous materials identified by the Owner.

2.2 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

A. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 1. Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which meet one of the disclosure criteria:

1. ISO 14044 Conforming LCA: Valued as one whole product.
2. Industry-Wide Type III EPD: Valued as one whole product.
3. Product-Specific Type III EPD (Internally Reviewed): Valued as one whole product.
4. Product-Specific Type III EPD (Externally Reviewed and Verified): Valued as 1-1/2 products.

B. Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 2. Use products that have a compliant embodied carbon optimization report or action plan separate from the LCA or EPD. Use at least 5 permanently installed products sourced from at least three different manufacturers.

C. Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices. Provide products that meet at least one of the responsible extraction criteria below for at least 15%, by cost, of the total value of permanently installed building products in the project:

1. Extended producer responsibility program.
2. Bio-based materials.

3. Certified Wood: Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

    a. Rough carpentry.
    b. Miscellaneous carpentry.
    c. Heavy timber construction.
    d. Wood decking.
    e. Metal-plate-connected wood trusses.
    f. Structural glued-laminated timber.
    g. Finish carpentry.
    h. Architectural woodwork.
    i. Wood paneling.
    j. Wood veneer wall covering.
    k. Wood flooring.
    l. Wood lockers.
    m. Wood cabinets.
    n. Furniture.

4. Materials Reuse: The following materials may be salvaged, refurbished, or reused materials:

    a. As directed by Architect.

5. Recycled content.

    a. Exceptions: Do not include fire protection, operational plumbing, operational mechanical, and operational electrical components, and specialty items, such as elevators and equipment, in the calculation.

AND additionally, for any product meeting at least one of attributes 1-5 above:

6. Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

D. Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

1. Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm), which meet one of the following disclosure criteria:

    a. Manufacturer Inventory.
    b. Health Product Declarations (HPDs).
    c. Cradle to Cradle (C2C) certifications.

d. Declare product labels.
e. UL Product Lens certifications.
f. ANSI/BIFMA e3 Furniture Sustainability Standard.

E. Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

1. Use at least 5 permanently installed products sourced from at least three different manufacturers that have a compliant material ingredient optimization report or action plan. Products are weighted as shown below.

a. Material Ingredient Screening and Optimization Action Plan (0.5 product) - action plan based on publicly available material Inventory to at least 1,000ppm prepared by the manufacturer and signed by a manufacturer executive.
b. Advanced Inventory and Assessment (1 product) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Bronze Level or higher, Declare Label designated as Red List Free or LBC Red List Free, or Health Product Declaration (HPD) that Inventories Ingredients to at least 100ppm and no GreenScreen LT-1 hazards or GHS Category 1 hazards are present OR 75% by weight of the product Is assessed using GreenScreen and the remaining 25% has been Inventoried.
c. Material Ingredient Optimization (1.5 products) - third-party verified Cradle to Cradle Certified, Material Health Certificate at Silver Level or higher, Living Product Challenge certified with Imperative 09, or Health Product Declaration (HPD) that Inventories to at least 100ppm and 95% by weight of the product Is assessed using GreenScreen with no BM-1 hazards present and the remaining 5% has been Inventoried and screened using GreenScreen List Translator and no LT-1 hazards are present.

2. Products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at twice their base contributing number of products, up to a maximum of 2 products.

2.3 LOW-EMITTING MATERIALS

A. Low-Emitting Materials, General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health, (CDPH), Standard Method v1.2-2017, using the applicable exposure scenario. Manufacturer’s documentation demonstrating compliance must state the range of total VOCs (tVOC) after 14 days measured as follows:

1. 0.5mg/m3 or less,
2. between 0.5 and 5.0 mg/m3 or,
3. 0.50 mg/m3 or more.

B. Low-Emitting Materials, Paints and Coatings, VOC content: For field applications that are inside the weatherproofing system, 100 percent of paints and coatings shall comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, OR the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.

California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings:

Product Type:	Allowable VOC Content (g/L):
Flat coatings	50
Nonflat coatings	100
Nonflat - High gloss coatings	150
Aluminum roof coatings	400
Basement specialty coatings	400
Bituminous roof coatings	50
Bituminous roof primers	350
Bond breakers	350
Concrete curing compounds	350
Concrete/Masonry sealers	100
Driveway sealers	50
Dry-fog coatings	150
Faux finishing coatings	350
Fire resistive coatings	350
Floor coatings	100
Form-release compounds	250
Graphic arts coatings (sign paints)	500
High temperature coatings	420
Industrial maintenance coatings	250
Low solids coatings	120
Magnesite cement coatings	450

Mastic texture coatings	100
Metallic pigmented coatings	500
Multi-color coatings	250
Pre-treatment wash primers	420
Primers, sealers, and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Rust preventative coatings	250
Shellac - Clear	730
Shellac - Opaque	550
Specialty primers, sealers, and undercoaters	100
Stains	250
Stone consolidants	450
Swimming pool coatings	340
Traffic marking coatings	100
Tub and tile refinish coatings	420
Waterproofing membranes	250
Wood coatings	275
Wood preservatives	350
Zinc-rich primers	340

South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016:

Product Type:	Allowable VOC Content (g/L):
Bond breakers	350
Colorant - Architectural coatings, excluding IM coatings	50
Colorant - Solvent-based IM	600
Colorant - Waterborne IM	50

Concrete - Curing compounds	100
Concrete - Curing compounds for roadways and bridges	350
Concrete surface retarder	50
Driveway sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings - Decorative coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings - Trowel applied coatings	50
Fire-proofing coatings	150
Flats	50
Floor coatings	50
Form release compound	100
Graphic arts (sign) coatings	200
Industrial maintenance coatings	100
Industrial maintenance coatings - color indicating saftey coatings	480
Industrial maintenance coatings - High temperature IM coatings	420
Industrial maintenance coatings - Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings - Zinc-rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-Color coatings	250
Nonflat coatings	50
Pre-treatment wash primers	420

Primers, sealers, and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Sacrificial anti-graffiti coatings	50
Shellac - Clear	730
Shellac - Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Stone consolidants	450
Swimming pool coatings - Repair	340
Swimming pool coatings - Other	340
Tile and stone sealers	100
Traffic coatings	100
Tub and tile refinish coatings	420
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood coatings - varnish	275
Wood coatings - sanding sealers	275
Wood coatings - lacquer	275
Wood conditioners	100
Wood preservatives	350
Low solids coatings	120

C. Low-Emitting Materials, Paints and Coatings, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 75 percent of paints and coatings, measured by volume or surface area, shall comply with the requirements of the

California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:

    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green
    d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable exposure scenario.

D. Low-Emitting Materials, Adhesives and Sealants, VOC content: For field applications that are inside the weatherproofing system, 100 percent of adhesives and sealants shall comply with the limits for VOC content when calculated according to South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements effective on October 6, 2017.

South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements effective on October 6, 2017:

Product Type	Allowable VOC Content (g/L)
Adhesives for Architectural Applications	
Building envelope membrane adhesive	250
Carpet pad adhesives	50
Ceramic glass, porcelain, & stone tile adhesive	65
Cove base adhesives	50
Dry wall and panel adhesives	50
Multi-purpose construction adhesives	70
Roofing- single ply roof membrane adhesive	250
Roofing- all other roof adhesives	250
Rubber floor adhesives	60
Structural glazing adhesives	100
Structural wood member adhesive	140
Subfloor adhesive	50
VCT and asphalt tile adhesives	50
Wood flooring adhesive	100

All other indoor floor covering adhesives	50
All other outdoor floor covering adhesives	50
Specialty Applications	
Computer diskette manufacturing adhesive	350
Contact adhesive	80
Edge glue adhesive	250
ABS welding cement	325
ABS to PVC transition cement	510
CPVC welding cement	490
PVC welding cement	510
All other plastic cement welding cements	100
Rubber Vulcanization Adhesive	250
Special purpose contact adhesive	250
Thin metal laminating adhesive	780
Tire tread adhesive	100
Top and trim adhesive	250
Waterproof resorcinol glue	170
All other adhesives	250
Substrate Specific Applications	
Metal substrate-specific adhesives	30
Plastic foam substrate-specific adhesives	50
Porous material (except wood) substrate-specific adhesives	50
Wood substrate-specific adhesives	30
Fiberglass substrate-specific adhesives	80
Reinforced plastic composite substrate-specific adhesives	200
Sealants for Architectural Applications	
Clear, paintable, and immediately water-resistant sealant	250

Foam insulation	250
Grout	250
Roadway sealant	250
Non-staining plumbing putty	250
Potable water sealant	250
Roofing - single ply roof membrane sealant	450
Roofing - all other roof sealants	300
All other architectural sealants	50
Marine deck sealant	760
All other sealants	420
Adhesive Primers	
Plastic adhesive primers	550
Pressure sensitive adhesive primers	250
Traffic marking tape adhesive primers	150
Vehicle glass adhesive primers	250
All other adhesive primers	250
Sealant Primers	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
All other sealant primers	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers, or any other primers	250

1. Exception: The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

E. Low-Emitting Materials, Adhesives and Sealants, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 75 percent of adhesives and

sealants, measured by volume or surface area, shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:

    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green
    d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable exposure scenario.

F. Low-Emitting Materials, Flooring, General Emissions Requirement: 90 percent of flooring measured by cost or surface area, shall be tested according to California Department of Public Health (CDPH) Standard Test Method v1.2-2017, using the applicable exposure scenario.

1. To comply with the General Emissions Requirement, products may comply with one of the following:

    a. FloorScore Certified (resilient, hard surface, textile flooring, and flooring adhesives).
    b. UL Greenguard Gold Certified.
    c. CRI Green Label Plus certified (carpet, adhesive, and cushion).
    d. SCS Indoor Advantage Gold Certified.
    e. NSF/ANSI 332 certified (resilient flooring).

G. Low-Emitting Materials, Composite Wood: 75 percent, measured by cost or surface area, of composite wood and agrifiber products, including Plywood, Medium Density Fiberboard, Hardwood Veneer Plywood, and Structural Composite Wood, shall be made using ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins (NAF) as defined in the California Air Resources Board "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or EPA TSCA Title VI.

H. Low-Emitting Materials, Ceilings, Walls, Thermal and Acoustic Insulation: 90 percent of ceilings, 75 percent of walls, and 75 percent of insulation, measured by cost or surface area, shall comply be tested according to the California Department of Public Health (CDPH) Standard Test Method v1.2-2017, using the applicable scenario.

1. To comply with the General Emissions Requirement, products shall meet one of the following:

    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green

d. Meet California Department of Public Health (CDHP), Standard Method v1.2-2017, using the applicable scenario.

I. Low-Emitting Materials, Furniture: Furniture, measured by cost, shall be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011; comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate.

2.4 INDOOR WATER USE REDUCTION

A. Indoor Water Use Reduction:

1. Building Water Use: Provide WaterSense labeled products for interior plumbing fixtures. Do not exceed water flow requirements indicated in Division 22 - PLUMBING.
2. Appliance and Process Water Use: Provide US EPA ENERGY STAR or performance equivalent appliances. Comply with other LEED requirements for process water use, indicated in Division 22 - PLUMBING and Division 23 - HEATING, VENTILATING, AND AIR CONDITIONING.

B. Indoor Water Use Reduction, Plumbing Fixtures: Do not exceed water flow requirements indicated in Division 22 - PLUMBING.

1. Provide US EPA WaterSense labeled plumbing fixtures, where applicable.

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING

A. Environmental Tobacco Smoke Control: Smoking is prohibited on site.

1. Refer to Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Construction and Demolition Waste Management: Comply with Section 017400 - CONSTRUCTION WASTE MANAGEMENT.

3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. Construction Indoor Air Quality Management Plan: Comply with Section 018120 - CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT.

END OF SECTION

LEEDv4 BD+C: Schools (LEEDv4 SC)
Project Scorecard SPECIFICATION

The Green Engineer
Sustainable Design Consulting

Project: **Oakdale Elementary School**
Address: **147 Cedar St, Dedham, MA 02026**
Date: **8/22/2024**

	Yes	Maybe	No			
	0	1	0	**INTEGRATIVE PROCESS**		1
D		1		IPc1	Integrative Process	1
	Yes	Maybe	No			
	6	0	9	**LOCATION & TRANSPORTATION**		15
D			N	LTc1	LEED for Neighborhood Development Location	15
D	1			LTc2	Sensitive Land Protection	1
D	1		1	LTc3	High Priority Site	1-2
D	2		3	LTc4	Surrounding Density and Diverse Uses	1-5
D			4	LTc5	Access to Quality Transit	1-4
D	1			LTc6	Bicycle Facilities	1
D			1	LTc7	Reduced Parking Footprint	1
D	1			LTc8	Green Vehicles	1
	Yes	Maybe	No			
	6	4	2	**SUSTAINABLE SITES**		12
C	Y			SSpr1	Construction Activity Pollution Prevention	Req'd
D	Y			SSpr2	Environmental Site Assessment	Req'd
D	1			SSc1	Site Assessment	1
D		1	1	SSc2	Site Development - Protect or Restore Habitat	1-2
D	1			SSc3	Open Space	1
D		3		SSc4	Rainwater Management	2-3
D	2			SSc5	Heat Island Reduction	1-2
D	1			SSc6	Light Pollution Reduction	1
D			1	SSc7	Site Master Plan	1
D	1			SSc8	Joint Use of Facilities	1
	Yes	Maybe	No			
	7	1	4	**WATER EFFICIENCY**		12
D	Y			WEpr1	Outdoor Water Use Reduction	Req'd
D	Y			WEpr2	Indoor Water Use Reduction	Req'd
D	Y			WEpr3	Building-level Water Metering	Req'd
D	2			WEc1	Outdoor Water Use Reduction	1-2
D	4	1	2	WEc2	Indoor Water Use Reduction	1-7
D			2	WEc3	Cooling Tower Water Use	1-2
D	1			WEc4	Water Metering	1
	Yes	Maybe	No			
	24	7	0	**ENERGY & ATMOSPHERE**		31
C	Y			EApr1	Fundamental Commissioning and Verification	Req'd
D	Y			EApr2	Minimum Energy Performance	Req'd
D	Y			EApr3	Building-level Energy Metering	Req'd
D	Y			EApr4	Fundamental Refrigerant Management	Req'd
C	6			EAc1	Enhanced Commissioning	2-6
D	14	2		EAc2	Optimize Energy Performance	1-16
D		1		EAc3	Advanced Energy Metering	1
C		2		EAc4	Demand Response	1-2

D	4	1		EAc5	Renewable Energy	1-3
D		1		EAc6	Enhanced Refrigerant Management	1

	Yes	Maybe	No			
	3	7	3	**MATERIALS & RESOURCES**		**13**
D	Y			MRpr1	Storage & Collection of Recyclables	Req'd
C	Y			MRpr2	Construction and Demolition Waste Management Plan	Req'd
C		3	2	MRc1	Building Life-Cycle Impact Reduction	2-5
C	1	1		MRc2	Building Product Disclosure & Optimization-EPD's	1-2
C		1	1	MRc3	Building Product Disclosure & Optimization-Raw Materials	1-2
C	1	1		MRc4	Building Product Disclosure & Optimization-Material Ingredients	1-2
C	1	1		MRc5	Construction and Demolition Waste Management	1-2

	Yes	Maybe	No			
	9	6	1	**INDOOR ENVIRONMENTAL QUALITY**		**16**
D	Y			EQpr1	Minimum IAQ Performance	Req'd
D	Y			EQpr2	Environmental Tobacco Smoke (ETS) Control	Req'd
D	Y			EQpr3	Minimum Acoustical Performance	Req'd
D	2			EQc1	Enhanced IAQ Strategies	1-2
C	3			EQc2	Low-Emitting Materials	1-3
C	1			EQc3	Construction IAQ Management Plan	1
C	1	1		EQc4	IAQ Assessment	1-2
D		1		EQc5	Thermal Comfort	1
D	1		1	EQc6	Interior Lighting	1-2
D		3		EQc7	Daylight	1-3
D	1			EQc8	Quality Views	1
D		1		EQc9	Acoustic Performance	1

	Yes	Maybe	No			
	5	1	0	**INNOVATION**		**6**
D	1			INc1.1	INc1 IN: EB:O&M Starter Kit - Green Cleaning and IPM	
D	1			INc1.2	INc1 IN: Exemplary Performance - EPDs, HPDs	
D	1			INc1.3	INc1 IN: Green Building Education, Low Mercury Lighting	
C		1		INc1.4	INc1 IN: Occupant Comfort Survey, Design for Active Occupants	
C	1			INc1.5	INc1 Pilot Credit: Integrative Analysis of Building Materials	
C	1			INc2	INc2 LEED Accredited Professional	

	Yes	Maybe	No			
	2	1	1	**REGIONAL PRIORITY 02026 (underlined)**		**4**
D			1	RPc1	RP: LTc4 Surrounding Density @4	1
D			x	RPc2	RP: LTc5 Access to Quality Transit @1	1
D			x	RPc3	RP: SSc2 Protect or Restore Habitat @2	1
D	1			RPc4	RP: EAc2 Optimize Energy Performance @8	1
D	1			RPcX	RP: EAc5 Renewable Energy Production @2	1
C		1		RPcX	RP: MRc1 Bldg Life-cycle Impact Reduction @2	1

Yes	Maybe	No		
62	28	20	**PROJECT TOTALS (Certification Estimates)**	**110**

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

LEED PRODUCT DATA SUBMITTAL - SUSTAINABLE ATTRIBUTES REPORTING FORM

THIS FORM IS REQUIRED TO BE SUBMITTED *WITH ALL 'Product Data Submittals'*

You must include backup documentation such as *SPECIFIC* Product Data Sheets, Cut Sheets, Product Specific Letter from Manufacturer, etc. DO NOT INCLUDE GENERIC MARKETING MATERIAL

PROJECT NAME: _____

SUBCONTRACTOR: _____

Specification Section: _____ Submittal Number: _____

				MR Building Product Disclosure and Optimization Information (BPDO)										IEQ Low-Emitting Materials Information			
				EPDs		*Sourcing of Raw Materials*						*Material Ingredients*				*Product Categories*	*Some Emissions Evaluation Standards*
																Paints, Coatings, Adhesives, Sealants Composite (Particle Board, MDF, Hardwood Plywood) Flooring Ceilings Wall Panels Insulation (Thermal & Acoustic) Furniture	CDPH v1.1 or 1.2; or i.e, Greenguard Gold NAF or CARB ULEF FloorScore or Green Label Plus CDPH v1.1 or 1.2; or i.e, Greenguard Gold CDPH v1.1 or 1.2; or i.e, Greenguard Gold CDPH v1.1 or 1.2; or i.e, Greenguard Gold ANSI/BIFMA Level 7.6.1 or 7.6.2
	Project Product Data ***Applies to permenently installed products, Divisions 3-10, 31 and 32 (31.60.00, 32.10.00, 32.30,00, 32.90.00)*** *(MEP - optional, furniture - optional)*			**Environmental Product Declaration[2]**	**Life Cycle Assessment Action Plan**	**FSC Certified[4] Wood Products**	**Post-Consumer Recycled Content[5]**	**Pre-Consumer Recycled Content[6]**	**Extended Producer Responsibility**	**Locally Sourced**	**Declare Label**	**Health Product Declaration[3]**	**Cradle to Cradle**			***GENERAL EMISSIONS EVALUATION [7, 9]***	***VOC CONTENT [8]***
	Product Description	Manufacturer	Product Costs[1] (only exclude install labor) ($)	Product Specific (PS) or Industry Wide (IW)?	LCA Action Plan or LCA Impact Reductions?	(%)	(%)	(%)	Manufacturer Takeback Program?	Extracted, Manufactured, & Purchased within 100 miles?	Ingredient disclosure greater than 1000 ppm?	Ingredient disclosure greater than 1000 ppm?	C2C version (2.1.1 or 3.0) Level of Certification?		**Product Category from above? (Select one or NA)** Applies to all products installed within waterproofing membrane	Which Emissions Evaluation Standard does it meet?	**VOC Content[8] (grams/liter)** (Applies ONLY to Paints, Coatings, Adhesives and Sealants installed within waterproofing membrane	Wet-Applied Products Volume Used (liters or gallons)
Ex.	ABC Product	ABC. Inc.	$ XX,XXX	Yes/No; PS/IW	Yes / No	%	%	%	Yes / No	Yes/No; # miles	Yes / No	Yes / No	Yes / No		Select Category	List compliance name	# grams/liter	# liters or gallons
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		

NOTES / DEFINITIONS:

1. Furnish Costs include all expenses to deliver the material to the project site, including taxes, transport, fabrication and profit. Do not include site labor or installation.
2. Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. https://spot.ul.com/
3. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard. https://www.hpd-collaborative.org/hpd-public-repository/
4. Wood products must be certified by the Forest Stewardship Council (FSC) and must be provide proof of vendor FSC Chain-of-Custody with this Product Data Submittal. http://info.fsc.org/certificate.php
5. Post-Consumer Recycled Content: Sourced from recovered Consumer Waste and used as a raw material (e.g. plastic bottles, newspaper, etc).
6. Pre-Consumer Recycled Content: Recovered Industrial Materials diverted from municipal solid waste for use in a different mfg. process, prior to use by a consumer. Note: "home scrap" from the original mfg. process that are reused / reprocessed do not qualify.
7. Building Products must have a 'General Emissions Evaluation' that tested and determined compliance in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010 or v1.2-2017 http://www.usgbc.org/resources/low-emitting-materials-third-party-certification-table
8. All paints and coatings wet-applied on site must meet applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
9. Composite Wood Evaluation as defined by the California Air Resources Board (CARB), Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde (NAF) resins.
10. Millwork and Fixtures: Built-in cabinetry/bespoke joinery, countertops, window treatments (e.g., curtains, blinds), window films and freestanding partition panels. Beddings, pillows, artwork, rugs and appliances are not considered.
11. RoHS Restrictions: Acronym for Restriction of Hazardous Substances, a Europe-based regulation that limits certain chemicals in electrical and electronic components. https://www.rohsguide.com/

I, _____ a duly authorized representative of_____ hereby certify that the material information submitted here is an accurate representation of the material to be provided under our contract.

EMAIL CONTACT FOR AUTHORIZED REPRESENTATIVE: _____ Direct Phone: _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____

SECTION 018120

CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. This Section includes requirements for the Contractor's implementation of indoor air quality management controls and systems for the duration of the Work.

B. Sustainable Design Intent: Refer to Section 018110 - SUSTAINABLE DESIGN REQUIREMENTS for LEED certification requirements.

1. Environmental Tobacco Smoke Control: Prevent exposure of building systems to environmental tobacco smoke during construction.
2. Construction Indoor Air Quality Management Plan: Requirements for minimum indoor air quality (IAQ) performance standards during the construction period.
3. Indoor Air Quality Assessment: Requirements for assessment of minimum indoor air quality (IAQ) performance standards through either building flush-out or air testing before occupancy

C. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 011000 - GENERAL REQUIREMENTS for photographic documentation requirements, submittal requirements, temporary construction facilities, protection, and controls.
2. Section 017420 - CONSTRUCTION WASTE MANAGEMENT for demolition and construction waste management.
3. Division 23 - HVAC for coordination with HVAC requirements.
4. Divisions 02 through 49 Specification Section for specific requirements relating to indoor air quality.

1.3 PERFORMANCE REQUIREMENTS

A. Environmental Tobacco Smoke Control: At a minimum, take the following measures:

1. Comply with Owner’s Non-Smoking Campus Policy.
2. Do not allow smoking in enclosed portions of the project site, on the rooftop, or in construction trailers.
    a. This prohibition includes tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances and the emissions produced by electronic smoking devices.

3. Locate exterior designated smoking areas at least 25 feet away from entries, outdoor air intakes, and operable windows. Provide signage for designated smoking areas, located within 10 feet of each entry. Provide ash receptacles and clean areas daily.

B. Construction Indoor Air Quality Management Plan: During construction, comply with the following requirements:

1. Coordinate with Owner's current IAQ management plans and procedures.
2. Meet or exceed the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, Second Edition, November 2007, Chapter 3.
3. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-2007. Protect active outdoor air intakes and return air grilles with applicable filtration media. Periodically inspect temporary media and replace as necessary. Replace filtration media immediately prior to occupancy, with MERV 13 or higher.
4. Protect absorptive materials stored on-site and installed from moisture damage. Immediately remove from site and properly dispose of any materials susceptible to microbial growth and replace with new, undamaged materials.

C. Indoor Air Quality Assessment: Comply with one of the following requirements:

1. Option 1: Perform a building flush-out with outside air, either before occupancy or during occupancy.
2. Option 2: Conduct IAQ testing for air contaminant levels in the building, after construction ends and before occupancy.

1.4 SUBMITTALS

A. Construction Indoor Air Quality Management Plan: Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall submit Construction IAQ Management Plan.

1. Construction IAQ Management Plan: Include, but do not limit to, the following:
   a. HVAC Protection.
   b. Source Control.
   c. Pathway Interruption.
   d. Housekeeping.
   e. Scheduling.

2. Product Data: Submit for each type of filtration media used during construction and installed immediately prior to occupancy, with MERV values clearly identified.

B. Indoor Air Quality Assessment:

1. Option 1, Flushout: Signed statement describing the building air flush-out procedures, including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
   a. Product Data: Submit for filtration media used during flush-out and occupancy, with MERV values clearly identified.

2. Option 2, IAQ Testing: Report from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements, with testing laboratory name and date clearly identified.

PART 2 - PRODUCTS

2.1 FILTRATION MEDIA

A. Filtration Media: Comply with ASHRAE 52.2-2007 and provide MERV as required.

PART 3 - EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT PLAN IMPLEMENTATION

A. IAQ Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the Project.

1. Distribution: The Contractor shall distribute copies of the Construction IAQ Management Plan to the Job Site Foreman, each subcontractor, the Owner, and the Architect.
2. Instruction: The Contractor shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the Project.

B. Preconditioning: Allow products, which have odors and significant VOC emissions, to off-gas in a dry, well-ventilated space for sufficient period to dissipate odors and emissions prior to delivery to Project.

1. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
2. Condition products in ventilated warehouse or other building.

C. Ventilation: Ventilate interior spaces directly to the exterior to minimize accumulation of odors and VOC emissions during construction.

D. Coordinate Construction IAQ Management Plan with construction cleaning and final cleaning as indicated in Section 011000 -GENERAL REQUIREMENTS.

3.2 INDOOR AIR QUALITY (IAQ) ASSESSMENT

A. Indoor Air Quality Assessment: Option 1, Flush-Out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 deg F and a relative humidity no higher than 60 percent.

a. Operating Requirements: Refer to Division 23 - HVAC.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside air or the design minimum outside-air rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. of outside air has been delivered to the space.

a. Operating Requirements: Refer to Division 23 - HVAC.

B. Indoor Air Quality Assessment: Option 2, Indoor Air Quality Testing: Engage testing agency to perform the following:

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Building Design and Construction."
2. Demonstrate that contaminants do not exceed the concentrations listed below:

    a. Formaldehyde: 27 ppb.
    b. Particulates (PM10): 50 micrograms/cu. m.
    c. Ozone: 0.075 ppm.
    d. Total Volatile Organic Compounds (TVOCs): 500 micrograms/cu. m.
    e. Carbon Monoxide (CO): 9 ppm and no greater than 2 ppm above outdoor levels.
    f. Target Volatile Organic Compounds: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v1.2–2017, Table 4-1.

3. For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.
4. Air-sample testing shall be conducted as follows:

    a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-air flow rate for the occupied mode throughout the duration of the air testing.
    b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are encouraged, but not required, to be in place for the testing.
    c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft.
        1) For large open spaces, one sampling point per 50,000 sq. ft. may be used.
    d. Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION

SECTION 024119 - BUILDING DEMOLITION

1. Work Included: Demolish and remove existing buildings, materials, systems, equipment, and structures indicated on the Drawings.

2. Occupancy: Buildings to be demolished will be unoccupied prior to commencement of demolition.

3. Temporary Protections: Provide temporary barricades and other forms of protection as required to for protection of personnel from injury due to demolition operations.

    1. Provide shoring and bracing as required to prevent collapse of existing systems and adjacent facilities or work to remain.
    2. Remove temporary protections at completion of the work.

4. Coordination with Owner: Coordinate schedule of building demolition operations with Owner in order to allow Owner plenty of time to install temporary heating systems to the adjacent Walsh building.

5. Locate, identify, stub-off, and disconnect utility services that are indicated not to remain. Provide by-pass services as necessary to maintain continuity of service to occupied areas.

6. Where items are indicated to be salvaged, carefully remove indicated items, clean items, and deliver to storage area designated by Owner.

7. Material resulting from demolition and not identified for salvaging shall become the property of the Contractor and shall be legally transported and disposed of offsite. Disposal shall be performed as promptly as possible and not left until the final clean up.

SECTION 042000 UNIT MASONRY ASSEMBLIES

1. Work Included:
    1. Provide unit masonry work.
    2. Masonry reinforcing, anchors, and ties.
    3. Cavity wall insulation.
    4. Stainless steel flashing, soldered end dams and mitered corners.
    5. Products installed, but not furnished, under this Section include the following: Steel lintels for unit masonry, furnished under Section 055000, METAL FABRICATIONS.

2. Brick Veneer
    1. Provide face brick conforming to ASTM C 216, Grade SW, Type FBS. Provide building brick conforming to ASTM C 62.
    2. Size: 8 in. x 8 in. and 4 in. x 12 in.
    3. Provide special shapes where indicated. Never expose cores, frogs, or unfinished surfaces. Provide solidly-grouted bricks at tops of walls and under wall openings.
    4. Brick/Color shall be equal to Endicott's Desert Iron Spot light; as manufactured by Endicott Clay Products; or approved equal by Belden Brick. Finish of Brick shall be smooth.
    5. Brick shall have factory extruded false 3/8 in. joints; 4 different patterns including 1 without false joint.

6. Brick shall have factory extruded false 3/8 in. joints; 4 different patterns including one without false joint.

3. Concrete Masonry Units

    1. Basis of design manufacturer for facing veneer and structural CMU: Westbrook Concrete Block Company, Inc., Westbrook CT
    2. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
    3. Load bearing hollow and solid, normal weight concrete masonry units: Conform toASTM C90, Type 1, Class 1, normal weight.

    4. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.
    5. CMU Veneer - Nominal 4 inches deep by 8 inches high by 16 inches wide, having scores (false joints) as indicated.
    6. Nominal 12 inches deep by 8 inches high by 16 inches wide, having no scores (false joints).
    7. Minimum allowable compressive strength for an individual unit of not less than 5.1700 psi (net area); and not less than 2,000 psi. (net area) for average of 3. units; when tested in accordance with ASTM C 140.
    8. Oven dry density: 125 pounds per cubic foot moisture content for average of 3 units, when delivered, not exceeding 35 percent of the total absorption, when tested in accordance with ASTM C 140.
    9. Block Colors - CMU exposed to view - Gray Portland Cement with white colorant as selected by Architect from Manufacturer's options.
    10. CMU painted or not exposed to view - Gray Portland Cement with no color additive.

4. Mortar

    1. Portland cement: ASTM C 150, Type I, free from water soluble salts and alkalies. Provide cement which exhibits no efflorescence when tested in conformance with these specifications. Lime: ASTM C 207, hydrated, Type
    2. Grout Aggregate: Complying with ASTM C 404.
    3. Mortar Aggregate: Complying with ASTM C 144, well graded.
    4. Mortar Pigment: Natural and synthetic oxides of iron and chrome, compounded for use in mortar. Provide products equal to Davis Colors or Solomon Grind-Chem.
    5. Water: Clean, potable.

5. Reinforcing ties and anchors

    1. Stainless steel masonry ties equal to HB-250 heavy duty stainless steel.

6. Miscellaneous materials

    1. HB quadravent or equal.
    2. Cavity Drainage Material: thickness as required to fit firmly between back of masonry veneer and face of cavity wall insulation, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings

OAKDALE ELEMENTARY SCHOOL

SCHEMATIC DESIGN STRUCTURAL NARRATIVE

(LEM # 22.0258)

DEDHAM, MA

DECEMBER 29, 2023 **REVISED JUNE 20, 2024**

PREPARED BY

LeMessurier.
1380 SOLDIERS FIELD ROAD
BOSTON, MA 02135

PREPARED FOR

JONATHAN LEVI ARCHITECTS
266 BEACON STREET,
BOSTON, MA 02116

STRUCTURAL NARRATIVE

INTRODUCTION

This schematic design structural narrative contains a project description, an outline of the structural components and estimated material quantities for the structural work of this project for preliminary budget purposes only. The report is to be read in conjunction with the schematic architectural drawings and narrative.

In general, the narrative included herein describe the main or typical structural elements in a preliminary manner. Appropriate allowances should be made for non-typical conditions.

PROJECT DESCRIPTION

The proposed new building will consist of two stories on a relatively flat site with a partial basement totaling 87,000 gross square feet. The building will be configured to support a design enrollment of 360 students.

STRUCTURAL SYSTEMS

The proposed main building structure will be a structural steel frame with concrete floor slabs on composite steel deck. The main building roof will be composite steel deck with concrete topping. The Cafeteria, Media Room and Gymnasium will be framed with mass-timber with galvanized metal roofing. The lateral load resisting system will consist of steel braced frames in the transverse direction and steel moment frames in the long direction. Foundations will be cast-in-place reinforced concrete walls, slabs-on-grade, and spread footings.

Foundations

A geotechnical engineering report titled “Preliminary Geotechnical Date and Engineering Report” was issued by Reliance Engineers dated 25 September 2023 has been issued. The report

recommends shallow foundations with an allowable bearing pressure of 4 tons per square foot and a seismic site class C. Footings are to bear on till ranging in depth from 4-feet to more than 7-feet deep. Footings will need to be lowered in locations to bear on till or the fill removed and backfilled with compacted structural fill. Based on this information the foundations for the project will be as follows:

A. Walls

Typical foundation walls will be 18-inch thick reinforced concrete with 10-inch wide shelves as required to support façade elements. Exterior foundation walls will extend down to a minimum of 4'-0" below finished exterior grade. All foundation walls enclosing below-grade space shall be waterproofed on the exterior surface and a drainage system shall be installed around the perimeter of the foundation to divert ground water away from the building.

B. Slab-on-Grade

The partial basement and first-floor slab on grade will be a 5-inch thick slab-on-grade. A 15-mil vapor barrier and 12-inch layer of crushed stone will be placed beneath the slab to provide an adequate substrate and to allow for an under-slab drainage system where portions of the floor slab extend below exterior grade. Further development in design will provide for depressions, trenches, housekeeping pads, and other potential equipment requirements.

C. Footings

The foundations will consist of reinforced concrete spread footings and continuous wall footings bearing on compacted structural fill or undisturbed soil. Partial basement foundation walls will be simply supported and rely on the ground floor slab on metal deck for lateral support at top of wall.

D. Pits

Elevator and other pits that may be required will consist of an 18-inch thick reinforced concrete base slab and 12-inch thick reinforced concrete pit walls. All pits shall receive waterproofing.

Superstructure – Gravity Load System

A. Partial Basement

Slab-on-grade as described above.

B. Ground Floor

Slab-on-grade as described above. Composite slab-on-metal deck with composite steel framing over the partial basement.

C. Typical Floor Construction

Floor construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The floor slab will be reinforced with WWF 6x6-W4.0xW4.0 throughout. Beams and girders will be structural steel rolled shapes (typically W14, W16, & W18) made composite with the floor slabs via ¾-inch diameter, 5½-inch long welded steel shear studs. Gravity columns will typically be structural steel HSS shapes (typically 6-inch and 8-inch square).

D. Typical Roof Construction

Typical construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The roof above the Media, Cafeteria and Gymnasium that do not require a fir rating will be 3-inch deep, 18 gage, galvanized steel roof deck. Roof beams and girders will be structural steel rolled shapes. Hot-dipped galvanized steel dunnage will be provided on top of the roof if necessary to support mechanical equipment and for mechanical equipment screening.

D. Cafeteria

The cafeteria structure will be constructed from mass-timber framing consisting of glue-laminated members. The leaf-like structure will consist of a central 23 3/4" wide by 75 ¾" deep slopped glue-lam spine girder running the length of the cafeteria with 13-5/8" x 27 ½" roof purlins at 11-feet on center spanning between the girder and perimeter framing. The roof deck will consist of galvanized steel roof decking. Glue-laminated columns will be located at the perimeter. Refer to Figure 1 below for an isometric of the timber framing. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.

Figure 1 – Media Room Timber Framing Isometric

E. Media Room

The media room will be constructed from mass-timber framing consisting of glue-laminated members. The tree-like structure will consist of a central built-up glue-laminated columns with diagonal struts extending to the roof purlins. Roof purlins vary from 17-5/8" wide, 25-1/2" to 41-5/8" deep are supported by the central column, diagonal struts and glue-laminated columns at the perimeter. The roof deck will consist of galvanized steel roof decking. Refer to Figure 2 for an isometric of the timber framing and Figure 3 for a plan. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.

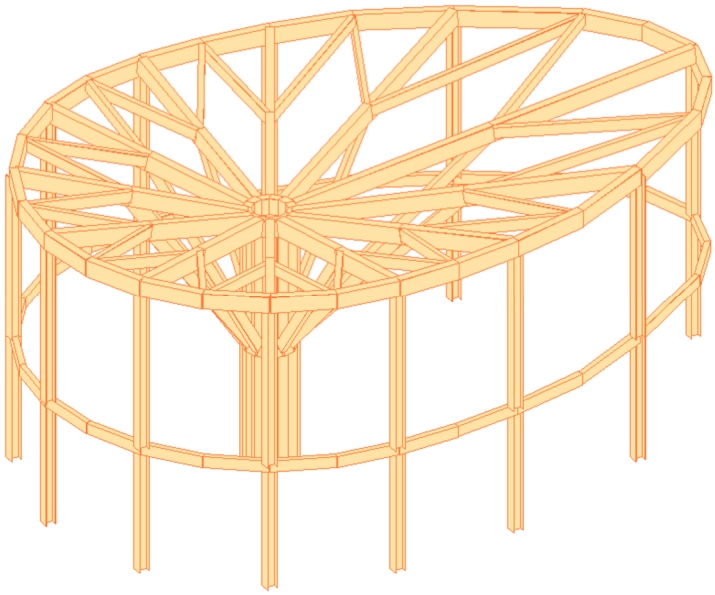

Figure 2 – Media Room Timber Framing Isometric

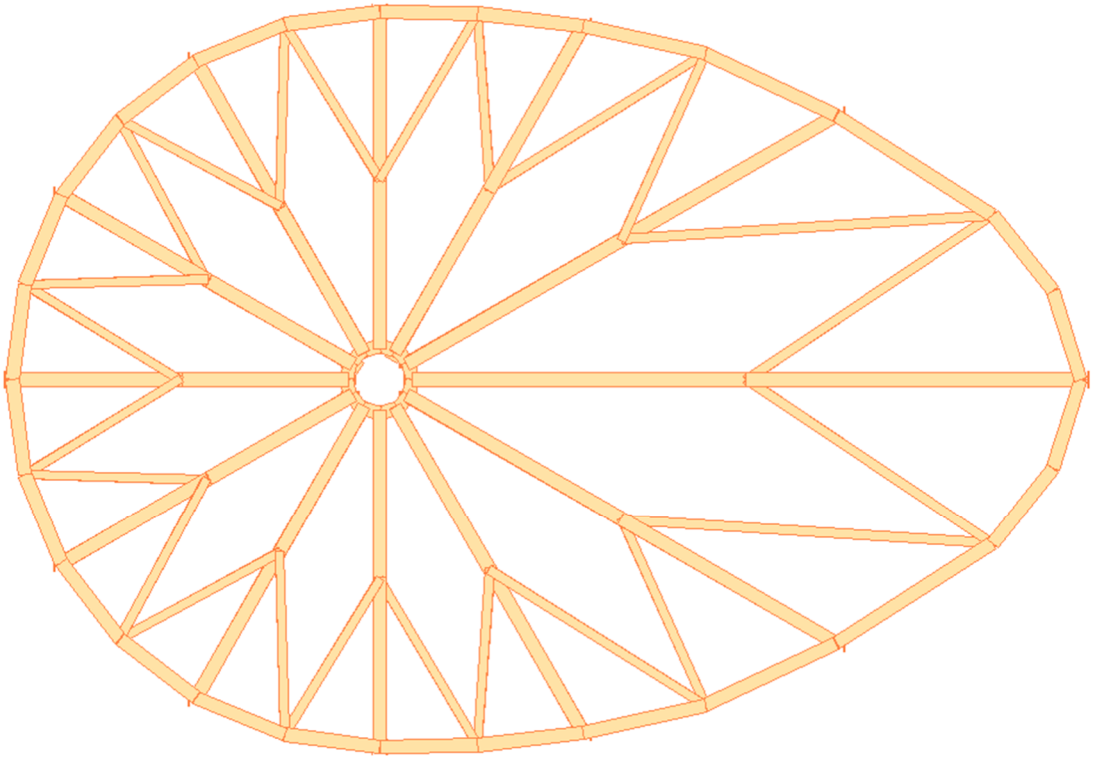

Figure 3 – Media Room Timber Framing Plan View

F. Gymnasium

The gymnasium roof structure will consist of open web steel joists with maximum spacing of approximately 7-feet on center. Depth of joist will be approximately 68-inches. Roof deck to consist of 1 ½-inch, 18-gage cellular galvanized acoustic roof deck. Joists will be supported by W30 girders at the perimeter with W12 columns. The perimeter walls will consist of 8-inch reinforced CMU walls which will act as the lateral load resisting system for the gymnasium.

G. Typical Façade Support

Continuous support of the building façade is expected to occur from each framed level above grade. This may likely consist of hung steel angle frames with all material outside the air and vapor barrier system to be hot-dipped galvanized.

Superstructure – Lateral Load System

The lateral force resisting system will consist of concentrically braced steel frames in the transverse direction. Structural steel tubes, 6-inch and 8-inch square, will be oriented diagonally in vertical planes between columns to provide resistance to wind and seismic forces. Initial considerations will be to concentrate the majority of the braced frames within stacked walls along the three floors and located in the common classroom walls. The lateral force resisting system in the longitudinal direction will consist of moment frames along the corridors. The stability of the gymnasium, media room and cafeteria will be satisfied with braced frames located at the perimeter walls. Final locations of the frames will be coordinated with the architectural layout as design progresses.

SCHEMATIC DESIGN ESTIMATED QUANTITIES

Footings	Typical Interior – 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Perimeter - 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Braced Frame - 10'-0"x10'-0"x2'-6" w/ 11-#7 T&B EW
Perimeter Frost Walls	1'-6" thick x 3'-6" deep, reinforced at a rate of 100 lbs/cu yd.
Frost Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Foundation Walls	18" foundation wall, reinforced at rate of 300 lbs/cu yd.
Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Grade Beams	24"x24" typical, reinforced at rate of 300 lbs/cu yd. Locate at braced frames.
Piers at Columns	2'-0"x2'-0", reinforced at rate of 300 lbs/cu yd.
Piers at BF Columns	2'-6"x2'-6", reinforced at rate of 300 lbs/cu yd.
Elevator Pit Walls	12" thick concrete, reinforced at rate of 180 lbs/cu yd. (Assume 5-ft pit)
Elevator Pit Slab	18" thick concrete, reinforced at rate of 200 lbs/cu yd
Slab-On-Grade	5" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
MEP Equipment Pads	6" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
Slab on Deck (Typ. Floor)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Slab on Deck (Typ. Roof)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Exterior Slab Edge	All exterior slab edges to have 3/8" perimeter bent plate with ¾" diameter x 8" long headed studs and hooked rebar (#5@12" on center x 5'-0" long). Curtain wall attachment to be coordinated.
Roof Deck (Typical)	3" deep, 18-gage galvanized Type N steel roof deck
Roof Deck (Acoustic)	3" deep, 18-gage galvanized cellular roof deck at Media Room, Cafeteria and Gymnasium.

Exterior Roof Edge	All exterior roof edges to have 3/8" perimeter plate cantilevered from spandrel beam.
Steel Floor Framing	Composite wide flange framing. See below for estimated quantities.
Steel Roof Framing	Typical wide flange framing. See below for estimated quantities.
Columns	W10 and HSS columns. Included in steel framing allowances.

STEEL FLOOR AND ROOF FRAMING ALLOWANCES

Level	Steel Allowance
Pop-Up/ Misc	12 psf
Roof	13 psf
Level 03	15 psf
Level 02	15 psf
Level 01 (over basement)	12 psf

Notes:

1. Steel allowances include steel floor framing, columns and bracing. A 10% allowance for connections has been included in the listed values.
2. Steel allowances do not include perimeter bent plate, parapets, screen wall, miscellaneous façade support framing, shear studs, etc… See below for additional items.

Shear Studs	¾" Diameter x 5 ½" long at a rate of 1/2 per square foot of floor and roof areas with slab.
Canopies	20 psf steel allowance
Parapets	Provide 60 lb/ft galvanized steel allowance at parapets at flat roofs.
Screen Walls	12 psf galvanized steel allowance over screen wall elevations.
Dunnage	15 psf galvanized steel allowance over equipment area.
Brick Relief	Continuous galvanized shelf angle at Levels 2 and 3. Hangers and kickers at hung relief (40 lb/ft allowance) Loose lintels above openings.

Lateral System	Typical HSS6x6 and HSS8x8 braced frames in transverse direction. Moment frames in longitudinal direction along the corridor consisting of W14 columns and W24 beams. Tonnage allowance included in steel framing allowance.
Elevator Backup Rails	Assume HSS6x6x3/8 behind each elevator guide. Assume three per elevator. HSS6x6x3/8 to span between floors.
Elevator Hoist Beam	W10x30 centered over the shaft.
Cafeteria	See description.
Media Room	See description.
Gymnasium	68DLH Open Web Joists at 7-ft on center. Double up at ends Joist Bridging at 1/5th points of joist span W30 girders at joist support (170 lbs/ft) W18 beams at perimeter (52 lbs/ft) W12 columns at 30-ft max on center (90lb/ft) SSPC 3 surface prep. Zinc-rich primer on all steel. 1-1/2" – 18 gage cellular acoustic roof reck 8" CMU walls at perimeter. Reinforce with #5 @ 24" vertical, #5 @ 32" horizontal and 9GA ladder reinforcement at 16".

Design contingency shall be as appropriate for stage of development.

DESIGN LOADS

Risk Category	III (to be confirmed by Code Consultant)

Dead Loads:

Weight of Building Components	As Required
Roofing Allowance	15 psf
Hung Ceiling, Lights, HVAC	10 psf uniform
Hung Ceiling, Lights, HVAC	20 psf uniform (above MEP)

Live Loads:

Lobbies and Assembly Areas	100 psf uniform, 2,000 lbs conc
Gymnasium	100 psf uniform, 2,000 lbs conc
Cafeteria	100 psf uniform, 2,000 lbs conc
Classrooms	40 psf
Offices	50 psf uniform, 2,000 lbs conc
Corridors – First Floor	100 psf uniform, 2000 lbs conc
Corridors Above First Floor	80 psf uniform, 2000 lbs conc
Stairways	100 psf
Mechanical Rooms	150 psf or weight of mech equip.
Storage (light)	125 psf
Roof (Assembly Area)	100 psf
Roof	20 psf
Partition Allowance	20 psf (Included in live load ≥ 100psf)

Live loads will be reduced as permitted by ASCE 7-16

Ground Snow Load:	40 psf
Importance Factor, Is	1.00
Flat Roof Snow Load	35 psf plus drift

Wind Loads: Basic wind speed	129 mph
Exposure	B
Importance Factor, Iw	1.00
Wind Pressure (ASCE 7-16)	P = q GCp - qi (GCpi)
Maximum Overall Drift	0.0020H

Earthquake Loads:

Soil Site Class	C
Importance Factor, Ie	1.25
Spectral Acceleration, S_S	0.244
Spectral Acceleration, S_1	0.062
Design Spectral Acceleration, S_{DS}	XX
Design Spectral Acceleration, S_{D1}	XX
Seismic Design Category	B
Seismic Resisting System	R = 3 Steel System
Response Modification Factor, R	3
Overstrength Factor	3
Deflection Amplification Factor, C_d	3
Seismic Base Shear, V	C_SW
Maximum Story Drift	0.015h

DESIGN CODES AND STANDARDS

"International Building Code" (IBC 2021) with Massachusetts Amendments
"Massachusetts State Building Code" (780 CMR, 10th Edition)
"Minimum Design Loads for Buildings and Other Structures" (ASCE 7-16)
"Specification for Structural Steel Buildings" (AISC 360-16)
"Code of Standard Practice for Steel Buildings and Bridges" (AISC 303-16)
"Seismic Provisions for Structural Steel Buildings" (AISC 341-16)
"Specifications for Structural Joints Using ASTM A325 or A490 Bolts" (RCSC 2004)
"Building Code Requirements for Reinforced Concrete" (ACI 318-19)
"Specifications for Structural Concrete for Buildings" (ACI 301-16)
"Manual of Concrete Practice 2014" (ACI, Volumes 1 through 6)
"ACI Detailing Manual - 2004" (SP-66)
"Manual of Standard Practice 2009" (CRSI)
"Structural Welding Code – Steel Reinforcing Bars" (AWS D1.4/D1.4M-2018)
"North American Specification for the Design of Cold-Formed Steel Structural Members" (AISI S100-16), including 2020 Supplement
"Code of Recommended Standard Practice for Composite Deck, Form Deck, and Roof Deck Construction" (SDI 31)
"National Design Specification 2018 for Wood Construction" (NDS 18 with Supplement)

Construction Materials

Cast-in-Place Concrete (General):	f'_c = 4,000 psi, unless noted otherwise
Cast-in-Place Concrete at Foundation Walls:	f'_c = 4,500 psi
Concrete Slabs on Steel Deck:	f'_c = 4,000 psi
Concrete Equipment Pads(lightweight):	f'_c = 3,000 psi
Reinforcing Steel:	ASTM A615, Grade 60
Structural Steel:	ASTM A992, Grade 50
Rectangular or Square HSS (Tubes):	ASTM A500, Grade C (F_y = 50 ksi)
Round HSS (Pipes):	ASTM A500, Grade C (F_y = 50 ksi)
Anchor Bolts:	ASTM A307, ASTM A449 UNO
High Strength Bolts:	ASTM A325, ASTM A490

End of Structural Narrative

SECTION 054000 COLD FORMED METAL FRAMING

1. Work Included
    1. Furnish and install cold formed steel framing, as indicated on the Drawings and as specified herein. Cold formed steel framing includes but is not necessarily limited to: Cold formed steel stud exterior vertical and horizontal framing, including crossbridging, bracing, and anchoring to the building structure, complete in all respects.
    2. Interior soffit framing.
    3. Interior partition supports, including box beams and hangers at openings required to support infill glazing or opening type.

2. Manufacturers

    1. AllSteel Products, Inc.
    2. Clark Steel Framing.
    3. Craco Metals Manufacturing, LLC.
    4. Dale/Incor.
    5. Dietrich Metal Framing; a Worthington Industries Company.
    6. MarinoWare; a division of Ware Industries.
    7. Steel Construction Systems.
    8. United Metal Products, Inc.

3. Framing Compnents

    9. Studs shall be 16 gauge or heavier except where noted on the Drawings. Studs shall be manufactured from steel sheet meeting the requirements of ASTM A 1003, Structural Grade, Type H with a minimum yield strength of 50,000 psi. Studs shall have pre-punched holes
    10. Grade: ST50H (ST340H). Coating: G90 (Z275).
    11. Z-Furring: Provide ZF_Series Z-furring as manufactured by Dietrich Metal Framing, or approved equal. Z-furring shall be minimum 20 gage galvanized steel, sizes as required.
    12. Tracks shall be 18 gauge or heavier unpunched tracks manufactured of commercial quality steel sheet meeting the requirements of ASTM A 1003 with a minimum yield strength of 50,000 psi. Provide special shaped tracks with one 4 in. high leg where required. Tracks shall be hot dip galvanized in accordance with the following:
    13. Grade: ST50H (ST340H), Coating: G90 (Z275).

SECTION 055000 - METAL FABRICATION

1. Work Included

    1. Steel handrails, guardrails and railings.
    2. Steel pipe bollards.
    3. Miscellaneous framing and supports for platforms, and supports for equipment, counters, benches, and vanities.
    4. Stairs
    5. Shop priming and finish painting of hot-dip galvanized work.

2. Materials, General: Provide products and materials of new stock, free from defects, and of best commercial quality for each intended purpose.

    1. Steel Plates, Shapes, and Bars: ASTM A 36.

    2. Steel Tubing: ASTM A 500 or A 501, hot or cold rolled, as required for design loading.

    3. Steel Pipe: ASTM A 53, schedule 40, Type S (seamless), black except where galvanized is indicated, Grade A for cold-bending.

    4. Steel Sheet: ASTM A 366, A 570, or A 611, grade required for design loading.

    5. Bolts and fasteners: ASTM A 307 and A 325.

    6. Concrete: Concrete fill for steel bollards is specified in Section 033000, CAST-INPLACE CONCRETE.

    7. Inserts: Threaded or wedge type, galvanized ferrous castings; either ASTM A 47 malleable iron, or ASTM A 27 cast steel. Provide threaded inserts and wedge inserts.

    8. Provide exposed fastenings of same material and finish as metal to which applied, unless otherwise noted.

    9. Welding rods: Conform to AWS Standards and recommendations of welding rod manufacturer.

    10. Grout for Interior Applications: Pre-mixed, non-staining, non-corrosive, non-shrink, non-metallic complying with CE CRD-C-621, Type D.

    11. Grout for Exterior Applications: Provide Factory-packaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at project site. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating.

3. Fabrication - Fabricate work of this Section to be straight, plumb, level and square, and to sizes, shapes and profiles indicated on approved shop drawings. Ease exposed edges. Cut, reinforce, drill and tap metal work as required for proper assembly.

    1. Fabricate miscellaneous supports, brackets, braces and the like required to fully complete the work.
    2. Obtain loading requirements from suppliers of work to be supported. Design and support systems with a safety factor of at least 6 unless otherwise indicated.
    3. Allow for thermal movement resulting from 100°F change in ambient temperature.
    4. Shear and punch metals accurately. Remove burrs.
    5. Ease exposed edges to a radius of approximately 1/32 in., unless indicated otherwise. Form bent corners to smallest radius possible without causing grain separation or impairing work.
    6. Remove sharp or rough areas on exposed traffic surfaces.
    7. Weld seams continuously. Spot welding is permitted for temporary welding only.

3. Work Exposed to View: For work exposed to view, select materials with special care. Provide materials which are smooth and free of blemishes such as pits, roller marks, trade names, scale and roughness. Fabricate work with uniform hairline joints. Form welded joints and

seams continuously. Grind welds flush to be smooth after painting. For exposed fasteners, use hex head bolts or Phillips head machine screws.

4. Radius/Curved Work: Form radius/curved work to true radius without segmentation, buckling, warping, or otherwise altering member dimensions or appearance. Where member cannot be formed to required dimensions, provide equal shape and size member fabricated from equivalent plate stock, fabricated, welded and ground to provide required appearance and performance.

5. Galvanizing: Hot-dip galvanize exterior metal fabrications, items located at exterior locations, and other items indicated to be galvanized, in compliance with ASTM A 123,

6. Steel Handrails and Guardrails: Conform to ASTM E 985 for design and engineering for 9 performance based on testing performed in accordance with ASTM E 894 and ASTM E 935, using load and deflection values specified below. Design and fabricate handrails and guardrails to support 50 lb. per linear foot uniform load and 200 lb. concentrated load, located at any point to cause greatest stress horizontally or vertically.. Load conditions do not act concurrently. Design maximum deflection of any member under load conditions shall not exceed L/360.

7. Concrete Filled Pipe Bollard Fabrication: Provide minimum 8 in. diameter Schedule 80 steel pipe of length to extend from at least 64 in. below grade to at least 48 in. above grade, unless otherwise indicated.

8. Miscellaneous Framing and Supports: Fabricate miscellaneous framing and supports to adequately support live and dead loads with a safety factor of 6. Provide necessary anchors, inserts, and fasteners. Fabricate support system to carry entire load of work being supported to structure above. Do not transfer any loads to ceiling systems.

9. Counter and Bench Supports: Fabricate counter and bench support brackets to support weight of counter, bench or table, plus an additional 500 lbs. concentrated load located to create greatest stress. Fabricate brackets to be inconspicuous from normal viewing angles, unless otherwise indicated on Drawings. Drill brackets for anchor bolts and fasteners.

SECTION 05 70 00 DECORATIVE METAL

1- Work Included: Decorative guardrails and railings at monumental stairs and bridge elements.

1. Perforated Decorative mechanical grilles and frames, interior, shop finished.
2. Perforated steel panels at steel guardrails – primed for metallic paint field finish by painter.
3. Custom T vertical balusters.
4. Basis of Design Product: Subject to compliance with requirements, provide products by Accurate Perforating Company or comparable product by MarCo Specialty Steel or McNichols.

SECTION 061000 - ROUGH CARPENTRY

1. Work Included - Provide all rough carpentry work, as indicated on the Drawings and as specified herein. Rough carpentry shall include but not be limited to:

1. Rough hardware, inserts, and related metal components.
2. Rough carpentry sleepers, blockings, curbs, cants, edgings, grounds, nailers, and furring.
3. Wood preservative treatments and applications.
4. Fire-retardant treatments and applications.
5. Construction panels, including plywood backing panels for electrical and telephone equipment; plywood sheathing at exterior walls.

2. General Carpentry - Material Schedule shall be as follows:

Item	Grade	Species
Lumber 2 in. nominal thickness or greater	Construction Grade	Spruce-Pine-Fire
Lumber less than 2 in. nominal thickness	Construction Grade	Spruce-Pine-Fire

SECTION 062000 FINISH CARPENTRY

1. Work Included - Provide all finish carpentry and millwork.

1. Interior standing and running trim.
2. Solid surface countertops with undermount stainless steel sinks.
3. Quality Standards - Provide work complying with applicable requirements of AWI Quality Standards Where not otherwise indicated, fabricator may choose among options permitted by AWI for grade of work specified.
4. Panel Products: Provide minimum 45 pounds per cubic foot medium density fiberboard. Do not use hardboard.
5. Fire Performance: All concealed work in this section shall be UL labeled fire-retardant treated. Exposed woodwork shall have a flame spread of less than 200 when tested in compliance with ASTM E 84.

2. Products

1. Quality Standard: Provide AWI Premium Grade materials and workmanship.
2. Wood Species and Cuts: Provide FSC Certified Poplar
3. Solid surfacing material - Provide Staron Sheet and Staron Sinks and Bowls, as manufactured by Samsung Chemical USA, Inc.; or equal, color selected by architect.
4. Solid surfacing work includes, but is not limited to countertops and vanities with undermounted stainless steel sinks.

SECTION 064000 ARCHITECTURAL WOODWORK

1. Work Included Provide architectural woodwork

1. Custom plastic laminate casework and sills.
2. Custom plastic laminate paneling.
3. Custom plastic laminate benches.
4. Upholstered cushions for benches.
5. Wood handrails.

2. References

1. American National Standards Institute (ANSI):

A161.2	Performance Standards for Fabricated High Pressure Decorative Laminate Countertops
A208.1	Particleboard, Mat-Formed Wood

2. American Society for Testing and Materials (ASTM):

E 84	Surface Burning Characteristics of Building Materials

3. The Architectural Woodwork Institute (AWI):

Quality Standards	Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program

2. Plastic Laminate Casework

4. Basis-Of-Design: Plastic laminate types, colors and textures are based on those manufactured by Aborite. Provide these products, or equal from one of the following, or equal:
5. Aborite.
6. Formica.
7. Nevamar.
8. Wilsonart.

9. Scope: Custom plastic laminate casework includes, but is not limited to, the following:
1. Cabinets.
2. Cubbies.
3. Display cases.
4. Benches and seats.
5. Wall paneling.
6. Miscellaneous plastic laminate casework.

4. Quality Standard: Provide AWI Premium Grade materials and workmanship. Provide exposed facing materials as follows:

1. Provide vertical grade high pressure plastic laminate for both sides of swinging and sliding doors, drawer fronts, and all exposed cabinet ends
2. Color/Texture/Pattern: Provide laminates in colors, textures and patterns selected by Architect. Up to 4 different colors of woodgrain Plastic Laminate may be selected.

5. Preparation for Related Work: Prepare casework for all related electrical, telephone, mechanical, and plumbing work.

6. Medium-Density Fiberboard (MDF) Cores for Laminated Products: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde. Provide Sierra Pine's "Medex," "Medex NC," and "Medite II" or Weyerhaeuser's "Premier Plus" fiberboard, or equal.

SECTION 071415 – COLD FLUID APPIED WATERPROOFING

1. Work Included:

1. Fluid applied single component waterproofing at mechanical room basement walls.

2. Materials

A. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.

3. Fluid applied membrane

1. Single-Component, Polymer-Modified Waterproofing: .
2. Basis-Of Design Product: Provide Tremco “Tremproof 260” fluid-applied waterproofing, or equal

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Anti-Hydro International, Inc.
b. BASF Corporation-Construction Systems.
c. Tremco Incorporated.
C. Typical Physical Properties:

1. Adhesion to Concrete ASTM C794: 1 pli per ASTM C836
2. Exceeds Elongation ASTM D412: 800%
3. Crack Bridging Ability ASTM C1305: Pass (*Tested at recommended application thickness of 60 dry mils)
4. Water Vapor Permeance ASTM E96, wet cup: 0.09 perms 5.47 X 10 -9 g/Pa*S*m2
5. Water Vapor Permeability ASTM E96, wet cup: 0.0054 perm inch, 50% R.H.
6. Hardness, Type 00 ASTM D2240: Passes 5.5 of ASTM C836; 50 minimum

SECTION 071600 CEMENTITIOUS WATERPROOFING

1. Work Included

A. Provide cementitious waterproofing at the elevator pit, and elsewhere as indicated on the Drawings and as specified herein.

2. Cementitious Waterproofing

2.. Products:
Subject to compliance with requirements, provide one of the following, or equal:

1. Anti-Hydro International, Inc.; A-H Hydroseal.
2. Five Star Products, Inc.; Five Star Waterproofing.
3. International Chem-Crete, Inc.; CCC 150.
4. Sika Corporation, Inc.; Sika Top Seal 107.

2. Water Permeability: Maximum zero for water at 30 feet (9 m) when tested according

to CE CRD-C 48.
3. Compressive Strength: Minimum 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
4. Flexural Strength: Minimum 710 psi (4.8 MPa) at 28 days when tested according to ASTM C 348.
5. Bond Strength: Minimum 220 psi (1.5 MPa) at 14 days when tested according to ASTM C 321.
6. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction, but not exceed 400 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

SECTION 071613 – BITUMINOUS DAMPPROOFING

1. Work Included: Provide below-grade bituminous dampproofing at foundation walls.

2. Dampproofing Product: Asphalt-based emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.

3. Spray Grade: Emulsified asphalt, prepared with mineral-colloid emulsifying agents without fibrous reinforcement, complying with ASTM D 1227, Type III.

4. Protection Course: ASTM D 6506, 1/8-inch- (3-mm-) thick, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

SECTION 072100 BUILDING INSULATION

1. Work Included Provide building insulation work as indicated on Drawings, and as specified, including but not limited to:

2.
   1. Rigid extruded polystyrene foundation insulation.
   2. Stone wool exterior wall insulation
   3. Underslab insulation.
   4. Installation of Sound-Absorbing Insulation at Acoustical Metal Deck.

2. Rigid Extruded Polystyrene Insulation

A. Extruded-Polystyrene Board Foundation Wall and Underslab Insulation: Provide extruded polystyrene insulation conforming to ASTM C 578, minimum 25 lbs. per sq. in. compressive strength at 0.1 in. deformation, 2.0 lbs. per cu. ft. density "K" factor of 0.185 at 40^{O}F. and 0.20 at 75^{O}F. per in. thickness, water vapor transmission of 1.0 perm, and water absorption by volume of 0.1%.

1. Provide one of the following products, or equal:
2. DiversiFoam Products.
3. Dow Chemical Company.
4. Owens Corning
5. Pactiv Building Products Division. R-Values: Provide the following minimum R-Values:
   1. Underslabs on Grade: Minimum R=15..

2. Foundation Walls: Minimum R=10.

3. Stone-Wool Exterior Wall Insulation

A. Provide non-combustible, lightweight and water repellent, high density 6.0 PCF semi-rigid insulation board, for use in cavity wall applications. Stone wool insulation shall be in compliance with FM Global Data Sheet 1-12. Provide product equal to:
1. Thermafiber - Rain Barrier HD (high density full thickness boards)
2. R values: Provide minimum R-Values:
a. Exterior Walls: Minimum R= 21.

B. Mechanically Adhesively Attached, Spindle-Type Anchors (Stick-Pins): Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated.
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square. Plate shall have 2 screws each.
2. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
3. Mastic adhesive shall have a VOC content not more than 80 g/L.

SECTION 072720 AIR AND VAPOR BARRIERS

1. Work Included –

Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane NFPA 285 compliant.

2. Products: Subject to compliance with requirements, provide one of the following, or equal:
Elastomeric, Modified Bituminous Membrane:

1. Henry Company; Air-Bloc 06 WB.
2. Meadows, W. R., Inc.; Air-Shield LM.
3. Tremco Incorporated, an RPM company; ExoAir 120SP/R.
4. Synthetic Polymer Membrane:Grace, W. R., & Co. - Conn.; Perm-A-Barrier Liquid; Henry Company; Air-Bloc 32.

3. Physical and Performance Properties:

5. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
6. Vapor Permeance: Maximum 0.1 perm (5.8 ng/Pa x s x sq. m); ASTM E 96/E 96M.
7. Ultimate Elongation: Minimum [500] <Insert number> percent; ASTM D 412, Die C.

4.. Auxiliary Materials

1. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
2. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

3. Counterflashing Strip: Modified bituminous, 40-mil- (1.0-mm-) thick, self-adhering sheet consisting of 32 mils (0.8 mm) of rubberized asphalt laminated to an 8-mil- (0.2-mm-) thick, cross-laminated polyethylene film with release liner backing.

4. Butyl Strip To Terminate Air Barrier to EPDM or TPO Roofing Membranes: Vapor retarding, 30 to 40 mils (0.76 to 1.0 mm) thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.

5. Modified Bituminous Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, selfadhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1mm-) thick polyethylene film with release liner backing.

6. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.

7. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

8. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

9. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0250 inch (0.64 mm) thick, and Series 300 stainless-steel fasteners.

10. Sprayed Polyurethane Foam Sealant To Fill Gaps at Penetrations and Openings: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

11. Modified Bituminous Transition Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.

12. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil- (1.3- to 1.6-mm-) thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.

13. Preformed Seal for Openings in Wall: Manufacturer's standard system consisting of cured low-modulus silicone or fiberglass, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding to substrates.

    1. Products: Subject to compliance with requirements, provide one of the following, or equal:

        1. Dow Corning Corporation; 123 Silicone Seal.
        2. Momentive Performance Materials Inc.; US11000 UltraSpan.
        3. Pecora Corporation; Sil-Span.
        4. Tremco Incorporated, an RPM company; Spectrem Simple Seal or Proglaze.

N. Joint Sealant: ASTM C920, single-component, neutral-curing silicone; Class 100/50 (lowmodulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O.

SECTION 074243 METAL COMPOSITE MATERIAL WALL PANELS

1. Work Included: Provide factory-formed and -assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.
2. Product:
    1. Alucobond; Alucobond Plus
    2. Arconic Architectural Products; Reynobond FR.
    3. Fairview Architectural; Vitrabond FR.
    4. Mitsubishi Plastics Composites America, Inc
    5. Alpolic/fr

3. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- thick, coil-coated aluminum sheet facings.

    1. Panel Thickness: 4 mm.
    2. Core: Fire retardant.
    3. Reveal: As indicated.
    4. Exterior Finish: Mica fluoropolymer – color to match architects sample.

SECTION 075300 – SINGLE PLY MEMBRANE ROOFING

1. Work Included: The scope of work includes:

    1. Fully-adhered single ply, reinforced thermoply roofing membrane.
    2. Roof flashings.
    3. Roof cover board.
    4. Roof underlay board at acoustical decks without concrete.
    5. Roof insulation at membrane roofing.
    6. Fully adhered vapor retarder.
    7. Roof pavers.

2. Manufacturers: Provide Thermoplastic PVC Sheet, uniform, flexible sheet formed from thermoplastic PVC, and as manufactured by one of the following:

    1. Sarnafil.
    2. Carlisle SynTec, Inc.
    3. Johns Manville

3. Roof System: Basis of Design - Sarnafil G410 membrane as manufactured by Sarnafil, 60-mil thick reinforced.

    1. Provide thermoply roofing system consisting of adhered single-ply PVC sheet and mechanically-attached insulation over roof deck. Provide system conforming to UL Class A and

Factory Mutual Class 1. Roof system shall conform to Factory Mutual Windstorm Resistance Classification I-90.

2. Membrane Color: tan membrane color.

4. Isocyanurate Board Roof Insulation: Provide indicated thickness of flat and tapered rigid isocyanurate foam roof insulation consisting of isocyanurate integrally laminated on top and bottom with non-reflective facer. Provide insulation conforming to Fed. Spec. HH-I-1972, and that is acceptable to roofing system manufacturer.

1. Rigid isocyanurate shall have minimum density of 2 lb. cu. ft., minimum compressive strength (ASTM D 1621) of 25 psi, maximum moisture vapor transmission (ASTM E 96) of 2.0 perm, "C" factor of 0.16 (1 in.) or better, and "R" value of 6.67 (1 in.).

2. Insulation shall be approved by Factory Mutual (FM) for Class 1 Insulated Steel Deck Construction and shall be UL listed Class A.

5. Underlayment Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **5/8 in.**

1. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia- Pacific Corporation, or designer approved equal.

6. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **1/2 in.** thick.

1. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-Pacific Corporation, or designer approved equal.

7. Roof Vapor Retarder: Manufacturer’s standard self-adhereing sheet vapor retarder.

8. Membrane Flashing: Provide manufacturer’s standard PVC membrane flashing material, compatible with roofing sheets.

9. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway rolls, approximately 3/16 in. thick, and acceptable to membrane roofing system manufacturer.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

1. Work Included: The scope of work includes Roof edge stops and flashings.

2. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's two coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.

1) Color: Custom 2-coat Mica equal to Duranar Sunstorm, color as selected by architect.

3. Formed Roof Edge Units: Provide 2- piece roof edge consisting of:
   1. Metal Era (or equal) - Anchor Tite roof edge with continuous extruded aluminum cleat and custom color snap on edge fascia.
   2. Formed coping flashing set below upper roof edge.
   3. Mitered corners.

4. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

5. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

6. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

7. Fabrication, General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

SECTION 078116 CEMENTITIOUS FIREPROOFING

1. Work Included :Provide spray applied cementitious fireproofing
.
2. 1HR and 2 HR Medium density cementitious fireproofing.

SECTION 078123 INTUMESCENT FIREPROOFING

1. Work Included Field Applied Intumescent Fireproofinbg at pedestrian bridge hangers.

2. : Products

   1. CAFCO Sprayfilm, manufactured by Isolatek International, Stanhope, NJ 07874
   2. Nullifire, manufactured by the Carboline Company, St. Louis, MO 63144.
   3. Albi Clad, manufactured by Albi Manufacturing Division of StanChem, Inc.; East Berlin, CT 06023.

SECTION 078410 - THROUGH PENETRATION FIRESTOP SYSTEMS

1. Work Included: Provide firestop systems consisting of a material, or combination of materials, installed top retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, or gases through penetrations in firerated barriers. Firestops shall be used in locations including, but not limited to, the following:

    1. Penetrations for the passage of duct, cable, cable trays, conduit, piping, electrical busways, and electrical raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor slabs and floor/ceiling assemblies), and vertical service shafts.
    2. Openings between structurally separate sections of walls or floors.
    3. Above walls or partitions extending to underside of ceiling or roof assemblies above.
    4. Concealed furring spaces behind finishes.
    5. Where pipes, conduits, ducts, and other items pass through fire-rated assemblies.
    6. Openings for items mounted on or within fire-rated assemblies.

2. UL Listed Designs: Firestopping materials and systems shall be installed in each location and type of installation conforming to listed UL designs.

    1. Firestopping materials shall be UL Classified as "Fill, Void, or Cavity Material" for use in through-penetration firestop systems.

    2. Provide firestop systems that are UL listed with a fire-resistance rating equal to the hourly resistance rating of the fire-rated barrier being penetrated.

3. Fire-Resistance: Provide materials and construction identical to fire-rated assemblies tested in compliance with ASTM E 119, ASTM E 814, UL 263, or NFPA 251, by independent agencies acceptable to Designer and governing authorities.

4. Burning Characteristics: Provide products with maximum ASTM E 84 surface burning characteristics of flame spread 25 and smoke developed 25.

5. Firestop systems shall have been tested in accordance with ASTM E 814 or UL 1479 under a minimum positive pressure of 0.01 in. of water.

SECTION 079200 - JOINT SEALANTS

1. Description of Work: Work includes the following:

    1. Joint sealing of joints in exterior construction.
    2. Joint sealing of interior joints.

2. Self-Leveling Joint Sealants: Provide two or more part, self-leveling, polyurethane based elastomeric sealant, complying with ASTM C 920, FS TT-S-00227E Type 1 Class A, having Shore A hardness of not less than 30 when tested according to ASTM C 920, cured modulus of elasticity at 100% elongation of not more than 150 psi when tested according to ASTM D 412, and tear resistance of not less than 50 lbs./inch when tested according to ASTM D 624.

3. Products:

1. Pecora Urexpan NR-200.
2. Mameco Vulkem 245 or 255.
3. Sika 2C, SL.
4. Sonneborn Sonolastic PvJtSt.
5. Tremco THC 900.

4. Non-Sag Joint Sealants: Provide multi-part, non-sag, polyurethane based elastomeric sealant, complying with ASTM C 920 Type M, Grade NS, Class 25, Fed. Spec. TT-S00227E Class A, having Shore A hardness of 20 to 30, cured modulus of elasticity at 100% elongation of not more than 75 psi, and tear resistance of not less than 50 lbs./inch when tested according to ASTM D 624.

5. Products

6. Mameco International Vulkem 227 2) Sika Sikaflex 2c NS.
7. Sonneborn Sonolastic NP 2.
8. Tremco Dymeric

6. Extent: Provide non-sag polyurethane sealant for all metal to metal joints, metal to concrete joints, metal to metal window joints, wood to metal joints, wood to wood joints, and other joints not indicated to be sealed with another type of sealant.

7. Silicone Rubber Sealants: Provide one part, silicone rubber based elastomeric sealant, complying with ASTM C 920 Type S, Class 25, Grade NS and Fed. Spec. TT-S-001543A Class A.

1. Provide one of the following products or approved equal:

1. Dow 786.
2. General Electric 1702 Sanitary.
3. Pecora 863.
4. Rhodorsil 6b White.
5. Sonneborn OmniPlus.
6. Tremco Proglaze.

8. Extent: Provide silicone rubber sealant for interior joints around plumbing fixtures and tile to tile joints in ceramic tile work.

9. Acrylic Latex Sealants: Provide permanently flexible, latex rubber modified acrylic emulsion sealant, complying with ASTM C 834.

1. Pecora AC-20
2. Tremco Acrylic Latex 834
3. Sonneborn Sonolac

4. Extent: Provide acrylic latex sealant for use at mirrors, for exposed acoustical sealant, and for interior joints except where silicone rubber sealant is indicated.

10. Miscellaneous Sealant Materials

1. Primer: Provide primer recommended by sealant manufacturer for surfaces to be adhered to.

2. Bond Breaker Tape: Provide polyethylene or other plastic tape recommended by sealant manufacturer to prevent three-sided adhesion.

3. Sealant Back-Up Rod: Closed-cell, non-gassing, polyethylene rod "Ethafoam" by Dow Chemical Co. or approved equal. The diameter of the rod shall be approximately 25 percent in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.

4. Foamed-In-Place Sealant: Provide two-component polyurethane foam, UL Fire Hazard Classification Class I, consisting of polymeric isocyanurate and polyether polyol components, pressurized with nitrogen, and dispensed from portable, self contained insulation frothing kit, equal to "Froth-Pak" by Insta-Foam, or equal as approved by Designer.

SECTION 081100 - STEEL DOORS AND FRAMES

1. Work Included: Provide steel doors and frames and related items as indicated on Drawings and as specified herein. Include, but do not limit to, the following:

   a. Interior and exterior flush doors.
   b. Interior and exterior steel frames.
   c. Door louvers.

2. Fire Doors and Frames: For doors and frames installed in fire-rated assemblies and where indicated or required by authorities having jurisdiction, provide door and frame assemblies that comply with NFPA 80, and which have been tested, listed and labeled in compliance with ASTM E 152 by an independent agency acceptable to authorities having jurisdiction.

   a. Temperature Rise Rating: Labeled fire doors within an interior exitway stairway shall have a label indicating a maximum transmitted temperature end point of not more than 450°F. above ambient at the end of 30 minutes of standard fire test exposure.

3. Hot Rolled Steel: ASTM A 568 and ASTM A 569, commercial quality, pickled and oiled.

4. Cold Rolled Steel: ASTM A 366 and ASTM 568, commercial quality carbon steel.

5. Galvanized Sheet Steel: Roller leveled commercial quality zinc coated carbon steel sheets complying with ASTM A 525, G60, mill phosphatized.

6. Exterior Work: Fabricate exterior doors and frames from galvanized sheet steel with closed tops and bottoms.

7. Faces: Fabricate exposed faces from stretcher leveled cold rolled steel.

8. Interior Doors (Non-Rated): SDI-100, Grade II, Heavy Duty, 16 gage minimum face sheets, Model 3 or 4, seamless construction.

9. Interior Doors (Fire-Rated): SDI-100, Grade II, Heavy Duty, 16 gage minimum face sheets, Model 4, with seamless mineral fiberboard composite construction.

10. Exterior Doors: SDI-100, Grade III, Extra Heavy Duty, 14 gage minimum face sheets, seamless, Model 4, maximum U-factor of 0.24 BTU/HR/$FT^2/^oF$, ASTM C 236. Frames shall be demountable at service entries.

SECTION 081416 - WOOD DOORS

1. Work Included: The work of this section includes, but is not limited to, the following:

    1. Flush Wood Doors: Solid core flush wood doors with veneer faces.
    2. Stile and Rail Wood Doors: Solid stile and rail wood doors with factory glazed decorative laminated glass.
    3. Prefitting and premachining of wood doors.

2. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

3. Solid Core Wood Doors, General: AWI PC-5 construction as specified in AWI Quality Standards Section 1300-G-3. Core, stiles, and rails shall be glued together before sanding. Wood for stiles and rails shall be thoroughly seasoned, kiln-dried stock with 5% to 8% moisture content. Exposed wood door edges of stiles and rails for doors to receive transparent finish shall be same species and cut of wood to match face veneers.

    1. Core for non-fire-rated doors shall be lumber staves, edge-glued, kiln-dried softwood lumber of single species, with horizontal joints staggered in contiguous rows.
    2. Core for fire-rated doors shall be manufacturer's standard mineral core conforming to ANSI A208.1, Algoma Weldrok core, or approved equal.
    3. Crossbands shall be 1/16 in. thick hardwood, full width of door, with grain at right angle to face veneer grain.
    4. Veneers for transparent finishes shall be Premium Grade Select Quarter-Sawn FSCCertified White Maple, at least 1/50 in. thick, adhered to 1/16 in. hardwood crossband, core, rails, and stiles by hot press method. Provide veneers book matched, balance matched, and pair matched.

4. Mineral Core Flush Wood Fire-Rated Doors: Flush wood-faced mineral core doors, 1-3/4 in. thick, five-ply, with crossbanding and face veneers bonded to both faces, of fire-rated construction, equal to Superstile Edge Architectural Wood Composite Fire Door manufactured by Algoma Hardwoods, Inc. or approved equal doors by above listed manufacturers. Provide blocking for hardware so that screws fasten into hardwood for entire length. Furnish UL Label of indicated Class and Hour rating affixed to hinge jamb of each door.

5. Solid Core Flush Interior Wood Doors: Flush type, Algoma Grade Novodor of five-ply construction with crossband and veneers bonded to both faces. Doors shall be 1-3/4 in. thick.

6. Solid Stile and Rail Interior Wood Doors: Interior doors complying with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors," fabricated from FSC-Certified White Maple.

7. Factory Finishing of Wood Doors: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

    1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
    2. Finish doors at factory.

3. Transparent Finish:

    1. Grade: Premium.
    2. Finish: AWI catalyzed polyurethane system.
    3. Staining: As required to match Architectural Woodwork.
    4. Effect: Filled finish.
    5. Sheen: Satin.

SECTION 083113 - ACCESS DOORS AND FRAMES

1. Description of Work: Furnish access doors and access panels for installation under work of other Sections as indicated on Drawings and as specified.

2. Access Doors and Panels: Furnish metal access doors and panels for access to valves, damper controls, pipes, conduits, switches, regulators, etc., to the proper trades for building into the work, except that any access panels specifically specified under the Mechanical or Electrical Sections of the Specifications to be furnished by those trades are excluded from the work of this Section.

3. Furnish flush-type access doors, 18 ga. minimum thickness specially designed for each type of wall and ceiling finish and construction with which used, with factory-applied prime finish, as manufactured by Karp Associates, Inc., Birmingham Ornamental Iron Co., Miami-Carey, Babcock-Davis, or equal approved by Architect. Refer to Architectural, Mechanical, and Electrical Drawings for locations, sizes, and materials with which used.

    1. Where installed at fire-rated walls or ceilings access panels shall be of fire-resistive construction and shall bear the U.L. 2-hr. label.

    2. Where installed in surfaces finished with ceramic tile, access panels shall be stainless steel with No. 4 finish.

    3. Where installed in drywall construction, access panel frames shall be flush edge-frame type, designed for drywall insert.

    4. Access panels shall have concealed hinges.

SECTION 083340 - OVERHEAD COILING GRILLES

1. Work Included: Work of this Section consists of furnishing all labor, materials, equipment, and services necessary to complete the work indicated, and without limiting the generality thereof includes:
    1. Electrically operated overhead coiling grilles.

2. Hand operated horizontal “curtain type” grilles

2. Overhead coiling grilles - linked-rod type, up-rolling, manufactured by Atlas Door Corp., Edison, NJ 08818, equivalent products of Kinnear Walter Balfour and Co., Inc., Cookson Co., or Cornell Iron Works, Inc., or approved equal.

3. Grille Curtain: Grille curtains shall be straight-linked rectangular design, constructed of horizontal aluminum rods not less than 5/16 in. diameter, continuous from jamb to jamb and spaced not more than 2 in. on center. Rods shall be held in position by aluminum links in rectangular grid pattern, spaced not more than 9 in. on center. The ends of each horizontal rod shall be secured to an end link to lock the curtain in the guides. Bottom of curtain shall be equipped with aluminum angle or tube rail.

4. Guides: Guides shall be formed of aluminum and shall be provided with wood or vinyl pipe stripping on both sides to reduce noise and friction.

5. Electrical Operation: Equip coiling grilles with manufacturer's standard electrical operator specially designed for size, type, and operation of coiling grille, operating from 208 V, 3 phase, 60 HZ power sources as indicated on Drawings. Locate operator to clear obstructions. Operator shall be UL listed. Equip each operator with remote control switch to be installed and connected under Division 26, ELECTRICAL at locations indicated on Drawings. Provide key operated controls for each grille. Keying shall be as directed by Owner.

SECTION 084113 – ALUMINUM STOREFRONTS AND ENTRANCES

1. Work Included: Provide aluminum entrances and storefront work as indicated on the Drawings and as specified herein, including, but not limited to the following:

    1. Storefront framing systems.
    2. Entrance and vestibule doors.
    3. Manufacturer’s concealed operable vents with multi-point operators and custum painted trim retainers.
    4. 3-6” extended sunscreen and supports with extruded custom extruded shade louvers.
    5. Standard and custom 6” extruded cap covers and fiberglass pressure plates.
    6. 6” extruded aluminum trim channels.
    7. Standard 45 degree corner mullions where indicated.
    8. Wet glazing over extruded or cut gaskets at security glazing per security film manufacturer.
    9. Custom extruded starter sills.

2. Storefront Manufacturers: Provide storefront and entrance systems that meet or exceed requirements of the listed system:

    1. Kawneer Company, Inc.
    2. Oldcastle
    3. YKK

Sunshade Manufacturers:

1. McGill Architectural Products – Basis of Design

3. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125 in. thick extrusions for door stiles and storefront framing. Provide 0.050 in. thick aluminum for glazing moldings.

    1. Storefront Basis of Design: Kawneer 601 UT
    2. Sunshades basis of Design: Model PL-645 Horizontal
    3. Framing shall be field glazed with 1-3/4 in. heat strengthened glass or tempered glass (where required by law). Glass and glazing is specified as work of Section 088000, GLAZING.

4. Entrance and Vestibule Doors: Aluminum doors shall be TuffLine Series 350 Medium Stile factory-glazed aluminum doors, manufactured by Kawneer Company, Inc., or approved equal.

    1. Aluminum doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.1875 in. thick for door stiles and 0.050 in. thick for glazing molding.
    2. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.
    3. Corners shall be Dual-Moment welded.
    4. Each door shall be factory glazed with 1/4 in. thick, clear tempered glass at interior vestibule doors, and 1 in. thick insulating glass at exterior doors set in neoprene glazing gasket. Glass shall conform to requirements of Section 088000, GLAZING.

6. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's two coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.

    1. Color: Custom 2-coat Mica equal to Duranar Sunstorm, color as selected by architect.

SECTION 086200 UNIT SKYLIGHTS

1. Work included:

    1. Provide factory-assembled unit skylights that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance
    requirements indicated.
    B. Unit Size: 7’-0”.
    C. Acrylic Glazing: Monolithic, formable, transparent (colorless) or translucent (white) sheets with
    good weather resistant. Triple dome acryilic thermoformed domes designed to meet OSHA fall standard requirement loadings.
    2. Glazing Gaskets: Manufacturer's standard.

3. Condensation Control: Fabricate unit skylights with integral internal gutters and non-clogging weeps to collect and drain condensation to the exterior.
4. Thermal Break: Fabricate unit skylights with thermal chambered PVC.
5. Integral Curb: Fabricate from double skin of 1100-H14 sheet aluminum, insulated with 1-1/2", R5.8, EPS insulation. Provide thermal break at top and bottom.

SECTION 087100 - HARDWARE

1. Work Included: Provide Finish Hardware to provide correct functions for intended use. Provide related items and services as indicated on the Drawings and as specified. Furnish hardware schedules and templates as required for fabrication of doors and frames under other Sections. Provide hardware that complies with applicable codes and requirements of authorities which have jurisdiction.

2. Quality Assurance

    1. Hardware for Fire-Rated Openings: NFPA 80, and local requirements.
    2. Handicapped Accessibility: ANSI A117.1, and local requirements.
    3. Materials and Application: ANSI A156 series standards
    4.

    3. Door Hardware:

        1) Quality Level: Commercial type.
        2) Locksets and Latchsets: Mortise type.
        3) Lock Cylinders: Interchangeable type.
        4) Keying: Owner's requirements keying and key control system.
        5) Hinges and Butts: Full-mortise type with nonremovable pins at exterior doors.
        6) Closers, Door Control: Barrier-free type; concealed in public areas.
        7) Pivots: Offset or center-hung type.
        8) Push/Pull Units: Through-bolted type.
        9) Entrance doors at vestibules: Rockwood 36" straight bar pulls.
        10) Hardware Finishes: US 32D satin stainless steel on exposed surfaces.
        11) Electromagnetic locks and power supply coordinated with security system. 11) Exit Devices: Concealed vertical rod, typical.

    4. Auxiliary Materials:

        1) Door Trim Units: Kickplates, edge trim, viewers, and related trim.
        2) Stops and overhead door holders.
        3) Door Silencers.
        4) Soundstripping.
        5) Weatherstripping and thresholds.
        6) Electromagnetic hold-open devices.
        7) Card-operated opening devices, including all entrance doors.

    5. Power Door Operators: Door operators for power-assisted doors.

        1) Power Units: Two-way swing door type.
        2) Operator: Electromechanical operator.
        3) Automatic Door Control: Infrared motion detector automatic controls.
        4) Manual Door Control: Rail-supported switch.
        5) Wall push-plate switch.

SECTION 088000 - GLAZING

1. Work Included: The scope of work, includes interior glass and glazing work and exterior glass at entrances and storefronts, and includes:

    1. Interior glass for doors, sidelights, borrowed lights, etc.
    2. Exterior glass for aluminum curtain wall and entrances.
    3. Mirrors.

2. Clear Float Glass: ASTM C 1036 ,Type I-Transparent, Flat, Class 1-Clear, Quality q3.

3. Clear Heat Strengthened Glass: ASTM C 1048, Condition A-Uncoated, Type I-Transparent, Flat, Class 1-Clear, Quality q3, Kind HS.

4. Clear Tempered Glass: ASTM C1048, Condition A-Uncoated, Type I-Transparent, Flat, Class Clear, Quality q3, Kind FT.

5. Exterior Low 'E' Coated Insulated Glass: Equal to Viracon 1-3/4" (44mm) Triple Insulating (Double low e Coating) VE1-2M.

6. Mirrors: 1/4 in., Quality q2, clear float glass with silver, copper, and organic coating, and as follows:

    1. Edges: Uniformly ground and polished.

7. General Glazing Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:

    1. Dow Corning 795.
    2. General Electric Silglaze N 2500 or Contractors SCS-1000.
    3. Rhodorsil 3B, 5C, or 6B.
    4. Tremco Proglaze.

8. Weather Seal Sealant: Provide non-acid curing sealant with movement range ± 50%, ASTM C 719. Provide one of the following:

    1. Dow Corning 795.
    2. General Electric Silpruf.
    3. Rhodorsil 3B, 5C, or 6B.
    4. Tremco Spectrum 2.

9. Structural Sealant: Provide one of the following structural sealants recommended by manufacturer for structural glazing applications.

    1. Dow Corning 795 or 983.
    2. General Electric Ultraglaze SSG 4000 or SSG 4200.

3. Tremco Proglaze II.

10. Mirror Adhesive: Palmer's Mirro-Mastic.

11. Glass Schedule: Provide following glass types.

1. Exterior Type 1: Curtain wall glass, 1-3/4 in. thick insulating units comprised of three1/4 in. glass lites within 1/2 in. air space, high performance low-e coating on #2 and #4 surfaces.
2. Exterior Type 2: Curtain wall glass, 1-3/4 in thick insulating units with the exterior lite ¼" Schott Narima dichroic and inner two lites ¼ clear with low e surface #4.
3. Interior Type 1: 1/4 in. mirror glass.
4. Interior Type 2: ½" laminated glass with .030 decorative interlayer with dot screen gradiant pattern by architect. Interior doors and interior glazing.

SECTION 08 87 13 GLAZING FILMS

1. Work Included:

1. Decorative glazing interlayer for laminated glass units installed by interior glass and glazing contractor.
2. Basis of Design Product: Subject to compliance with requirements, provide Solyx; White
3. Matte Dot Gradation SXJ-0500 or comparable product by one of the following:
   1. 3M; Fasara.
   2. Llumar.

4. Security film includes the following furnished and installed on exterior insulated glazing units in aluminum-framed curtain wall and entrances by the curtain wall contractor (ground floor and entrance vestibules).
5. Security Window Film - 3M Safety & Security Window Film Ultra 800 Series, comparable product.

SECTION 089000 - LOUVERS

1. Work Included: Furnish and install metal wall louvers, as indicated on Drawings and as specified herein.

2. Metal wall louvers shall be the products of one of the following manufacturers, or approved equal:

   1. Construction Specialties Inc., Cranford, NJ 07016.
   2. Airolite Company, Marietta, OH, 45750.
   3. Industrial Louvers, Inc., Delano, MN 55328.

3. Aluminum Extrusions:

   1. ASTM B 221, alloy 6063-T52.
   2. Minimum Thickness: 0.081 in.

4. Fabrication: Unless otherwise indicated, exterior stormproof louvers shall be 4 in. deep, continuous blade, drainable type, with 40% minimum free air area and channel frame as indicated.

5. Construction:

1. Assemble louvers by heli-arc welding.
2. Arrange louvers in full height and width panels without exposed vertical mullions.
3. Heads, sills, and jambs shall be one piece structural members.
4. Manufacturer shall provide all necessary structural supports and bracing to carry wind load of not less than 20 psf.

6. Screens: Provide louvers with 1/2 in. mesh, 0.063 in. diameter aluminum wire intercrimp bird screens secured in removable extruded aluminum frames.

7. Aluminum Finish: Fluoropolymer Two-Coat System; Manufacturer's two-coat, thermocured system consisting of specially formulated inhibitive primer, and fluoropolymer color coat, with color coat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight; complying with AAMA 605.2.

1. Color: Custom 2-coat Mica equal to Duranar Sunstorm, color as selected by architect.

SECTION 092900 - GYPSUM BOARD ASSEMBLIES

1. Work Included: Furnish and install gypsum drywall work, as indicated on the Drawings and as specified. Include, but do not limit to:

    1. Steel suspension systems for ceilings and soffits.
    2. Screwable steel stud interior partition framing.
    3. Screwable steel stud framed and furred enclosures at columns and beams.
    4. Blockings and attachments for fixture supports.
    5. Gypsum wallboard finishes.
    6. Concealed acoustical sealant work, and acoustical insulation of gypsum wallboard finishes at steel stud framed partitions and furrings where indicated.
    7. Installation of access doors.
    8. Other gypsum drywall work called for on the Drawings or reasonably required to complete the Project intent.

2. Metal Ceiling Suspension System Components: Provide components that conform to ASTM C 754 for materials and sizes, unless indicated otherwise. Provide all metal runners, hangers, studs, and channels hot-dip galvanized conforming to ASTM A 525, G60, unless noted otherwise.

    1. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, 12 gauge minimum.
    2. Hanger Rods: Where required for loading or by local authorities, provide mild-steel rods, sized as required, hot-dip galvanized.
    3. Flat Hangers: Where required for loading or by local authorities, provide mild-steel flat hangers, sized as required, hot-dip galvanized.
    4. Channels: Provide cold-rolled steel channels, minimum 16 gauge with 7/16 in. wide flanges, protected with corrosion-resistant coating, and as follows:

        1. Carrying Channels: 1-1/2 in. deep, 475 lb. per 1,000 lin. ft., hot-dip galvanized.
        2. Furring Channels: 25 ga. hot-dip galvanized, screwable, pressed steel furring channels, 7/8 in. thick, hat section.

3. Steel Studs for Furring Channels: ASTM C 645, minimum 25 gage, hot-dip galvanized, with flange edges bent back 90 degrees and doubled over to form minimum 3/16 in. lip, depth as indicated.
4. Resilient Channels for Mounting at Emergency Generator Room Ceiling: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
5. Clips for attachment of steel furring channels to steel carrying channels shall be proprietary clips as recommended by manufacturer.

3. Ceiling Suspension System: Provide a complete, mechanical suspension system conforming to ASTM C 645, consisting of cold-rolled steel channel main runners, screwable steel furring channels hangers and anchors and all required clips and other components, required for complete installation.

4. Steel Stud Wall Framing Systems:
   1. Unless otherwise indicated, steel stud system for walls and partitions shall be a complete proprietary framing system consisting of prefabricated, non-load bearing, screwable 20 ga. and 25 ga. steel studs, steel track, anchors, and related items, conforming to ASTM C 645. Provide all metal runners, hangers, studs, and channels hot-dip galvanized conforming to ASTM A 525, G60, unless noted otherwise.

   2. Special system at gypsum shaft-wall construction shall be as above, except with "C-H" Type galvanized steel studs, or equivalent.
   3. Provide minimum 20 gage steel studs at jambs of door and fixed glass frames, at open partition ends, and where the partition is to receive wall-mounted shelves, heavy fixtures, etc.

5. Gypsum Wallboard: Indicated thickness(es) by 48 in. width by lengths as required, tapered edge, paper finish, conforming to ASTM C 36. Where used in fire-rated assemblies, provide Type X fire resistant type.

6. Water Resistant Gypsum Backer Board: Provide water resistant type gypsum backing board conforming to ASTM C 630 at locations indicated.

7. Impact-Resistant Drywall: Where indicated, interior gypsum board partitions in public areas shall be 5/8 in. thick, tapered edge, Gold Bond Fire-Shield Type X Hi-Impact 3000 Wallboard, as manufactured by National Gypsum Co.; or equal by US Gypsum; Domtar Gypsum; or approved equal.

8. Gypsum Shaft Wall Liner: 1 in. thick solid gypsum core, in multilayered, moisture-resistant green paper, 24 in. wide by lengths as required to eliminate end joints.

9. Preformed Reveals: Preformed reveals and corners for gypsum wallboard partitions shall be equal to Softforms Commercial Grade Standard Extrusions, manufactured by Softforms Division, Pittcon Industries, Inc., or approved equal. Shapes shall be extruded 6063-T5 aluminum alloy 1/8 in. thick, minimum (profile areas). Shapes shall be primed; plaster and paints shall be capable of bonding to primed surface. Fire rating shall be Class A. Provide all required shapes and radii indicated or required to complete the work.

10. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 5: At all wall and ceiling surfaces that will be exposed to view unless otherwise indicated.

SECTION 093000 - TILING

1. Work Included Furnish and install floor and wall tile.

    1. Floor quarry tile.
    2. Porcelain floor tile.
    3. Ceramic wall tile.
    4. Base tile.
    5. Marble thresholds

2. Prodcuts:

    A. Quarry Tile: 6 in. by 6 in. by 1/2 in. thick, unglazed, natural clay quarry tile, edge ground for exact and consistent face size, with ribbed or other bonding features on back, and with non- slip abrasive grit applied to face, equal to American-Olean "Murray", Midstate Tile Co. "Quarry Tile", Summitville "Quarry Tile", or equal. Color shall be as selected by Architect.

    1. Provide matching 6 in. by 6 in. coved sanitary base with rounded or square tops as indicated.

    B. Floor Tile: 1 in. Penny-Round ceramic floor tile, equal to “Complete Tile Collection” by Penny Rounds; or approved equal as manufactured by DalTile; American-Olean, Summitville, or equal. Colors shall be as follows:

    1. Color: Art White, matte.

    C. Ceramic Wall Tile: 4-1/4 in. by 12-3/4 in., ceramic wall tile, equal to DalTile “Modern Dimensions”; or approved equal as manufactured by American-Olean, Summitville, or equal. Color shall equal to DalTile “Matte Arctic White” 0790.

    1. Provide bullnose trim pieces at all exposed edges and corners.
    2. Flat-Top Cove Base: 4-1/4 in. x 8-1/2 in. to match wall tile color.

    D. Ceramic Accent Tile: 1 in. Penny-Round ceramic wall accent tile, equal to “Complete Tile Collection” by Penny Rounds; or approved equal as manufactured by DalTile; American- Olean, Summitville, or equal. Colors shall be as follows:

        1. CT-A1: Color 1 (Art White, gloss).
        2. CT-A2: Color 2 (Iron Azul, gloss).
        3. CT-A3: Color 3 (Rojo Coral, gloss).
        4. CT-A4: Color 4 (Amarillo).

3. Tile Installation Methods: Install and grout tile in accordance with the provisions of the standard specification and published details hereinbefore listed, generally as follows, in accordance with TCA "Recommended Uses":

1. Floor Tile, Thinset: Latex-Portland Cement Mortar, TCA Method F113, with Latex-Portland Cement Grout.

2. Ceramic Wall Base: Latex-Portland Cement Mortar, Applied to Cementitious Tile Backerboard, TCA Method W244, with Latex-Portland Cement Grout.

SECTION 095113 ACOUSTICAL PANEL CEILINGS

1. Work Included: Provide suspended acoustical ceilings as indicated on Drawings and as specified.

1. Acoustical panel lay-in ceiling with exposed suspension system.

2. Suspension System Provide products of one of the following manufacturers that meet or exceed requirements specified, or equal:

1. Chicago Metallic Corporation
2. Donn Corporation
3. Armstrong World Industries.
4. National Rolling Mills
5. Technical Ceiling Systems

6. Narrow Exposed Suspension System: Provide manufacturers narrow exposed "Tee", commercial quality cold-rolled, electro-galvanized steel grid system, equal to Armstrong 9/16 in. Suprafine XL, complying with ASTM C 635 for "Intermediate-Duty System". Provide grid modules to match ceiling panel sizes. Provide manufacturer's standard white baked enamel finish on steel exposed surfaces.

3. Acoustical Panels and Tile - Provide ceiling panel and tile products of one of the following manufacturers that meet or exceed requirements specified:

1. Armstrong World Industries, Inc.
2. Celotex Corporation.
3. United States Gypsum Co.
4. CertainTeed

B. Interior Ceiling Panels, Basis-Of-Design: Provide as follows, or approved equal:

1. Typical ACT Ceiling: Provide ACT plank system in varying sizes as shown on Drawings, equal to Armstrong World Industries “Health Zone Optima” 24 in. x 24 in. (#3216); 24 in. x 48 in. (#3217); or equal products by Celotex; United States Gypsum “Mars ClimaPlus HRC; or CertainTeed “Symphony M. System shall be designed to interface with a 9/16 in. Suprafine XL grid.

2. Band and Chorus Rooms: Basis of Design USG Geometrix

3. Practice Rooms: Basis of design Armstrong Ultima

SECTION 096446 - WOOD SPORTS-FLOOR ASSEMBLIES

1. Work Included: Gymnasium strip flooring system and field finishing of work.

2. Wood Flooring (Gymnasiums): Wood Flooring System shall be one of the following:

    1. "Rezill Channel" system, manufactured by Connor AGA, Amasa, MI 49903;
    2. “Bio-Channel” system as manufactured by Robbins Sports Surfaces, Cincinnati, OH, 45226;
    3. “AacerChannel” system as manufactured by Aacer Flooring, Peshtigo, WI 54157.

3. Wood Flooring Treatment And Finishing Materials:

    1. Treatment: Treat all flooring with MFMA tested and listed wood preservative. Stamp each bundle with official treating plant certificate and number.
    2. Finish Materials: Provide Robbins Miracle Oil modified polyurethane sealer and finish, or Architect approved equal. Provide game-line paints as recommended by finishing materials manufacturer to be compatible with finish.
    3. Provide game lines and solid painted areas in layouts indicated, or if not indicated, as recommended by MFMA Ref. 3.
    4. Game Line and Solid Painted Area Colors: Provide game lines and solid painted areas in colors selected by Architect. Five different colors will be selected. Match Architect's color chip for each color selected.

SECTION 096500 RESILIENT FLOOR TILE

1. Work included

Provide resilient flooring and related items.

1. Vinyl composition tile flooring.
2. Vynl compostion 12’ base.
3. Mastics and leveling compounds.

2. Vinyl Composition Flooring

4. Armstrong World Industries, Inc.
5. Tarkett .
6. Johnsonite.

A. Basis-Of-Design Vinyl Composition Tile Type: 1/8 in. thick, 18 in. by 18 in. "Excelon Stonetex" Series, manufactured by Armstrong World Industries, Inc. or approved equal manufactured by Johnsonite or Tarkett. Tile shall meet or exceed Fed. Spec. SS-T-312B, Type IV.

1. Colors: Provide colors as follows to create patterns:

    1. VCT1 = Limestone Beige 52139
    2. VCT2 = Chamotte 52172

3. VCT3 = Spanish Moss 52180
4. VCT4 = Hermit Shale 52186
5. VCT5 = Golden Bamboo 52170

2. Layout: Layout of tile shall be running bond with 1/3 offset.

3. Installation Materials

1. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

2. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

3. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant applications

4. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic

5. Emissions from Various Sources Using Small-Scale Environmental Chambers."

6. Floor Polish: Provide protective liquid acrylic floor polish products as recommended by manufacturer.

SECTION 096605 PRECAST CONCRETE STAIR TREADS

1.Work Included Furnish and install precast concrete stair treads and landings at monumental stairs.

2. – Products

1. Wausau Tile
2. Stepstone, Inc.
3. Diamond concrete products.
4. Basis-Of-Design: Precast polished concrete stair treads shall be as manufactured by Wausau Tile, Wausau, WI or approved equal.
5. Color and finish of precast concrete stair treads shall be custom.
6. Product/Style: Equal to Model C-31, as manufactured by Wausau Tile, Inc. or equal.
7. Abrasive Nosings: Provide each tread with three ½ in. wide abrasive scores, spaced at ½ in Inlay scores with epoxy abrasive material in color as selected by Architect.

SECTION 096723 RESINOUS FLOORING

1.Work Included: Furnish and install resinous flooring at rest rooms.

2. Products: Basis of Design: Dur-a-Flex “Hybri-Flex EQ”. Self-leveling broadcast quartz, epoxy/aliphatic urethane topcoat seamless flooring system

SECTION 096800 CARPETING

1.Work Included: Furnish and install Carpeting in the media room.

2. Products: Basis of Design: Bentley Mills, product “Movito” carpet tiles.

SECTION 097112 CEMENTITIOUS WOOD FIBER WALL PANELS

1. Work Included: Provide cementitious wood fiber wall panels as indicated on Drawings and as specified.

2. Products The Basis of Design is Tectum Standard Interior Wall Panels, as manufactured by Tectum, Inc., or equal, and as follows:

1. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
2. Thickness: 1 in.
3. Widths: 3 standard widths; to be field cut and beveled where other than standard widths apply (corners). Match patterns indicated on Drawings.
4. Lengths: Varies, as indicated on Drawings.
5. Edge Condition: Beveled design, square ends.
6. Color: Two colors: White and light Beige.
7. Painted trim to match at exposed edges and cut outs.

SECTION 097233 DRY-ERASE WALL COVERING

1. Work Included The work of this Section consists of dry-erase wall coverings as required for a complete and proper installation including accessories.

2. Products

1. Koroseal Interior Products, Fairlawn, OH.
2. OptiMA, Inc., Shrewsbury, MA.
3. Smarter Surfaces, Dublin, Ireland.

2. Magnetic Projectable/writing surface

A. Basis of Design: Basis of Design: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Koroseal Interior Products, Fairlawn, OH, “Walltalkers” series, product: “Projectable Mag- rite”, model “M2PR,” of sizes indicated on Drawings.

1. Description: Dry erase writing surface, having scrim backing, impregnated with ferrous powder, pigmented vinyl capped with dry erase film.
2. Characteristics:
    1. Conforming to ASTM E-84, Class A Flammability Testing.

2. Roll width: 47/48 inches (1.19/1.22m) width.
3. Fabric: Woven Polyester
4. Laminate thickness: 24 mils.
5. Tensile strength, (warp x fill): 80 by 80 pounds.
6. Surface: Matte finish.
7. Colors: As selected by the Architect from manufacturer's full range of options.

2. Accessories

A. Trim and marker tray:

1. Cap Wallcovering Trim: Clear satin, anodized aluminum, low profile trim.
2. J-Trim: 1/4 inch extruded aluminum, clear anodized.
3. Marker Tray: Clear anodized aluminum marker tray, continuous along full width of dry erase wallcovering.

SECTION 097625 - FIBERGLASS-REINFORCED PLASTIC PANELS (FRP)

1. Work Included: Provide FRP wall panels as indicated on Drawings and as specified.

2. Products: FRP panels as manufactured by The Kemlite Company; or approved equal.

1. Nominal Thickness: Not less than 0.12 inch (3.0 mm).
2. Surface Finish: Smooth.
3. Panel Color: As selected by Architect.

3. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1 Color: Match panels.

4. Adhesive: As recommended by plastic paneling manufacturer.

5. Sealant: Single-component, mildew-resistant, acid-curing silicone sealant recommended by plastic paneling manufacturer.

SECTION 097713 FABRIC-WRAPPED TACKABLE PANELS

1 Work Included

1. Fabric wrapped tackable panels, Type 1 and Type 2.

2. Type 1 Fabric Wrapped Tackable Panels

1. Basis-of-Design Product: The H.I.R. #1 Tackable Panels, as manufactured by Decoustics Limited; or comparable product by one of the following, or equal:

    1. Armstrong World Industries.
    2. Decoustics Limited; a CertainTeed Ceilings company.
    3. Kinetics Noise Control, Inc.

3. Noise Reduction:

    1. NRC: For 1-1/8 in. panel NRC shall be 0.90 minimum.

4. Fabric-Wrapped Wall Panel: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.

    1. Mounting: Back mounted with manufacturer’s standard adhesive.
    2. Core: Manufacturer's standard glass-fiber board.
    3. Core-Face Layer: Manufacturer's standard tackable, impact-resistant, high-density board.
    4. Edge Construction: Manufacturer's standard resin hardened core.
    5. Edge Profile: Square.
    6. Facing Material: Fabric from same dye lot; color and pattern as selected by Architect from manufacturer's full range].
    7. Nominal Overall Panel Thickness: 1-1/8 inches.

2.02 TYPE 2 FABRIC-WRAPPED TACKABLE PANELS

3. Basis of Design: Homasote Company, P.O. Box 7240, West Trenton, NJ 08628.

    1. Provide Class A Panels: Homasote DesignWall(tm) Interior Panels, or equal
    Substrate: NCFR(R) fiberboard manufactured from 100 percent recycled wood fiber material; physical properties as follows
    2, Thickness: 1/2 inch (13 mm).
    3.Density: 34-40 pcf (545-640 kg/cubic m).

    2. Fabric: FR 701(R), as manufactured by Guilford of Maine or equal, physical properties as follows:

        a. Content: 100 percent polyester.
        b. Weight: 16.0 +/- 0.5 oz./lin. yard (50 kg +/-16 g/m).
        c. Colorfastness to Light: No less than Grade 4 after 40 hours, per AATCC 16, Option A.
        d. ASTM E 84: Class A.
        e. NFPA-701: Passes.
        f. UL Test No. 214: Passes.
        g. FAA (PARA.25.853B): Passes.
        h. Boston Fire Code BFD IX-1: Passes.
        i. State of Massachusetts 527 CMR 21.00: Passes.
        j. Color: As selected by Architect from manufacturer's standard range.

    3. Fabrication: Wrap fabric around long edges of panel to back side and laminate to substrate.

SECTION 099100 - PAINTING

1. Work Included: The scope of work consists of all painting work shown on the Drawings, described in the Specifications, or as reasonably inferred from either, in the opinion of the Architect, as being required, and includes:

   a. Surface preparation and field painting of the following:

      1) Exposed exterior items and surfaces;
      2). Exposed interior items and surfaces;
      3) Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surfaces treatments specified in other sections.

   b. Paint exposed surfaces whether or not colors are designated in "schedules", except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint same as similar adjacent materials or surfaces. If color or finish is not selected, the Designer will select colors or finishes from manufacturer's available choices.

      1) Painting work of this Section includes field painting exposed bare and covered pipes and conduits (including color coding), hangers, exposed steel and iron work, and metal surfaces of athletic, mechanical, and electrical equipment.

2. Latex and Alkyd Based Paints: Provide products of one of the following manufacturers that meet or exceed specified requirements, or approved equal:

   a. Benjamin Moore and Co. (Moore).
   b. Pratt & Lambert. (P & L).
   c. The Sherwin Williams Company (S-W)

3. High Performance Paint Coatings: Provide products of one of the following manufacturers that meet or exceed specified requirements, or approved equal:

   a. Tnemec Corporation (Tnemec).
   b. International Protective Coatings (IPC).
   c. Ameron Corporation (Ameron).

4. Interior Gypsum Wallboard for Eggshell, or Satin Finish:

   One Coat
   1. Benjamin Moore; Eco-Spec Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).
   2. Duron Equal
   3. S-W Equal

   Two Coats
   1. Benjamin Moore; Eco-Spec Latex Eggshell Enamel: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
   2. Duron Equal
   3. S-W Equal

5. Interior Gypsum Wallboard Ceilings for Flat Finish:

One Coat
1. Benjamin Moore; Eco-Spec Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).
2. Duron Equal
3. S-W Equal

Two Coats
1. Benjamin Moore; Eco-Spec Latex Flat: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
2. Duron Equal
3. S-W Equal

6. Interior Finish Carpentry, for Satin-Gloss Paint Finish (softwoods, paint grade hardwoods, MDO, and hardwood veneers):

One Coat
1. Benjamin Moore; Eco-Spec Interior Latex Primer: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).
2. Duron Equal
3. S-W Equal

Two Coats
1. Benjamin Moore; Eco-Spec Latex Eggshell Enamel: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
2. Duron Equal
3. S-W Equal

7. Interior Finish Carpentry for Satin Transparent Finish (all hardwoods and hardwood veneers, except paint grade and factory-finished items):

Sand
120 grit sandpaper.

Sand
220 grit sandpaper.

Stain
1. Moore Interior Wood Finishes Penetrating Stain
2. Devoe Equal
3. S-W Equal

Two Coats
1. Moore Benwood Polyurethane Finish
2. Devoe Equal
3. S-W Equal

8. Interior Metals not Specified to Receive other Coating Systems:

One Coat
1. Approved primer, in shop under other Sections

One Coat
Field Primer (only where shop primer is not specified):

1. S-W Universal metal primer.

Two Coats
1. S-W Acrylic Enamel.

9. Interior Mechanical and Electrical Work (Paint all exposed items throughout the interior project except factory finished items with factory-applied baked enamel finishes which occur in mechanical rooms, and excepting chrome or nickel plating, stainless steel, and aluminum other than mill finished. Paint all exposed ductwork and inner portion of all ductwork visible through grilles and registers): Same as specified for other interior metals, hereinabove.

10. Exterior Galvanized Steel for Acrylic Polyurethane Finish (exterior handrail and railing assemblies, steel bollards):

One Coat	1. Epoxy Primer in fabricator's shop, under other Sections.
Finish Coat	1. Urethane top coats in fabricator's shop, under other Sections.

11. Exterior Galvanized Steel Doors and Frames for Acrylic Polyurethane Finish:

One Shop Coat	1. Shop Primer in fabricator's shop, under Section 081100.
After Installation:	
Barrier Coat:	1. As recommended by manufacturer for compatibility between shop coats and field coats.
First Field Coat	1. Tnemec "No. N69 Hi-Build Epoxoline" Epoxy 2. IPC Equal 3. Valspar Equal
Second Field Coat (dry film 1.5 to 2.0 mils)	1. Tnemec "No. 1081 Endura-Shield III" 2. IPC Equal 3. Valspar Equal

12. Exterior Finish for Wood Siding, Trim, and Trellis Work:

Two Coats	1. Benjamin Moore Exterior Finish Deck and Siding Translucent Alkyd (#326).

13. Interior Steel Doors and Frames for Acrylic Polyurethane Finish:

One Shop Coat	1. Shop Primer in fabricator's shop, under Section 081100.
After Installation:	
Barrier Coat:	1. As recommended by manufacturer for compatibility between shop coats and field coats.
First Field Coat	1. Tnemec "No. N69 Hi-Build Epoxoline" Epoxy 2. IPC Equal 3. Valspar Equal
Second Field Coat (dry film 1.5 to 2.0 mils)	1. Tnemec "No. 1081 Endura-Shield III" 2. IPC Equal 3. Valspar Equal

SECTION 101400 - SIGNAGE

1. Work Included:

    1. Provide wall and door plaques as scheduled.
    2. Provide cut-out metal letters.
    3. Provide occupancy signs in spaces required by code or local ordinance.

2. Products:

    1. Melamine Plastic: Material shall be “self-extinguishing” and furnished with a “life-ofbuilding” warranty. Material shall be as manufactured by Westinghouse, Wilson, General Electric, or approved equal in thickness required for intended use.

    2. Bronze Plate: ASTM B 36/B 36M, Alloy UNS No. C22000 (commercial bronze).

    3. Paint: Water based aliphatic polyurethane, as manufactured by Tnemec, IPC, or PPG.

    4. Vinyl Die-Cut Letters and Film: Opaque, non-reflective vinyl film. 0.0035 in. minimum thickness, with pressure sensitive adhesive backing, suitable for exterior use as well as interior applications.

    5. Aluminum: Provide aluminum sheet and tubing of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

3. Dimensional Characters

A. Cutout Characters: Characters with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; Manufacturers as follows:

    1. APCO Graphics, Inc.
    2. ASI Sign Systems, Inc.
    3. Gemini Incorporated.
    4. Matthews International Corporation; Bronze Division. Metal Arts; Division of L & H Mfg. Co.
    5. Nelson-Harkins IndustriesSouthwell Company (The).
    6. Character Material: Sheet or plate bronze.
    7. Character Height: As indicated.
    8. Thickness: 0.25 inch.
    9. Finishes:
    10. Integral Metal Finish: As selected by Architect from full range of industry finishes.
    11. Mounting: Projecting studs.
    12. Typeface: As indicated.

4. Interior Room Signs

A. Provide raised tactile ADA complying signage meeting the following:

1. Solid-Sheet Sign: Bronze sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:

    1. Thickness: 0.125 inch (3.18 mm).
    2. Etched and Filled Graphics: Sign face etched or routed to receive enamel paint infill.

2. Surface Finish and Applied Graphics:

    1. Integral Metal Finish: As selected by Architect from full range of industry finishes.

3. Mounting: Surface mounted to wall with concealed anchors or fasteners.

5. Occupancy Signs

1. Frame for occupancy certificate, maximum occupancy and Building signs shall be bronze, satin finish, with one side of frame removable.

2. For size of frame see Drawings, minimum ½ in. face width.

3. Provide ¼ in. plywood backing in the frames.

4. Secure frames to walls using tamperproof devices suitable for intended substrate.

5. Text shall be white lettering on a bronze background and shall be as follows: “Maximum Occupancy”

(3 in. high, ¾ in. stroke) “Not to Exceed” (2 in. high, ½ in. stroke) “XXX Persons” (3 in. high,

¾ in. stroke)

SECTION 102113 - PLASTIC LAMINATE TOILET COMPARTMENTS

1. Work Included: The work of this Section consists of providing plastic laminate toilet compartments including related accessories, hardware, and related items, including, but not limited to:

    1. Plastic laminate toilet partitions and urinal screens, completely erected.
    2. Related mounting brackets, fastening devices, and anchors.
    3. Related finish hardware and accessories, as specified.

2. Manufacturer: Provide products of the following that meets or exceeds specified requirements:

    a. Model: Classic Series.

3. Partitions, Stiles, Screens, and Doors:

1. Plastic Laminate: Shall be high pressure laminated plastic, NEMA LDS-19 minimum thickness 0.0625 in., color as selected by Architect from complete range of standard and standard special colors offered by manufacturer. No limit is placed on the number of colors to be used, and will vary from floor to floor.

2. Core:

    1) Stiles: three ply resin impregnated particle board bonded to each side of an 11 gauge steel reinforcing core.
    2) Panels, doors, and wall post: three ply resin impregnated particle board, Type II, Grade DB, 45 lb. density.

4. Adhesives: Shall be type which will prevent delamination from heat and moisture in public washrooms.

5. Hardware and Fittings:

    a. Metal: Stainless steel, Type 304.
    b. Finish: Stainless steel: No. 4 Satin finish.

6. Leveling Device: Shall be 3/8 in. by 1 in. steel bar.

7. Fasteners:

    4. Hinge and Latch: Shall be factory installed threaded steel inserts and stainless steel one-way machine screws; latch track factory installed thread T-nuts.
    5. Door Hardware: Shall be stainless steel one-way sheet metal screws.
    6. Mounting Brackets: Shall be stainless steel phillips head sheet metal screws.
    7. Leveling Device: Shall be 3/8 in. threaded rod, nuts, and sleeve anchor.

8. Stile Shoes: Shall be one piece, 4 in. high, Type 304, stainless steel with No. 4 Satin finish.

9. Configuration:

    1. Toilet partitions shall be floor supported, overhead braced.
    2. Screens shall be wall hung.

10. Stiles, Partitions, Screens, and Doors:

    1. Bonded high pressure plastic laminated to core material with adhesive specially formulated to prevent delamination in moist, warm areas of public washrooms. Bond edges prior to bonding face sheets. Make no splices or joints in faces or edges.
    2. Install threaded steel inserts for mounting hinge and latch.

3. Pre-drill screw holes for coat hook and keeper.
4. Finish thickness - 1 in. for uniform flush front.

11. Anchoring and Leveling Devices: Continuously weld anchoring and leveling device to steel reinforcing core of stile.

12. Door Hardware:

5. Hinge: Shall be self-lubricating balanced hinge adjustable hold open feature.
6. Latch: Shall be combination slide latch and bumper equipped for emergency access, without use of tools.
7. No hardware for brackets will be permitted on the outside of compartment except on compartments with outswinging doors.

13. Accessories:

1. One combination coat hook and bumper shall be installed on each toilet enclosure door, and shall be manufacturer's standard, subject to Architect's approval.

SECTION 102800 - TOILET ACCESSORIES

1. Work Included: Furnish and install all toilet accessories as required to complete the work of the Contract.

2. Manufacturers: Accessories shall be manufactured by Bobrick Washroom Equipment Company; American Specialties, Inc.; Bradley Corporation Washroom Specialties Division; or approved equal.

3. Toilet Accessories:

1. Lavatory mirror: Bobrick B-290 1830
2. Soap dispenser: Bobrick B-2111
3. Towel dispenser/waste receptacle: Bobrick B-36903
4. Toilet paper dispenser: Bobrick B-2888
5. Sanitary napkin/tampon disposal: Bobrick B-254
6. Grab bars (HC toilet): Bobrick B-5806.99 x 42, 2 per stall

SECTION 104400 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

1. Work Included: Furnish and install fire extinguishers, cabinets, and accessories as required to complete the work of the Contract. Include, but do not limit to:

1. Fire extinguishers.
2. Fire extinguisher cabinets (satin bronze).
3. Mounting brackets.

2. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

3. Fire Extinguisher Cabinets and Accessories: Subject to compliance with requirements, provide products of one of the following manufacturers; Catalog designations of Larsen's Manufacturing Company cabinets are specified herein to establish standard of quality.

    1. Larsen's Manufacturing Company, Minneapolis, MN 55432.
    2. J. L. Industries.
    3. Muckle Manufacturing, Division of Technico, Inc.
    4. Profile International, Inc.

4. Fire Extinguishers: General Fire Extinguisher Co., Multi-Purpose Dry Chemical Type (4A60BC-FE): UL-rated 4-A:60-B:C, 10 lb. nominal capacity, in enameled steel container, for Class A, Class B, and Class C fires; No substitutions will be permitted.

5. Fire Extinguisher Cabinet, Fully Recessed Type at all Public Spaces: Larsen Model #2409, with the following features:

    1. Break glass door.
    2. Red fire handle.
    3. Bronze finish.
    4. Rough Opening: 24-1/2 in. x 10-1/2 in. x 6-1/4 in.

6. Fire Extinguisher Cabinet, Semi-Recessed: Larsen Architectural Series Model #2409-R2 for fully-recessed cabinets; and Model 2409-6R for semi-recessed cabinets, with vertical duo door style, with the following features:

    1. Tempered glass in door.
    2. Red fire handle.
    3. Bronze finish.
    4. Tub, 6 in. id.
    5. 2 hr. fire rated where installed in rated walls.

7. Cabinet Construction: Manufacturer's standard enameled steel box as required, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.

8. Wall Brackets: Where cabinet is not required, provide extinguisher manufacturer's recommended standard wall mounting bracket, sized to fit extinguisher.

SECTION 10 51 29 PHENOLIC LOCKERS

Work included:

1. PHENOLIC LOCKERS
A. Basis-of-Design Product: Subject to compliance with requirements, provide ASI Storage Solutions; Phenolic Traditional Plus Series or comparable product by the following, or equal:

1. Hollman.
B. Locker Sizes:

1. Type 1: 15 x 15 x 36 inches, single tier, open with display above.

2. Type 2: 15 x 15 x 72 inches, double tier, open.
3. Type 3: 15 x 15 x 72 inches, double tier, with doors, accent colors.
C. Construction Style: Manufacturer's standard, two-person Z configuration.

1. Components: Solid phenolic core decorative plastic laminate with multiple resin-impregnated kraft and surface sheets fused at high temperature and pressure. Units fabricated using stainless steel fasteners. Exposed edges shall be smooth and chamfered.

SECTION 10 82 13 ROOF TOP EQUIPMENT SCREENS

1. Work Included Pre-formed Panels: For enclosing roof top mechanical equipment.
1. Painted metal custom 2-coat mica.
   1. Aluminum Support Framing: For direct attachment of screening panels to mechanical equipment; no base or curb required unless shown otherwise on drawings.
   2. Sliding panels to permit easy access to mechanical equipment for servicing.
   3. Coordinate installation and detailing with RTU manufacturer
   4. Products Basis of Design Manufacturer: CityScapes International Inc., Hilliard, OH.

SECTION 111320 - PROJECTION SCREENS

1. Work Included: Work of this Section includes, but is not limited to: Electrically operated projection screens.

2. Manufacturers: Provide products from one of the following manufacturers, or Architect approved equal:

   1. Bretford Manufacturing Co., Schiller Park, IL 60176
   2. Da-Lite Screen Co., Inc., Warsaw IN 46580
   3. Draper Shade and Screen Co., Inc., Spiceland, IN 47385-0425

3. Manufacturer and Type: Provide "BoardRoom" Electrically Operated Projection Screen, manufactured by Da-Lite Screen Company, Inc., or approved equal from another specified manufacturer.

4. Description: Provide projection screen with glass beaded surface on flame and mildew resistant fabric, with 2 in. black masking borders. Provide screen electrically operated, ceiling recessed, and mounted on a roller of rigid metal, minimum 3 in. diameter, mounted on vibration and sound absorbing supports in a wood case with a metal-lined wiring compartment, complete with metal bracket hangers. Electrical operation shall be three wire, quick reverse type with accessible pre-set limit switches to stop screen automatically in up and down positions, with motor within roller. Motor shall be suitable for 115 volt, 60 Hz electric current. Unit shall be UL-listed.

5. Include remote three-position control switch to be installed and wired by electrical trade.

SECTION 116653 - GYMNASIUM EQUIPMENT

1. Work Included: Furnish and install the athletic equipment work, as indicated on the Drawings and as specified herein. Include but not be limited to:

    1. Basketball backstops, backboards and goals.
    2. Sleeves and floor plates for badminton and volleyball uprights.
    3. Protective wall padding

2. Folding Basketball Backstops: Provide as required forward folding backstop assemblies. Folding backstop assemblies shall be overhead structure supported with supplemental framing and shall include tempered glass backboards and collapsible goals, as manufactured by Porter Athletic Equipment Company (Porter), or approved equal as manufactured by Proline Athletic, or Performance Sports Systems; or approved equal. Porter catalog designations are specified to establish standard of quality for performance and materials. All backstop assemblies shall be suitable for basketball competition play in accordance with the requirements of NCAA Basketball. All backstop framing and supplemental framing shall be painted flat (matte) white. Provide capacity in backstop and supplemental framing to support shot clocks where such are indicated to be backstop mounted.

    1. Forward Folding Backstops: Provide where indicated Porter Model 950 series CenterStrut Ceiling Suspended, Forward-Fold, Front Braced, Bent Mast Backstop.

    2. Provide each backstop with backboard. Backboard shall be Porter Model 00208-000 rectangular tempered glass backboard with aluminum faced tubular steel frame. Backboard shall be 72 inch wide by 42 inch high with fused target and boarder markings. Marking color shall be white.

    3. Provide each backboard with Porter Model 00326-000 Bolt-On Backboard Safety Padding. Color shall be manufacturer's standard medium gray.

    4. Provide goal with net at each backstop. Goal shall be Porter Model 00250-500 TorqFlex at each backstop. Provide each goal properly mounted to transfer goal loads directly to backstop without loading backboard.

    5. Provide each backstop with electrically operated winch. Winch shall be Porter Model 00706-000 1/2 horsepower or model 00707-000 3/4 horsepower as required by backstop and applied loads. Winch shall be prewired with 54 inch long rubber covered cable with polarized plug attached. Provide keyed switch with cover plate for each winch. Keyed switch shall be located within room as directed by Designer unless indicated otherwise.

    6. Provide each backstop with safety lock. Safety lock shall be Porter Model 10797-100 Saf-Strap basketball safety lock.

    7. Conduit, outlet receptacles, connectors, and wiring shall be provided as a part of the work of Division 26, ELECTRICAL.

3. Control Center: Provide one (1) Porter Model 2500 Control Center for each Gymnasium.

4. Badminton Floor Plates and Sleeves: Provide cast brass nominal 0.20 in. thick flush-mount floor plate with hinged door, suitable for use of badminton uprights, with pre-drilled holes for anchors. Plates shall be Type KA 25 S manufactured by Senoh and distributed by Sports Imports Incorporated, Columbus, OH 43221, or approved equal.

    1. Sleeves shall be 3 in. internal diameter steel barrel with 0.14 in. thick walls and top screw-down flange. Sleeve shall be approximately 9 in. Base of sleeve barrel shall be flanged for setting into asphaltic concrete slab.

5. Volleyball Floor Plates and Sleeves: Provide volleyball floor plate and sleeve Schelde model 62107 sleeve and Model 62126 Oversized Floor Plate. Cover to be solid brass with hinged access cover, set flush in wood floor. Floor plate to be 7-7/16 inch outside diameter.
Sleeve to have pre-drilled flanges for fastening of cover plate. Sleeve shall be 12-3/8 in. long. Inside diameter of the sleeve shall be 4 in.

6. Corner and Wall Padding: Provide as follows:

    1. Wall protection mats shall be polyester reinforced solid vinyl, 14 oz. minimum, with 2 in., thick urethane foam padding. Mats shall have fire retardant covering. Sizes shall be as indicated on the Drawings.
    2. Wall Pad: Porter No. 00355-600, 6' - 0" wall pad with Velcro attachment strips, manufactured by Porter Athletic Equipment Co., or approved equal.
    3. Column Pad: Porter No. 00356-600, 6' - 0" column pads with Velcro attachment strips, manufactured by Porter Athletic Equipment Co., or approved equal.
    4. Wrap Around Column Pad: Porter No. 97060-000, wrap around column mat, manufactured by Porter Athletic Equipment Co., or approved equal.
    5. Color of matting and padding shall be selected by Architect from manufacturer's standard colors.

7. Tennis Net System: Provide floor mounted tennis net systems Porter Athletic Equipment Corporation model 02991-042 (net), 00947-00 (posts/standards), and 00875-200 (floor sleeves) or equal.

8. Batting Cage: Provide ceiling suspended, retractable batting cage, Porter Athletic Equipment model 90920. Batting cages shall be electrically operated from basketball goal control location.

SECTION 124813 - ENTRANCE MATS AND FRAMES

1. Work Included: The work of this Section includes, but is not limited to: Entrance mats

2. Basis-Of-Design Products: Provide Grate Mat XT foot grille by Mats Inc., PO Box 839, 37 Shuman Avenue, Stoughton, MA, 02072; telephone 800-628-7462 or 781-344-1536; fax 781-344-1537; www.matsinc.com.

3. Exposed hinge rail connectors shall be vinyl hinge only complete with perforations for drainage. Tread rails shall be manufactured from aluminum, complete with co-extruded soft-durometer cushions, supplied in mill finish.

4. Tread Insert Options: Carpet shall meet the Carpet and Rug Institute’s standard for indoor air quality. Fibers shall include a minimum of 100, 12 mil monofilament fibers per square inch

and colorfast, solution dyed nylon. Available in one of 11 standard colors as offered by manufacturer. Each carpet fiber and monofilament shall be fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths. Carpet weight shall be 33 oz./sq. yd.

5. Framing for Aluminum Foot Grille: Aluminum frame shall be a 1 in. deep recessed frame in 6063-T5 aliuminum alloy with 1/8 in. wide exposed surface. Frame color shall be mill finish.

SECTION 125220 - ROLLER SHADES

1. Work Included Work of this Section includes, but is not limited to: Electrically operated window shades and Manually operated window shades

2. Electrically Operated Window Shades: Provide Mecho Electri-Shades, as manufactured by Mecho Shade Systems, Inc., or approved equal as manufactured by Nysan. Provide shade fabrics and features as follows:

3. Shade Cloth: Provide "EcoVeil" non-PVC shade cloth, color shall be as indicated on Drawings.

4. Manually Operated Shades: Provide Mecho Shades SlimShades, as manufactured by Mecho Shade Systems, Inc., or approved equal as manufactured by Nysan. Provide shade fabrics and features as follows:

SECTION 126600 - TELESCOPING BLEACHERS

1. Work Included: Provide all labor, materials, equipment, and services necessary to complete the work indicated, and without limiting the generality thereof includesRetractable bleacher seating – wall attached, motorized telescoping wood bleachers (w/ plastic seats) with all associated hardware and railings.

2. Product: Provide Hussey Maxam Series Telescopic Gym Seat System or approved equal and as follows:

1. Manufacturer: Hussey Seating Company, U.S.A. Address: North Berwick, Maine, 03906

2. Model: MXM26 Series Telescopic Gym Seats, adjustable row spacing in two inch increments from 22 inches [559] to 26 inches [660].

1. Aisle Type: foot level aisles, intermediate aisle steps.
2. Seat Type: MVP (plastic seat module).
3. Seat color finish: manufacturers 15 standard.
4. Rail Type: Self-storing rail, aisle hand rails
5. Operation: electrical power
6. Electrical Power System: Integral power with pendant control.

3. Product Description/Criteria:

1. Bank Length: (2) banks @ 96’-6” long
2. Aisle Widths: 4’6 wide
3. Number of Tiers: 10 tiers
4. Row Spacing(s): 26”
5. Row Rise: 9 5/8”
6. Open Dimension: 20’-7”
7. Closed Dimension: 3’-7”
8. Overall Unit Height: 7’-10”

4. Miscellaneous Product Accessories: end panels, seat number’s, row letters.

5. Handicap Seating Provisions: Provide first tier handicap cutouts per requirements of (ADA) Americans with Disability Act located as indicated.

6. Special Seating Graphics: Provide contrasting or matching seat top or seat base colors to create graphic pattern as indicated.

3. Lumber: ANSI/Voluntary Product 20, B & B Southern Pine

4. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.

5. Structural Steel Shapes, Plates and Bars: ASTM A 36.

6. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.

7. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45, or 50, Structural Quality, Hot-Rolled Strip.

8. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.

9. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, structural quality.

10. Structural Tubing: ASTM A500 Grade B, cold-formed.

11. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation; in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

12. Fasteners: Vibration-proof, of size and material standard with manufacturer.

13. Frame System:

1. Wheels: Not less than 5" diameter by 1-1/4" with non-marring soft rubber face to protect wood and synthetic floor surfaces, with molded-in sintered iron oil impregnated bushings to fit 3/8" diameter axles secured with E-type snap rings.
2. Lower Track: Continuous Positive Interglide System interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and through-bolted guide at front to prevent separation and misalignment. Each CPI unit shall contain a Low Profile

PosiLock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacings.

3. Slant Columns: High tensile steel, tubular shape.
4. Sway Bracing: High tensile steel members through-bolted to columns.
5. Upper Guide: High tensile steel through-bolted to nose and riser. Interlocks with adjacent upper tier to prevent separation and misalignment. Provide adjustable stops to allow field adjustment of row spacings.
6. Deck Support: Securely captures decking for entire length of section.

14. Deck System:

1. Section Lengths: Each bank shall contain sections not to exceed 25'-6" in length with a minimum of two supporting frames per row, each section.
2. Nosing and Rear Riser: Continuous roll formed galvanized steel members.
3. Attachment: Through-Bolted fore/aft to deck guides, and frame cantilevers.
4. Decking: 5/8", AC grade, tongue & groove, transversely oriented plywood, interior type with exterior glue, 5-ply, all plies Southern Pine with plugged crossbands, produced in accordance with National Bureau of Standards PS-1-83. Longest unsupported span: MXM 26, 21-½"; MXM 33, 28 ½".
5. Deck End Overhang: Not to exceed frame support by more than 5'-7".

15. MVP Seat System:

1. Seat Modules: 18" long unitized, interlocking, engineered, high density polyethylene modules providing scuff resistant textured 10" wide anatomically contoured seat surface. 1/2" minimum interlock on seat and face.
2. Profile: Designed with internal reinforcement ribs and cantilevered to the rear to provide not less than 3" smooth toe space beneath the seat.
3. Seat Support: Each seat support module shall be secured against fore/aft movement by not less than (2) two longitudinally sited steel fasteners spaced no less than 2 1/4" on center, creating a steel to steel connection, tying the structure firmly to the steel nosing.
4. Number Plates: Seat module shall be designed to accept seat number plates.
5. End Caps: Each end of row shall be enclosed with matching end caps. End caps shall be designed with concealed attachment and provide indent for row letters. Color to match seat top.

16. Integral Power: Furnish and install Hussey (PF 1, 2, 3, or4), an integral automatic electro-mechanical propulsion system, to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed.

1. Operation shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward, and reverse control of the power operation.
2. Each Powered Frame unit shall consist of output shaft gear reducer with 6" diameter x 4" wide wheels covered with non-marring 1/2" thick composite rubber. Reducers shall be fitted with induction motors which will provide an average operating speed of (46/25) f.p.m.
3. Operating Loads: Each Powered Frame provides (220 / 550) lbs pull force which equals approximately (28 / 35) lbs psi lateral force on the floor.
4. Limit Switches: Furnish and install both open and closed limit switches for the integral power system. The limit switches will automatically stop integral power operation when seating has reached the fully extended or closed position.

17. Power operation shall utilize a combination of contactors and limit switches to insure the wiring is not energized except during operation. Straight wired electric system is not allowed.

    1. Motion Monitor: Provide flashing light with self-contained warning horn rated at 85 db at 10' mounted under telescopic seating for audio and visual warning during integral power operation.

    2. Electrical: Seating Manufacturer shall provide all wiring within seating bank including pendant control.

        1) Each unit is power operated by a 1/2 horsepower, 1725 R.P.M., 208 Volts, 50/60 Hz., three phase 1.25 service factor motor. This motor draws a full load current of 2.2 amperes. Power supply required shall be 120/208 volts three phase 4 wire plus ground service with 20 amps. Motors, housing, and wiring shall be installed and grounded in complete accord with the National Electric Code.
        2) The electrical contractor shall provide required power source with no greater than 4% voltage drop at the seatings junction box. The electrical contractor shall perform all wiring connections in junction box that are attached to or a part of the building.

18. Flex-Row: Provide first ROW modular units to be utilized by persons in wheelchairs and able bodied persons. Each Flex-Row unit shall have an unlock lever for easy deployment if wheelchair access is needed. Unlock lever shall lock the bleacher seats into position when fully opened.

    1. Provide a black full surround skirting 1/2" off the floor for safety and improved aesthetics.
    2. Provide a black injection molded end cap for the nose beam for safety and improved aesthetics.
    3. Provide a mechanical positive lock when the Flex-Row system is in the open and used position.
    4. Flex-Row modular units are designed to achieve multi-use front row seating to accommodate team seating, ADA requirements and facility specific requirements. Flex-Row units are available in modular units from 2 - 7 seats wide as well as full section widths.

19. Provide a removable belt barrier with or without signage for the rear of each recoverable Flex-Row module to assist with seating identification.
20. Front Aisle Steps: Provide at each vertical aisle location front aisle step. Front steps shall engage with front row to prevent accidental separation or movement. Steps shall be fitted with four non-skid rubber feet each 1/2" in diameter. Blow molded end caps shall have full radius on all four edges. Quantity and location as indicated.

21. Non-Slip Tread: Provide at front edge of each aisle locations an adhesive-backed abrasive non-slip tread surface.
22. Foot Level Aisles: Provide deck level full width vertical aisles located as indicated.
23. Intermediate Aisle Steps: Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Step shall have non-skid on surface. Quantity and location as indicated.
24. Intermediate Aisle Handrails: Provide single pedestal mount handrails 34" high with terminating mid rail. Handrails shall be attached to the socket and shall rotate 90° for easy storage in socket. Aisle handrails that are detached from the socket for storage are unacceptable.

25. End Panel: Provide closure end panels for stack position at each exposed bank ends. End panels shall be constructed of 5/8" Southern pine plywood or Polydeck.
26. Self Storing End Rails: Provide steel self-storing 42" high above seat, end rail with tubular supports and intermediate members designed with 4" sphere passage requirements.
27. Seat Numbers: Provide each plastic seat module with a 1-3/4" x 1 1/4" oval etched Lexan plate. Easy to read black numerals will be on the plate fitted in a vandal resistant recess
28. Row Letters: Provide at each row end of plastic seat a 1 3/4" x 1 1/4" oval etched Lexan plate with black numerals. Plates to be fitted flush in vandal resistant end cap recess.
29. Poly Deck: Shall be a high-density polyethylene overlay panel fabricated with a skidresistant textured top surface of 100% moisture barrier bonded to a plywood substrate with an exterior glue. Panel thickness shall be 5/8" with top polyethylene surface colored weathered gray.

SECTION 142100 - ELEVATORS

1. Work Included: Provide as follows:

    1. Installation of one (1) 4,500 lb. service shaped machine room less traction (MRL)
    2. Elevator operating at a speed of 200 fpm and serving four (4) landings.
    3. Electrical work to provide power and telephone wiring from disconnect switch in equipment room to hoistway and elevator.

2. Manufacturers: Provide products of one of the following manufacturers that meet or exceed requirements specified:

    1. Dover Elevator Co.
    2. Montgomery Elevator Co.
    3. Otis Elevator Co.
    4. Schindler Elevator Corp.
    5. U. S. Elevator Co.

3. Product: Provide pre-engineered, packaged or custom MRl elevator unit that fulfill the Specification requirements and have the features and characteristics scheduled.

4. Single Car Elevator Control: Provide solid state "Selective Collective Automatic Operation", as defined by ANSI A17.1, for each hydraulic elevator.

5. Passenger Elevator:

1. Quantity One (1)
2. Type Machine Room-less - Passenger
3. Capacity (lbs) 4,500
4. Speed (fpm) 200
5. Travel in Feet
6. Roping/Ropes 2:1
7. Number of Landings Four (4) at floors basement through 3
8. Number of Openings Same as landings
9. Front Openings All
10. Rear Openings None
11. Operation Simplex selective collective
12. Control Variable voltage variable frequency

13. Fireman's Control Phase I and II
14. Number of Push Button Risers One (1)
15. Clear Inside 5'-8" wide x 8'-0" deep
16. Guide Rails Steel tees
17. Buffers Spring
18. Car Door Size 4'-0" wide x 7'-0" high
19. Hoistway Door Size Same as car door
20. Door Operation Two speed side opening
21. Machine Type Gearless
22. Counterweight Safety Not Required
23. Compensation As required
24. Power Supply 480V-3Ph-60Hz (EE to verify)
25. CCTV and Card Reader Provisions
26. Voice Annunciator Required
27. MA Medical Emergency Required

FIRE PROTECTION SYSTEMS

NARRATIVE REPORT

The following is the Fire Protection Systems narrative, which defines the scope of work and capacities of the Fire Protection Systems, as well as, the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. SYSTEM DESCRIPTION

   A. The building will be served from the new 8” fire service line from the campus hydrant line. Cross connection control shall be provided by use a supervised double check valve assembly backflow preventer on the fire service as it enters the building in the dedicated Fire Pump room, adjacent to the exterior building wall.

   B. The entire building shall be protected throughout with a wet automatic fire suppression system and fed from an 8” Wet Riser Check Valve. System will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Standpipes meeting the requirements of NFPA 14-2013 shall be provided in the egress stairwells, horizontal exits and in the Stage area.

   D. Each floor will be divided in to Two (2) sprinkler zones and each wet sprinkler zone will include a control valve assembly. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   E. A fire department Siamese pumper connection will be provided at the outside of the fire service entrance or at a location requested by AHJ. The FDC will be wall-mount type. This system shall be designed in accordance with NFPA Standard 13, 2013, the Massachusetts State Building Code, 9th Edition and the local the town of Dedham Fire Department requirements.

   F. Furnish and install all Supervisory Switches, Flow Switches, Pressure Switches, and other Alarm Devices. Install all such devices on the piping and coordinate with the Electrical Subcontractor who shall wire all such devices to the Fire Alarm System. Every shutoff valve installed on this project shall have a supervisory trouble switch wired to the Fire Alarm Panel.

   G. An 8” electric bell will be provided on the exterior.

   H. A hydrant flow test was conducted and it was confirmed that a Fire pump is required for this building. The fire pump will be 750 GPM @ 60 PSI with a 40 HP motor and controller with ATS. A jockey pump will be 10 GPM @65 PSI with a 2 HP motor and controller.

4. BASIS OF DESIGN

A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; Stage is considered Ordinary Hazard Group 2; all other areas are considered light hazard.

B. Required Design Densities:
Light Hazard Areas = 0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1 = 0.15 GPM over 1,500 s.f.
Ordinary Hazard Group 2 = 0.20 GPM over 1,500 s.f.

C. Sprinkler spacing (max.):
Light Hazard Areas = 225 s.f.
Ordinary Hazard Areas = 130 s.f.

5. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe. All piping for dry system shall be Galvanized type.

B. Schedule 40 black steel pipe with threaded fittings for 1-1/2" and smaller and Schedule 10 pipe with grooved fittings for 2" and larger.

6. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

END OF SECTION

PLUMBING SYSTEMS

NARRATIVE REPORT

NEW BUILDING OPTION

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED v4 for Schools*** were indicated on this narrative.

1. CODES

A. All work installed under Section 22 00 00 shall comply with the MA Building Code, MA Plumbing Code 248 CMR and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

A. The Plumbing Systems that will serve the project are cold water, hot water, tempered water, sanitary waste and vent system, grease waste system, special waste system and storm drain system.

B. The building will be serviced by Municipal water and Municipal sewer system.

C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. SEWER DRAINAGE SYSTEM

A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running through the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The exterior grease interceptor of 5,000-gallon capacity will provided under Division 33 scope.

C. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

D. Art room sinks will be provided with solid interceptors

E. A floor drain will be provided in all toilet rooms where more than one water closet/urinal is present. Floor drains will be of cast iron body construction, heavy duty grade, PDI approved. Those for use in toilet rooms and other finished spaces will have rough bronze exposed finishes. Floor drains in Toilet rooms will require automatic trap primer systems. Those for use in mechanical rooms and other unfinished spaces will all be cast iron. All trap primers are to be electric, timer type.

5. STORM DRAIN SYSTEM

A. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point 10 feet outside the building.

B. The surface of the roof deck will be drained with dual-level promenade drains with the lower drain bodies flashed into the waterproofing membrane. The rainwater system will be sized to handle a rainfall rate of 4

inches per hour, with a total runoff from the main roof and the roof deck of just under 1 cubic foot per second.

C. A roof with parapet wall will have overflow drains. Overflow drains will be extended to the exterior wall with a nozzle.

D. The storm system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit at various locations of the building and connect to the rainwater collection system.

6. WATER SYSTEM

A. Domestic Cold-Water Service

a. New 6” domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided. A new reduced pressure backflow preventer will be installed at the main domestic water supply to protect the service (per the DEP regulation 310 CMR 22).

b. A new triplex, variable speed water Booster Pump System (5 HP ea.) shall be provided to maintain flow and pressure operation requirements at the remote fixtures. A full line by-pass shall be provided so only the fixtures requiring boosted pressure are served by the booster pump.

c. Boiler water feed and make-up, and any other mechanical take-offs will branch off through a reduced pressure -backflow preventer. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

d. Potable water will meet both the NSF 61 and NSF 372 standards for lead-free safe drinking water Act.

e. Domestic cold water inside the building will be “L” type copper tube with wrought or cast copper fittings.

f. All cold-water piping will be insulated to prevent condensation.

B. Domestic Hot Water Service

a. Domestic hot water supply will be generated through a point of use instantaneous electric water heater. The electric water heater in the range of 3 to 8 kw will be mounted under each fixture requiring hot water. The water heater will be modulating type and will be capable of providing fixture hot water flow at 60 °F rise.

b. The kitchen hot water demand will be generated through one 50 KW electric hot water heater manifold with 120-gallon buffer tank. The hot water will maintain dual system and operate at 140°F to serve the pre-rinse and 3-Compartment sink.

c. The other system will operate at 120°F and will serve the other kitchen appliances, hand sinks, and custodian room sink.

C. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC2015.

D. Tepid (70 deg. F – 90 deg. F) water will be provided to the emergency shower/eyewash fixtures as required by code.

7. WATER SUB METERS

A. The domestic water supply system will have water sub meters at a strategic location to record water consumption of fixtures on weekly basis. The following location were determined for remote analysis and trending of water consumption.

a. Main domestic water supply. (Whole building)
b. Submeter at domestic hot water supply to plumbing fixtures.
c. Submeter at cold water supply to plumbing fixtures.

8. PLUMBING FIXTURES LEED v4

A. Number of plumbing fixtures will be added in the facility to accommodate population of male students and female students and shall be in accordance with 248 CMR Paragraph 10.10, Table 1.

B. Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction-LEED-V4, Credit 2).

C. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

D. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Sloan, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

E. Fixtures shall be as scheduled on follows:

a. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.

b. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.

c. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet programmed for 10 second run-time cycle.

d. Sink: ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

e. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.

f. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

g. Laboratory Sinks: Faucets with vacuum breakers and 0.74 GPM aerators.

h. Emergency Shower/Eyewash: Recessed barrier free eye wash and shower safety station with ceiling mounted exposed shower and "in wall" drop-down eye wash with drain pan.

9. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

10. VALVES

A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

11. INSULATION

A. A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

B. All piping will be insulated with 1 in. thick high-density fiberglass. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC 2015.

12. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

B. Cleanouts for Special Waste System shall be Zurn #Z9A-C04 polypropylene cleanout plug with Zurn #ZANB-1463-VP nickel bronze scoriated floor access cover.

13. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

14. GREASE INTERCEPTOR

A. The kitchen Grease Waste System shall be a completely separate system beginning at the exterior grease interceptor through the kitchen and vented individually through the roof. Do not connect soil lines to the grease waste nor sanitary vents to the grease vent. Furnish and install the cast iron tees and associated piping within the grease trap including 5-foot length on the outlet. All the piping within the grease trap shall be made up of caulked and leaded joints. Install an exterior cleanout as detailed at the point where the line leaves the kitchen area. Grease trap is furnished and set in place including manhole access covers by the General Contractor.

15. MISCELLANEOUS

A. All toilet and mechanical rooms will have floor drains complete with trap primers.

B. The boiler room will include a service sink and eyewash station.

C. Plumbing roughing connections and faucets will be provided to each kitchen appliances requiring plumbing work. Non-freeze wall hydrants will be provided along the exterior wall of the school building.

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HVAC SYSTEM NARRATIVE

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

All work installed under Division 230000 shall comply with the Commonwealth of Massachusetts Adopted Building Codes (IBC 2021, IMC 2021, International Energy Efficiency Based on IECC 2021 - or latest Adopted Editions), Massachusetts Municipal Opt-In Specialized Stretch Energy Code 2023, and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

The HVAC narrative below provides as summary of options in section 4 below, and further defines the proposed preferred HVAC system under section 5 followed by two Alternate HVAC systems in sections 6 and 7, which shall also be studied as part on a life cycle cost analysis (LCCA). Sections 3, and 8 through 12 are general requirements and pertain to all options.

3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 7 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg. F for Heating, 75 deg. F +/- 2 deg. F (55% RH) for cooling for air-conditioned areas. Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the International Mechanical (latest adopted editions) as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. **HVAC SYSTEM OPTIONS:** As part of a life cycle cost analysis (LCCA), different HVAC systems shall be compared against a Stretch Code Compliant Baseline system to determine the system with the overall greatest savings over a 50 year study period.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year-round temperature control and comfort at a possible marginal increase in capital cost. The following HVAC systems are proposed to be studied as part of the life cycle cost analysis (LCCA) during the Schematic Design phase of the project.

A. **Baseline (All Electric Code):** The Baseline HVAC All-Electric System for comparison would be Packaged Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilator (ERV) providing Overhead Mixed-Air to terminal VAV units with Hot Water Coil Reheats. Hot water would be provided by an Air-to-Water Heat Pump Heater plant to terminal hot water radiation/radiant heating equipment for space perimeter heating, utility rooms, storage rooms, entryways, and other heated only areas of the building. Exhaust fans would be provided for janitor's closets, and utility rooms. Exhaust fans would be provided for janitor's closets, and utility rooms. Split system heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.

B. **Option 1 (Geothermal Heat Pump):** A central geothermal ground source water to water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Ground source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

1. Pros: Smallest Emergency Generator Size of All-Electric Options, Simultaneous Heating & Cooling, No Fossil Fuel Use, Highest energy efficiency (lowest EUI), Highest Utility Company Incentives, Federal IRA Tax Credit potential, Lowest Maintenance due to hydronic based systems, No exterior sound associated with exterior heat pumps, and no concern for Snow Removal for Heating/Cooling Plant Equipment.

2. Cons: Highest First Cost (can potentially be reduced with incentives and Federal tax credits), Site area required for wellfield. Indoor mechanical room required for heat pumps.

C. **Option 2 (Air Source Heat Pump):** A central air source to hydronic hot and chilled water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Ground source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.

1. Pros: Lower Maintenance than Option 3, High efficiency (low EUI), Utility Incentives, Moderate first cost

2. Cons: Higher Maintenance than Option 1, Additional maintenance and future replacement costs for outdoor air source heat pump, Additional Exterior Sound from Air Source Heat pump equipment, Potential snow removal concerns.

D. **Option 3 (Air Source VRF):** Roof mounted air source VRF (variable refrigerant flow) heat recovery heat pump units shall be connected to a combination of indoor ducted and ductless VRF indoor air handling units. Packaged Dedicated Outdoor Air System (DOAS) Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilation (ERV) and back-up electric heat shall provide the ventilation requirements for the majority of building areas. Backup heating shall be provided in areas of the building with extensive exterior exposures via perimeter electric resistance radiant heating panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Air source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.

1. Pros: Largest Emergency Generator Size of All Options, Simultaneous Heating & Cooling, No Fossil Fuel Use, Moderate First Cost, High energy efficiency (lower EUI), Utility Company Incentives.

2. Cons: Largest Emergency Generator Size of All Options, Increased Refrigerant piping in occupied areas, Increased cost for refrigerant monitoring, Greatest maintenance costs, Increased System replacement costs, outdoor "plant" equipment results in increased outdoor sound and concerns for keeping equipment clear of snow build up for heating. System is not compatible with Displacement air distribution (lower ventilation effectiveness)

5. **HVAC OPTION 1 - SYSTEM FEATURES AND CAPACITIES: The following HVAC system features and capacities are based on HVAC Option 1 (Geothermal Heat Pump Displacement Ventilation System).** Other HVAC system features and airflow, heating and cooling capacities will vary from this system and those differences will be studied and presented further during the Schematic Design LCCA phase of the project.

   A. Geothermal Heating and Cooling Plant:

      1. Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including a modular ground water source to water simultaneous heating/cooling heat pump chillers with heat recovery with a capacity of 300 nominal tons total; with six (6) nominal 50-ton modules, with two (2) of modules for heating/cooling backup purposes. The estimated peak heating load is 200 tons (including allowance for domestic hot water heating capacity). The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with ground source condenser water from approximately (50) closed loop type quad-loop ground source geothermal wells approximately 600 feet deep and spaced a minimum of 25' apart from one-another, based on a capacity of approximately 4 tons/well. The final well quantity, depth and distances shall be determined by the geothermal design consultant.

      2. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The plant shall supply a maximum hot water temperature of 130°F on a design heating day. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

      3. The heat pump chiller plant will distribute between 45°F and 55°F chilled water to the roof mounted air handling units and a compensated chilled water distribution system located throughout the building will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully-air conditioned Classrooms, Administration, Guidance, Media Center, Cafeteria, and Nursing Areas. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Chilled water pumps and variable frequency drives (which will control down to maintain a minimum flow to the chiller) will be provided for overall variable flow chilled water system distribution. Compensated chilled water pumps with variable frequency drives will be provided for variable flow chilled water system distribution. In addition to pumps, new chilled water accessories including air separators and expansion tanks shall be provided.

      4. Primary and standby geothermal water pumps with variable frequency drives (which will control down to maintain a minimum flow to the heat pump chillers) will be provided for overall variable flow condenser water system distribution. In addition to pumps, new geothermal water accessories including air separators and expansion tanks shall be provided.

B. Ventilation air handling equipment: It is proposed that a new air-conditioning displacement ventilation system should be provided to provide air-conditioning and ventilation to the occupied areas of the building.

1. New rooftop air handling units with 100% outside air operation capability, supply and return air fans with VFDs, energy recovery wheels, hot water heating coil with modulating valve, chilled water cooling coil, hot water re-heat coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classroom will typically be provided with two individual wall mounted displacement diffusing units between 275 and 400 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant panels will be provided along exterior walls that shall be interlocked with space enthalpy sensors that shall modulate the control valve of the coil closed when the space enthalpy is above dewpoint conditions.

2. It is estimated that the following Rooftop air handling equipment will be required to serve the different areas of the building:

a. RTU-1,2,3: Classrooms including SPED, Music, Art, Teacher Support, Cohort Commons, Circulation Areas: Estimated total airflow of 30,000 CFM (Average 10,000 CFM each)

b. RTU-4: Administration, Media Center and Adjacent Lobby Circulation Areas: Estimated total airflow of 9,000 CFM.

c. RTU-5: Cafeteria & Quiet Dining - Estimated airflow of 8,200 CFM

d. RTU-6: Gym & Stage - Estimated airflow of 13,000 CFM

e. RTU-7 Kitchen & Custodial/Support - Estimated airflow of 2,500 CFM

f. MUA-1: Kitchen Make-up air unit estimated at 4,500 CFM, with Kitchen Exhaust Fand and Dishwasher Exhaust Fan combined capacity of 5,000 CFM.

6. **HVAC OPTION 2 - SYSTEM DESCRIPTION – Air Source Heat Pump Chiller/Heater**

A. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that includes (10) modular air source to water heat pump chillers with heat recovery and a capacity of 30 nominal cooling tons each (approximately 25 tons heating per module), to meet the estimated peak heating load of 200 tons (including allowance for domestic hot water heating capacity). The heat pump chiller heater equipment shall consist of 2 banks of 5 modules manifolded together, with each bank having 1 backup module. The air cooled heat pump chiller units will be grade mounted on minimum 24" high structural support stands within a protected enclosure that allows adequate airflow. The unit shall be capable of providing 130ºF heating hot water supply at a 5ºF ambient temperature condition. A large outdoor location for the air-cooled heat pump chillers will be required. Provide pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. Primary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

A supplemental backup electric boiler shall also be provided to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

The heat pump chiller plant will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully air-conditioned areas of the building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Primary Chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new chilled water accessories including air separators, expansion and buffer tanks shall be provided.

B. Air Handling (HVAC) System:

New air handling units shall have hot water heating, chilled water cooling, supply fans with VFD drives, MERV-14 filters, and energy recovery where code required. New return air fans with VFD drives shall also be provided. New air handling unit and return fan controls shall be provided. The air handling units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The ductwork system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods. All new air handling units or rooftop units shall include complete protection (interior and exterior) from the corrosive environment (salt air) associated with coastal areas.

Refer to Section 5 Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

C. Air Distribution Systems:

The building areas are to be served by a fully air-conditioned variable volume displacement ventilation air distribution system with supplemental chilled water radiant cooling and heating panel system.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

Provide new toilet exhaust, kitchen exhaust, and utility room exhaust air fans systems shall be provided. All kitchen exhaust fans shall be rated for Grease exhaust duty.

E. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all general classroom, lobby and office areas of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors and entryways. Hot water unit heaters shall be provided for all utility rooms.

F. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

7. **HVAC OPTION 3 - SYSTEM DESCRIPTION – Air Source Variable Refrigerant Flow (VRF)**

A. Central Heating and Cooling Plant:

Under this option, a high-efficiency Air Source Variable Refrigerant Flow (VRF) heat recovery system shall provide simultaneous heating and cooling capabilities to all regularly occupied spaces via a combination of fan coil, ductless wall and/or ductless ceiling cassette type VRF terminal air handling units. Air conditioning will be generated by outdoor grade mounted heat recovery type air source heat pump condensing units that shall be connected to indoor air handling units or terminal heating and cooling units. The HVAC system terminal heating/cooling systems (excluding supplemental AC and electric resistance heating systems) shall have a total estimated capacity of 300 tons based on the peak heating loads and providing one (1) redundant outdoor condensers for each bank of manifolded heat pump condensers). The outdoor VRF heat pump condensing units will be sized and located according to AHU and terminal equipment zones capacity requirements and VRF system piping length limitations. Therefore, multiple banks of VRF outdoor heat pump condensing units shall be required.

B. Air Handling (HVAC) Ventilation Systems:

Ventilation shall be provided to building areas via a dedicated outdoor air system (DOAS) air handling unit as described below. Air handling units shall be provided with split cooling/heating coils connected to high efficiency air source heat pump unit. Remote condenser heat pump sections will include inverter-based compressor technology similar to the VRF system for improved energy efficiency.

The DOAS units shall be provided with MERV 13 filters, heat pump cooling/heating coil section (split air source heat pump condensers for indoor units), supply and exhaust fans with variable frequency drives or EC motors, supplemental electric heating coils, total energy recovery wheel, and a sensible reheat wheel or hot gas re-heat coil for dehumidification. The DOAS units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The DOAS system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods if unoccupied space set points are not maintained. All new air handling units or rooftop units shall include complete protection (interior and exterior) from the corrosive environment (salt air) associated with coastal areas.

Refer to Section 5 Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

C. Air Distribution Systems:

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements. All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

Provide new toilet exhaust, kitchen exhaust, and utility room exhaust air fans systems shall be provided. All kitchen exhaust fans shall be rated for Grease exhaust duty.

E. Terminal Heating & Cooling Equipment:

Heating for Entryways, Storage Rooms, Toilet Rooms, Janitor Closets, etc. and support areas will be generated by a combination of electric unit heaters, convectors, radiant panels, and fin tube radiation.

F. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

8. **COMMON REQUIREMENTS FOR ALL HVAC OPTIONS:**

A. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems. For HVAC Option 3 VRF System – Electric terminal heating equipment shall be provided.

B. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation and will typically be heated with horizontal type ceiling suspended hot water or electric unit heaters.

The Main Electric Rooms and IDF rooms will be air conditioned by high efficiency ductless AC cooling units.

C. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as art of the project scope.

D. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (electric, water). The new DDC/ATC system shall be capable of being integrated into the Town Wide Central energy management system.

The ATC/BMS system shall be designed as a proprietary system as manufactured by Siemens, or Equal.

9. **TESTING REQUIREMENTS:**

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Heat pump chiller plant system
- Condenser (Ground-Source or Air Source) water plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems.
- Terminal heating and cooling devices
- Variable Refrigerant Flow and Ductless AC Systems
- Automatic temperature control and building energy management system.

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

10. **OPERATION MANUALS AND MAINTENANCE MANUALS**

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

11. **RECORD DRAWINGS AND CONTROL DOCUMENTS**

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

12. **COMMISSIONING**

The project shall be commissioned per the Commissioning Section of the specifications.

Oakdale Elementary School
Dedham, MA
J#680 021 00.00
L#85892/Page 1/June 25, 2024

ELECTRICAL SYSTEMS

NARRATIVE REPORT

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED BD+C for Schools*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Interior lighting will be controlled by a networked lighting control system (NLCS) utilizing distributed load controllers (switching and dimming) actuated by signals from occupancy/vacancy sensors, daylight sensors, keypads, touchscreens, and auxiliary override inputs from the fire alarm, security, building management (BMS), and emergency power systems; BACnet/IP or contact closure output interfaces will be utilized from each system. Timed schedules following daily facility schedules with overrides will be employed for initial control of all common areas. Lighting will be fed from normal or life safety source panels; refer to item C below.

   B. Exterior lighting will be controlled by a networked lighting control system (NLCS) utilizing distributed load controllers or centralized panels (switching and dimming) actuated by signals from occupancy sensors, daylight sensors, keypads, touchscreens, and auxiliary override inputs from the fire alarm, security, building management, and emergency power systems; BACnet/IP or contact closure output interfaces will be utilized from each system. Pole-mounted area lighting will be provided with wireless load controller nodes integrated into each fixture allowing for individual or zoned control. Timed control following dusk-to-dawn schedules with overrides will be employed for initial control of all exterior lighting. Lighting will be fed from normal or life safety source panels; refer to item C below.

   C. Designated emergency and egress lighting will be wired to life safety source panels and be controlled by the NLCS when normal utility source power is available and brought to full “ON” through system control UL924 listed by-pass functions when normal utility source power is lost. Emergency exit signage shall be uncontrolled and remain “ON” constantly.

   D. Automatic control of receptacles based on occupancy will be provided for at least 50% of the receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, classrooms, and individual workstations. Controlled receptacles will be marked per NEC 406.3 (E).

   E. Demand response shedding of lighting loads will be capable in accordance with associated LEED requirements.

4. DESCRIPTION OF THE SYSTEMS

A. Utilities:

1. The new building will be supplied with utility power from the utility company Eversource. The new service will be fed via an underground primary duct bank to a pad mounted utility company owned liquid filled transformer.

2. The service electrical transformer will be furnished, installed, owned and maintained by Eversource, and it will be located adjacent to the building as shown in the civil drawings. The transformer will be of the pad-mounted type with a primary voltage of 13.8 kV and a secondary voltage of 480Y/277 volts. The transformer will be sized by the utility company based on the load data provided by The Design team.

3. Concrete pad and grounding grid for the pad-mounted transformer is provided by the Contractor per the Eversource standards.

4. Concrete encased duct bank of the two 4" PVC conduits will be provided by the Electrical Contractor for the primary feeder installation from a utility pole to the pad-mounted transformer. Pre-cast concrete manholes 5' x 5' will be provided by the Contractor to facilitate the primary cables field installation. The duct bank routing is shown in the civil drawings.

5. Utility company will provide a primary feeder cable from the utility manhole to the pad-mounted transformer via the new manhole and terminate the feeder cable on both ends.

6. Transformer secondary feeder of the copper conductors will be installed underground in the duct bank of five 4" PVC conduits from the pad-mounted transformer to the main electrical switchboard located in the main electrical room. The secondary feeder and terminations at the switchboard side will be provided by the Electrical Contractor and terminated at the transformer side by National Grid. The new service will be metered at the transformer secondary voltage.

7. National Grid metering CTs will be installed in a CT section of the switch board, the meter will be located at the direction of the utility company.

8. Telephone, Cable TV, and City Fiber will be fed underground into the building's Main Distribution Frame/Head End Room.

9. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for feeders 100 amperes or over.

10. The building connected electrical load estimate is based on the preliminary building systems design:

Load Type	KVA
HVAC Loads (including AHU, Destratification Fans, DCU, Chiller, UH, VRF, Boilers, FCs, Pumps, RTUs, Exhaust Fans, DCU)	758 KVA
Elevator	31.7 KVA
Exterior Lighting	2.0 KVA

Load Type	KVA
Interior Lighting	47 KVA
General Power	189 KVA
Kitchen	75 KVA
EV Charging	144 KVA
Plumbing/Fire Protection (Pumps, etc.)	160 KVA
Total Connected Load	**1406.7 KVA**

11. Electrical power distribution equipment will be installed in the main electrical room and in the electrical closets. There is one main electric room that also contains a 2-hour rated emergency electric room for life safety electrical switchgear. The main electric room shall be located on the First Floor. We anticipate four remote electrical rooms.

12. Electrical power distribution equipment in each electrical room or closet will support lighting, power, and HVAC loads in the associated areas.

13. A typical electric room will serve interior lighting, HVAC equipment and receptacle loads in the Academic Core areas. Each closet will house a 250 Amp 120/208-volt power panel (double tub) via a 75KVA dry-type transformer, a 100 Amp 277/480 panel for lighting, and a 150Amp 120/208-volt mechanical panel via a 45KVA transformer.

14. The panels in the Gym electrical closet will serve local HVAC equipment, lighting, receptacles and Gym equipment. The closet will house a 225 Amp 277/480 volt power distribution panel to feed a lighting 100 Amp, 277/480 volt 3 phase panel and a dry-type 75 kVA transformer with a double-tub 250 Amp,120/208 volt 3 phase receptacle panel. Provide 20-amp, 120-volt circuits for the basketball backboards, shot clocks, scoreboards, divider curtains and 20Amp, 208 volt, 3 phase circuit and disconnect for a mat lifter. Provide control stations and wiring for all Gym equipment.

15. A dry-type 75 kVA transformer and 250 Amp,120/208 volt, 3 phase panels will be provided for the Cafeteria and Kitchen loads. The kitchen refrigeration equipment will be power fed from the standby power panel.

16. Roof-mounted HVAC equipment will be power fed from the 400 Amp, 480-volt, 3 phase power panels located in the nearest second floor electrical closets.

17. HVAC equipment serving data communication rooms, heating plant equipment including heat pumps and circulator pumps, a sewage pump station and an elevator will be supported by the standby generator power panels.

B. Electrical Distribution System:

1. The service capacity will be sized for 2,000 Amperes with a 100% rated main breaker. The main buss will be sized at 2,500 Amperes and will have an available breaker space provision at the end of the switchboard to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance surge protection device (SPD) rated at 240 kA and a digital metering unit to monitor voltage, current, power factor, demand KW with a data communication port for interface with BMS. Main switchboard's short circuit rating will be rated for 65 KAIC.

2. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

C. Interior Lighting System:

1. The lighting design intends to provide a visual environment for the students and faculty that supports the educational activities within the building. The lighting system will be designed in compliance with the applicable Energy Code and be eligible for the Utility company rebate program.

2. All lighting fixtures will incorporate LED sources and electronic control gear/power supplies meeting the latest Design Lights Consortium (DLC) qualified products listing requirements and Mass Save Energy incentive requirements (as applicable to lighting selections).

3. Interior lighting illumination levels will meet the IESNA recommended values for applicable activity type, and be in compliance with the IECC 2021 energy allowances and LEED control requirements.

4. Daylight harvesting through continuous dimming will be provided for all general lighting zones near daylight openings; maintained foot-candle levels will comply with associated LEED requirements.

5. Classroom lighting fixtures will consist of pendant mounted direct/indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and for multi-level switching. Two daylight dimming zones will be provided in each classroom.

6. Office lighting fixtures will consist of recessed mounted direct LED luminaries and dimming drivers for continuous level dimming capability. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30% less than current ASHRAE 90.1. The power density reduction relates to ***LEED credit EAC2: Optimize Energy Performance.***

7. Lighting levels will be approximately 30 foot-candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***LEED Credit EQC6: Interior Lighting.***

8. Gymnasium lighting will be adjustable linear indirect fixtures with impact-resistant lensing zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Sensors and keypads will be impact resistant or provided with field-applied covers and wire guards.

9. Corridor lighting will combine recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Lighting will generally be scheduled for “ON” during normal school hours of operation with occupancy control of full “ON” overriding unoccupied dimmed levels and scheduled to “OFF” after normal business hours or other pre-determined time with occupancy sensor and keypad override.

10. Cafeteria lighting will be shielded flood lighting from top of the atrium for general illumination with a combination of recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Lighting will be generally be scheduled for “ON” during normal school hours of operation with occupancy control of full “ON” overriding unoccupied dimmed levels and scheduled to “OFF” after normal business hours or other pre-determined time with occupancy sensor and keypad override.

11. Kitchen and Servery lighting will be NSF listed recessed 2’x2’ lensed troffers zoned for switching and dimming control via the NLCS on response from occupancy sensors and keypads.

12. Media Center lighting will be a combination of recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads

13. Single occupant and “gang” bathroom lighting will be a combination of recessed linear wash wall slot and recessed linear direct linear slot zoned for switching and dimming control via the NLCS on response from occupancy and daylight sensors.

14. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied. Manual switches will be provided in each space. Classrooms and offices will have manual dimming capacities.

15. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC energy allowances, and LEED for Schools control requirements.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Classrooms	30 FC
Science Labs	40 FC
Offices, Conference Rooms, Library	30 FC
Kitchen	50 FC
Gymnasium	50 FC
Cafeteria	30 FC

Corridors	20 FC
Utility and Storage Rooms	20 FC

D. Exterior Lighting System:

1. Site area lighting will be pole-mounted fixtures featuring full-cutoff optics in the parking area and roadways with switching and dimming control via the NLCS. Pole heights will generally be 16 feet on 2.5' concrete mounting bases.

2. Building perimeter lighting will be wall-mounted sconces featuring full-cutoff optics over exterior doors with switching and dimming control via the NLCS. Fixtures will be served from life safety source panels.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Parking	2 FC
Roadways	1 FC
Walkways	2 FC
Building Entry	10 FC
Building Egress Points	5 FC
Outdoor Activity Areas	10 FC

E. Emergency Standby System:

1. One exterior 500 kW diesel emergency generators with sound attenuated enclosures and a 48-hour base tanks with alarms will be provided. Integral 200 kW resistive load banks will be provided for generator testing under load. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting and nurses' area will be connected to the emergency generator.

2. The generator power system has been sized to support emergency (life safety) and optional standby building loads. The life safety branch of the emergency system will be provided with a manual transfer switch on the emergency line side of the transfer switch in compliance with NEC 700.3(F).

   a. All Exit signs and emergency lighting in the areas listed below are fed by Life Safety Emergency Power (required by code):

      - Corridors
      - Electrical/Mechanical Rooms
      - Gymnasium, Locker Rooms
      - Cafeteria/Commons
      - Media Center
      - Lobbies
      - Administration areas

- Health Suite/Nurses Office
- Toilets
- Auditorium
- Stage
- Data rooms “Head End Room & IDF Closets”
- Kitchen/Servery
- Exterior Building mounted lights over doors required for egress lighting
- Where required by code (egress areas)

b. Fire Alarm System

c. Optional Standby Equipment:
   - Equipment listed below is fed by Optional Standby Emergency Power:
     - Heating Systems
     - Water Pumps
     - MDF and IDF Cooling units
     - Refrigeration (Kitchen/Nurse)
   - Strategically located receptacles in the administration area.
   - Equipment within the Head End and IDF rooms including (served by UPS):
     - Paging/Intercom System (MDF)
     - Security System (IDF/MDF)
     - Telephone System (MDF)
     - Network electronics (IDF/MDF)
     - Servers (MDF)
     - Clock system (MDF)
     - Building Management System (MDF)

d. Standby power loads:
   - Heating system with associated pumps and controls
   - Telephone/data closets and associated A/C equipment
   - Communication systems (telephone and public address systems)
   - Building DDC system control panels
   - Kitchen refrigeration equipment
   - Lighting and power in the Nurse/Medical area
   - Security system equipment

F. Metering:

1. Measurement devices shall be installed to monitor the electrical energy use for each of the following separately:

   a. Total electrical energy

   b. Sub-metering in accordance with ASHRAE 90.1 para. 8.4.3.

   Recording and Reporting:

   c. The electrical energy usage for all loads listed above shall be recorded a minimum of every 15 minutes and reported at least hourly, daily, monthly, and annually. The system shall be capable of maintaining all data collected for a minimum of 36 months.

G. Site Lighting System: ***LEED Credit SSC6: Light Pollution Reduction***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with the Illuminating Engineering Society.

2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

H. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25–40-foot intervals.

4. Exterior weatherproof receptacles with lockable in-use enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. All receptacles will be of the tamper resistant type.

I. Fire Alarm System:

1. A fire alarm and detection with mass notification system will be provided with 60 hours battery back-up standby, 15 minutes of alarm. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes with white and amber colored strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Amber strobes will be initiated during a mass notification event in which a different district message will be played over the speakers.

5. The system will be remotely connected to automatically report alarms to the Fire Department via an approved method by the Fire Department.

J. Uninterruptible Power Supply (UPS):

1. One (1) 24 KW, 3-phase centralized UPS systems will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

K. Level 2 AC Dual Electric Vehicle Charging Equipment (EVSE):

1. Conduit and wiring provisions will be provided to 10% of parking spots for future EV charging stations.

L. Renewable Energy System Provisions:

1. Electrical provisions will be made for a ballasted roof mounted renewable energy system consisting of a grid connected Photovoltaic PV System intended to reduce the facilities demand for power.

M. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

N. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners, and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication.

O. Security and Communications System Provisions:

1. Electrical Contractor will provide Integrated Security System and Technology System provisions including outlet boxes, empty raceways, 120-volt power, cable trays, and grounding.

5. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator system.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Two-way communication system.
- Distributed Antennae system.

B. Testing reports shall be submitted to the Engineer for review and approval before providing them to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

SECTION 31 10 00
SITE CLEARING

1. Description of Work: Furnish all labor, materials, and equipment required and perform all site preparation, complete as indicated and as specified herein. Unless otherwise indicated, the areas to be cleared, grubbed and stripped shall consist of the entire Worksite, with the exception of those areas specifically designated to remain in an undisturbed, natural condition.

2. Clearing: Cut and remove all roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground in the area of construction, as indicated on the Contract Drawings.

3. Grubbing: Grub and remove all stumps, roots in excess of 1-1/2 inches in diameter, matted roots, brush, timber, logs, concrete rubble and other debris encountered to a depth of 30 inches below original grade or 18 inches beneath the bottom of excavations, whichever is deeper.

4. Stripping: Strip topsoil and subsoil from all areas to be excavated as detailed on the contract drawings. Topsoil shall be free from brush, trash, stones larger than 2 inches in diameter and other extraneous material. Avoid mixing topsoil with subsoil. Stockpile and protect topsoil in the area.

5. Disposal: Contractor shall dispose of rubbish and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area. No rubbish or debris of any kind shall be buried on the site.

6. Protection: Trees and other vegetation not indicated to be removed in the contract drawings shall remain and shall be protected from damage by all construction operations. Provide protection to prevent damage to surrounding trees, not within the limit of work or specified to be removed, from the felling operations. Clearing operations shall be conducted in a manner so as to provide for the safety of employees and others.

END OF SECTION

SECTION 31 20 00
EARTH MOVING

1. Description of Work: Furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, fill and grading required to complete the Work as indicated on the Contract Drawings and as specified herein. The Work shall include excavation for drain manholes, drainpipes, and paving; all backfilling, compaction, and fill; embankment and grading; disposal of waste and surplus materials; temporary support of excavation, excavation dewatering and surface water control during excavation. All materials not re-used on-site shall be disposed of by the Contractor. Materials required in the Work which are not available from on-site excavated materials shall be imported from approved off-site sources.

2. Structural Fill: Structural Fill shall be gravel, sandy gravel, or gravelly sand free of organic material, wood, trash, snow, ice, frozen soil, and other materials which may be compressible, or which cannot be compacted as specified herein and shall be graded within the following limits:

Sieve Size	Percent Finer by Weight
4 in	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

3. Controlled Density Fill: Controlled Density Fill shall conform to the MassDOT Standard Specifications for Highways and Bridges, as amended.

4. Common Fill: Common Fill shall consist of mineral soil free from organic materials, topsoil, wood, trash and other objectionable materials which may be compressible, or which cannot be properly compacted. Common Fill shall not contain stones that are greater than 2/3 the lift thickness of common fill being placed. Common fill shall not contain granite blocks, broken concrete, masonry rubble or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Snow, ice and frozen soil will not be permitted. Soil excavated as part of the Work which meets the above requirements in this paragraph, as shown by a certified sieve analysis may be used in the Work.

5. Select Common Fill: Select Common Fill shall be as specified above for Common Fill, except that the material shall contain no stones larger than 2-in in diameter. Soil excavated as part of the Work which meets the requirements of this paragraph, as shown by a properly executed and certified sieve analysis may be used in the Work.

6. Riprap: Riprap shall be sound, durable rock which is angular in shape. Rounded stones, boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale and organic material, and meet the MassDOT Standard Specifications for Highways and Bridges, as amended.

7. Crushed Stone:

    a. Crushed stone for temporary access ways, construction entrances, walkways, setting bed for riprap, and sediment filtration devices shall conform to the MassDOT Standard Specifications for Highways and Bridges, as amended.
    b. Dense-graded crushed stone for subbase material in project pavement sections shall conform to the MassDOT Standard Specifications for Highways and Bridges, as amended.

8. Screened Gravel:

    a. Screened gravel shall be used for drainage pipe and drainage structures bedding as indicated or if standing water is observed in the pipe trench prior to installation and at other locations as specified on the Contract Drawings.
    b. Screened gravel shall consist of hard, durable, rounded or subangular particles of proper size and gradation and shall be free from sand, loam, clay, excess fines and deleterious materials. The gravel shall be graded within the following limits:

Sieve Size	Percent Finer by Weight
3-in	100
No. 4	40 to 75
No. 50	8 to 28
No. 200	0 to 10

9. Sand: Sand shall conform to ASTM C33 for fine aggregate.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROLS

1. Description of Work: Erosion and sedimentation control shall be provided as shown on the attached Contract Drawings with materials and procedures as specified herein. If the Contractor varies construction activities from those shown on the contract drawings the Contractor must, at no additional cost to the Owner, prepare and implement an Erosion and Sedimentation Control Plan (hereinafter called The Plan) to prevent storm water, soil erosion and air pollution due to project construction activities. The Plan shall implement erosion and sedimentation control prevention and treatment procedures such that stormwater runoff discharged from the site shall meet the following general requirements:

    a. All work shall be performed in accordance with the erosion control measures shown on The Plan.
    b. Best management practices (BMPs) shall be used to address storm water pollution prevention in accordance with MassDEP Stormwater Management Guidelines & EPA NPDES Regulations.
    c. The Plan shall be implemented and installed prior to commencement of earthwork activities.
    d. The EPA NPDES Stormwater Pollution Prevention Plan Shall be kept on-site at all times and review / project inspections shall take place as specified therein.

2. In order to minimize erosion, the natural vegetation of the area shall be preserved at locations adjacent to and outside the limits of work as indicated on the Contract Drawings. All earthwork, grading, moving of equipment and other operations likely to cause disturbed soil conditions and erosion and siltation and tracking of sediments, shall be planned and performed in a sequence as to avoid sedimentation and erosion of disturbed soil.

3. Furnish all labor, materials, equipment and incidentals required to perform installation, maintenance, temporary pumping, removal and area cleanup related to erosion and sedimentation control work as indicated and as specified herein.

4. Crushed Stone: For temporary access ways, staging areas, stone filter boxes, stone filter berms, setting bed for riprap, and sediment filtration devices, crushed stone shall conform to the MassDOT Standard Specifications Highways and Bridges, as amended.

5. Geosynthetic Materials:

    a. Drainage Fabric, Silt Fence, Filter Fabric and Filter Cloth shall be Mirafi Envirofence; American Excelsior “Siltstop” fence or DGIP series silt fence or approved equal.
    b. Stabilization Fabric:
    Erosion control blanket shall be constructed of a porous, biodegradable geotextile matting specifically manufactured to retain soil moisture, to hold soil temperatures and to generally stabilize soils where stormwater flows in channels, swales or on recently planted slopes such as Mirafi 100X; Curlex Excelsior, North American Green Bionet 575BN, or approved equal. Erosion control blanket shall be installed to protect soil and seedlings where specified.
    The erosion control fabric shall be ‘stapled’ to the surface which it is installed in accordance with the recommendation of the selected manufacturer. All materials used in the construction of and installation of the fabric must be biodegradable and require no maintenance by the Owner.

6. Sediment Fence:

    a. Wooden stakes shall be 4-ft in length, 2-in by 2-in oak.
    b. Sediment fence fabric shall be a woven, polypropylene, ultraviolet resistant, selected to provide a barrier to prevent the transport of sediment laden water with fines and debris, yet provide the passage of water.
    c. Prefabricated commercial sediment fence may be substituted for built-in-field fence.
    d. 1/4-in woven wire mesh shall be galvanized steel or hardware cloth.
    e. Temporary mulch:

Wood chip mulch or bark chip mulch: Chipped material shall have a uniform consistency and be free of rock and soil. Material shall be stockpiled on the site in approved areas at the direction of the Owner.

Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain a minimum of 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

f. Hay bales shall be bales made of straw of oats, wheat, barley, rye or natural hay and shall be utilized to control sediment runoff during construction activities. Each bale shall be either wire-bound or string tied. Bales shall be placed with bindings oriented around the bale rather than over and under. Furnish oak wood stakes 2-in x 2-in x 4-ft long or 1/2-in x 4-ft long rebar as indicated.
g. Tackifier for use on straw mulch areas shall be a latex acrylic copolymer emulsion specifically manufactured for use as a tackifier. Asphalt tackifier shall not be used.
h. Temporary seeding for erosion control
i. Dust Control
j. Cloth Filters: Cloth filters at catch basins shall be The Dandy Bag as manufactured by Dandy Products, Inc. or equal; Siltsack as manufactured by Jennian Enterprises; Drainpac as manufactured by Drainworks.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

1. Description of Work: Furnish labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

    a. Hot-mix asphalt pavement at all excavations made in any existing pavement.
    b. Pavement-marking paint.

2. Hot-mix Asphalt Pavement: Bituminous Concrete Paving shall be dense, hot-laid, hot-mix asphalt plant mixes approved by MHD Specifications, HMA Binder for binder courses, HMA Surface Standard Top for surface courses, and MHW 3/8” Top for sidewalks, designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types".

3. Asphalt - Tack coat shall consist of AASHTO M 140 emulsified asphalt, or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

4. Pavement-Marking Paint: Acrylic/latex type, low VOC, traffic marking paint.

END OF SECTION

SECTION 32 13 00
CONCRETE WALKWAYS

1. Description of Work: Furnish all labor, materials, equipment and incidentals required to install concrete walkways as shown on the Drawings and as specified herein.

2. Concrete: Concrete shall be as specified in Section 030000, but in no case shall be less than 4,000 psi at 28 days with 5% to 7% air entrainment.

3. Welded Wire Fabric: Welded wire fabric shall conform to ASTM A185 and shall be of size and gauge shown.

4. Expansion joint filler: Expansion joint filler shall be bituminous type, 1/2 –inch thick meeting AASHTO M-213-65.

5. Finish: Concrete sidewalks shall have a broom finish.

END OF SECTION

DOCUMENT 000120

OUTLINE SPECIFICATION

SCHEMATIC PHASE- CONSTRUCTION ASSEMBLIES AND SYSTEMS

PROJECT DESCRIPTION

G. SITEWORK

G10: SITE PREPARATION

G1010 – Site Clearing

- Remove and dispose of all trees and plants indicated on the Drawings. Remove stumps and roots completely by grinding or removing in areas indicated to be improved to the limits listed below.
    - Lawn Areas: 2'-0" minimum below grade
    - Shrub Beds: 3'-0" minimum below grade
    - Trees: 4'-0" minimum below grade
    - Paving: 3'-0" minimum below grade
- The Contractor may encounter tree stumps buried below grade. These stumps shall be removed to the limits listed in Paragraph B, above.
- All depressions resulting from demolition and removal, if not subject to further earthwork and construction, shall be filled with soil in layers 5" thick compacted to a density equal to adjacent grade to a depth within 6" of finish grade. Loam shall be placed up to finish grade.
- Tree Protection- Protect trees with Chain Link fence surround at drip line of tree canopy.

G1020 – Site Demolition and Relocation

- Refer to Engineering specifications for utility demolition and erosion control
- Strip and Stockpile existing topsoil for re-use
    - Loam and topsoil shall be stripped to its full depth from areas to be excavated, filled, re-graded, or resurfaced.
    - Loam and topsoil shall be stockpiled on site in a location that does not conflict with intense work areas and is protected. No loam and topsoil may be removed from the property of the Owner.
    - Loam to be stockpiled in excess of ten (10) days shall be covered with a canvas or plastic tarp and the base shall be surrounded by hay bales as necessary to prevent erosion from wind and stormwater.
    - Stockpiled loam and topsoil which conforms to the specifications may be used for finish grading in seeded and sodded surface locations subject to approval of the Owner's Representative. Coordinate with the work of SECTION 329100 – PLANTING SOILS.
    - Excess suitable loam or topsoil shall be bulk deposited in a location established by the Owner within one (1) mile of the site, and shall there

remain the property of the Owner. Disposal of unsuitable Loam or topsoil shall be the responsibility of the contractor.

- Bituminous Concrete Pavement Removal
    - Remove and dispose of existing bituminous concrete paving. Saw cut edges of pavements to be removed. Protect sawed edges of paving from damage until new paving is placed against it. Existing pavement which is damaged, disturbed or settles, shall be cut back by same method and replaced as directed by Owner's Representative at no additional cost to Owner. This includes removal of layers of pavement, gravel and other base and sub-base materials beneath pavements removed.

- Concrete pavement removal
    - Remove and dispose of existing concrete paving. Saw cut edges of pavements to be removed. Protect sawed edges of paving from damage until new paving is placed against it. Existing pavement which is damaged, disturbed or settles, shall be cut back by same method and replaced as directed by Owner's Representative at no additional cost to Owner. This includes removal of layers of pavement, gravel and other base and sub-base materials beneath pavements removed.

- Concrete Curb Removal
    - Remove and dispose of existing concrete curb. Saw cut edges of curb to be removed. Protect sawed edges of curb from damage. Existing curb which is damaged, disturbed or settles, shall be cut back by same method and replaced as directed by Owner's Representative at no additional cost to Owner.

- Chain link fence and backstop removal
    - Remove and dispose of Chain Link Fence in the areas indicated on the Drawings, including fabric, posts, rails, backstops, gates and footings. Protect fencing to remain from damage due to demolition. Fence sections to remain that are damaged during demolition shall be replaced with new fence to match existing.

G20: SITE IMPROVEMENTS

G2030 Pedestrian Paving

- General: Construct pedestrian pathways to meet the following requirements:
    - Concrete Pavement - Pedestrian
    - Concrete Pavement – Vehicular
    - Concrete Pads for Site Furnishings, etc.
    - Concrete paving shall be 4" depth for sidewalks, 6" depth for driving surfaces, 8" depth minimum for other pads (bike, bench, dumpster, trash receptacle, loading dock drive and deck, etc.).
    - All concrete shall be reinforced with welded wire mesh except where it is reinforced with steel bars.

- Expansion joints, at 20’ O.C. shall be reinforced with stainless steel tie bars, and filled with preformed joint filler, backer rod, and sealant.
- Control joints shall be saw-cut and shall be 5’ O.C. or as shown on the drawings.
- Provide light broom finish for most areas.
- Use 4,000 psi concrete with a maximum slump of 4”. Contractor is responsible for providing the mix design and for all concrete testing (strength, slump, and air content).
- Provide expansion joints per drawings and per manufacturer’s standards. Prepare shop drawings for review and approval showing all jointing.
- Provide concrete base material as subbase where shown on drawings.

G2031 Bases and Sub-Bases

- Provide subbase materials, drainage fill, and common fill materials for pavements. Refer to Civil Engineering Specifications

G2032 Paving and Surfacing

- Unit pavers on grade: install over concrete base slab: Precast Concrete Paver: Hanover Architectural Products, Inc. design, manufactured by Hanover Prest Paving Company, 240 Bender Road, Hanover Pennsylvania 17331, phone # 717.637.0500, or equal.
  - Size: Refer to plans – Pedestrian 2 3/8” thick
  - Matrix and Finish:
    - Type 1: Hanover Custom Matrix (TBD) and Tudor Finish
    - Type 2: Hanover Custom Matrix (TBD) and Tudor Finish
    - Type 3: Hanover Custom Matrix (TBD) and Natural Finish
    - Edge: Square
- Unit pavers on grade - permeable: install over crushed stone and sand based structural soil. Precast Concrete Paver: Hanover Architectural Products, Inc. design, manufactured by Hanover Prest Paving Company, 240 Bender Road, Hanover Pennsylvania 17331, phone # 717.637.0500, or equal.
  - Size: Refer to plans – Pedestrian 2 3/8” thick
  - Matrix and Finish:
    - Type 1: Hanover Custom Matrix (TBD) and Tudor Finish
    - Type 2: Hanover Custom Matrix (TBD) and Tudor Finish
    - Type 3: Hanover Custom Matrix (TBD) and Natural Finish
- Reclaimed granite curb surfacing
- Asphalt Surfacing System
  - Asphalt Surfacing System for Basketball Court: consists of the application of Plexipave System, as manufactured by California Products Corp., Andover, MA. 01810 www.plexipave.com, or approved equal.

- Stabilized Decomposed Granite Paving in Pedestrian areas

    - Organic-Lock for Organic-Lock stabilized pathway aggregate provided by: Envirobond Products Corporation, 6191-2100 Bloor Street West, Toronto, Canada M6S 5A5. Phone: (866) 636-8476. Email: info@envirobond.com. Websites: www. Envirobond.com and www.organic-lock.com

        - Crushed Aggregate Materials:
            - Crushed Aggregate Material shall consist of sound, angular, durable particles.
            - Color: Beige – as per Read Custom Soils Stonedust Color Chart

        - Organic-Lock Binder
            - Patented powdered organic binder designed to be blended with crushed aggregate.
            - Made from 100% naturally occurring materials.
        - 8” Gravel Base

- Accessible Curb Ramps with ADA Warning Strip
    - Curb ramps shall conform to MAAB requirements and be composed of the sur- rounding paving material (typically concrete).
    - Curb ramp shall include a detectable warning tile. The warning tile shall be manufactured of cast iron and be cast-in-place.
    - Tiles shall be in accordance with ADA Regulation for Detectable Warning on Curb Ramps and in accordance with municipal and commonwealth of Massachusetts Standards. (Cast iron detectable warning on curb ramps preferred over plastic or concrete unit paver tiles.)

- Resilient Surfacing:
    - Manufacturer: Surface America, Inc., or approved equal. Local representative is M.E. O’Brien & Sons, Inc., 93 West Street Unit F, Medfield, MA 02052. Phone: (508) 359-4200

    - Aliphatic poured-in-place playground surfacing system, including the following:
        - PlayBound™ Poured-In-Place Primer:
        - Material: Polyurethane.
            - PlayBound™ Poured-in-Place Base Course:

        - Material: Blend of 100% recycled SBR (styrene butadiene rubber) and polyurethane.
        - Thickness: 2" (51 mm).
        - Formulation Components: Blend of strand and granular material.
            - PlayBound™ Poured-In-Place Top Wearing Surface:
        - Material: Blend of recycled EPDM (ethylene propylenediene monomer) and polyurethane.

- Thickness: Nominal 1/2" (12.7 mm), minimum 3/8" (9.5 mm), maximum 5/8" (15.9 mm).
- Colors:
  Color A: TBD
  Color B: TBD
  Color C: TBD

- Granite Planter Curb

- Exterior Boardwalk and Rain Garden
  - Wood: Nominal Sizes are indicated, except as shown by detailed dimensions.
  - Provide dressed lumber for finished boardwalk carpentry, manufactured to the actual sizes described in this Section.
  - Moisture Content of pressure-treated Softwood Lumber: Provide kiln-dried (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values requires by the applicable grading rules of the respective grading and inspecting agency for species indicated.
  - Lumber: Identified by grade mark of, or certificate of inspection issued by an approved lumber grading or inspection bureau or agency per ALSC requirements.
  - Structural members hidden from view, including joists, beams, posts that support the deck shall be pressure-treated Southern Yellow Pine with an approved process and preservative in accordance with AWPA Book of Standards (IRC R317, IRC R318) from the following list. All lumber in contact with the ground shall be approved preservative treated wood suitable for ground contact (IRC R317.1.2).

TABLE 1: Common Preservative Treatments and Retention Levels (pcf) for Sawn Lumber in Ground Contact

Species	ACQ-B	ACQ-C	ACQ-D	CA-B	CuN-W
Southern Yellow Pine	0.40	0.40	0.40	0.21	0.11

  - Provide the following structural members:
    - Joists shall be 2x6 nominal
    - Beams shall be 4x6 nominal

  - Boardwalk, edge and fascia boards:
    - Water Resistant Wood:
      - 1x nominal stock as shown
      - 2 x4 and 2X6 nominal, eased edges
      - 4X4 square posts, nominal.
      - Alternative wood species:
        1) Black Locust, Robinia pseudoaccia:Premium Grade,
        2) Jarah, Eucalyptus marginata
        3) Purpleheart, Peltogyne spp.
        4) Approved equal with Janka hardness rating >1700

- Fasteners, Connectors, and Hardware
  - All screws, bolts, and nails for use with preservative treated wood shall be stainless steel as follows. Screws in lieu of nails.
    - All hardware (joist hangers, cast-in-place anchors, etc.) shall be stainless steel grade 304 or 316.
    - Fasteners and connectors shall be stainless steel grade 304 or 316.
- Fasteners and Anchorages for Exterior Finished Carpentry of wood: Provide 304 or 316 stainless steel nails, screws and other anchoring devices of the proper type, size, material and finish for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.
- Flashing shall be stainless steel. Aluminum flashing shall not be used.
- Cast-In-Place Concrete Footings
  - In accordance with requirements of Division 03 Sections for concrete, reinforcing and finishing.

G2033 – Metal Edging

- Permaloc: www.permaloc.com
- Material Type: Aluminum
- Model: .075” thick x 2.75” Brick Block Paver Restraint with V Trac Base System
- Finish: Black Duraflex complying with AAMA 2603 for electrostatically baked on paint.

G2040 – Site Development

- Stair Handrails:
  - Steel shapes, plates and bars: AISI grade 304L Stainless Steel
  - Finish: #4 Satin with Circumferential Finishing Direction and consistent with approved samples.
  - Hardware: AISI grade 304L Stainless Steel.
  - Nylon spacers, sleeves or pads: provide between dissimilar metals to separate from direct contact

- Wood Bench on Pedestals
  - Wood bench on pedestals: Ogden Bench as manufactured by Maglin Site Furniture Inc., 27 Bysham Park Drive, Woodstock, Ontario N4T 1P1 Canada. Toll Free: (800) 716.5506. Phone: (519) 539.6776. Fax: (877) 260.9393. Website: www.maglin.com. E-mail: sales@maglin.com or approved equal.
    - Dimensions:
      - Overall length: Varies
      - Radius: Varies
      - Height: 18”
    - Seat:
      - 100% Ipe
      - Layout: Front to Back
      - Finish: Untreated

- Leg Mounts:
  - Pedestal
  - Finish: E-Coat Rust Proofing with Standard Powdercoat
  - Color: Fine Textured Gunmetal FineTex,
  - Mounting Hardware: Stainless Steel

- Picnic Table and Bench Ensemble
  - Knight Table Ensemble by Forms+Surfaces manufactured by Forms+Surfaces 30 Pine Street Pittsburgh, PA 15223 phone: 800-451-0410 email: sales@forms-surfaces.com website: www.forms-surfaces.com or approved equal
  - Table Ensemble
    - Materials:
      - Frames: solid aluminum.
      - Slats: FSC 100% Ipé hardwood
      - Fasteners: stainless steel.
      - Finishes:
        - Frames: polyester powdercoat , Aluminum Texture
        - Slats, wood: Penofin® hardwood formula, “Transparent Natural.”
  - Dimensions:
    - Knight Table Ensemble, backless:
      - Knight Table Ensemble (set): 72" overall length, 79.5" overall depth, 30.4" overall height.
      - Four (4) of Nine (9) total Picnic Table Ensembles to include one (1) ADA bench: 36" length, 19.8" depth, 18" height.
      - Mounting: Surface mount. Provide anchors and stainless steel mounting screws.

- Sculptural Precast Seating Element
  - Bench: Supercell Benches as manufactured by MD3 Contract Ltd., 412 kelburn Rd. Suite 312 Deefield, IL Phone: (847) 940.7072. website: https://www.md3contract.com/

    - Concrete bench colored in mass, acid etched and waterproofed. Registered and protected design by the Intellectual Property Office of the European Union.
    - Supercell S: 90 x 60 x 43cm, 400kg.
      Supercell L: 140 x 110 x 43cm, 800kg.
    - Material: High quality concrete HA 30 B20 IIA, acid etched and waterproofed.
    - Cement: PORTLAND cement (BLIIB-LL52.5-R) and GRIFFI cement (BLIIB-LL52.5-R).
    - Aggregates: Aggregates of marble, granite, with selected granulometry. With guarantees and certificates CEE and ISO9001: 2000 SIMO.
    - Water: drinking water, which does not contain impurities,silt or suspended organic components

that can affect the quality of concrete such as structural concrete.

- Reinforcing: steel welded with corrugated steel mesh B500 S (UNE3092)
- Surface finish: Acid etching, leaving the aggregates on the surface and waterproofed. With anti-graffiti finish.
- Colors:
    - Supercell Large: 1 of each of the following – 1 white (standard finish), 1 grey (standard finish), 1 epoxy-polyurethane UV resistant system, glossy finish (color to be determined).
    - Supercell Small: 2 white (standard finish), 2 grey (standard finish) and 2 epoxy-polyurethane UV resistant system, glossy finish (color to be determined).

- Seating Stumps
    - Seating Stumps shall be Full-Round Steppers, model No. 1501 in the quantity shown on the project drawings. Manufactured by Columbia Cascade Company, 1300 SW Sixth Avenue, Suite 310, Portland, OR 97201 U.S.A. Phone 503/223-1157.
    - Full-Round Stepper shall be hand-hewn coastal Douglas fir (Pseudo-tsuga menziesii), 16” dia. (+/- 2”), clean peeled of bark and sanded.
    - Whole Log shall be peeled by hand. Logs that have been machine peeled or that include bark will not be accepted. To effectively receive pressure preservative treatment, all fabrication, including sawing and drilling must be completed prior to preservative treatment.
    - Full-Round Steppers shall be pressure treated with a non-toxic child safe preservative after all fabrication is completed. Preservatives containing arsenic, pentachlorophenol, creosote or similar toxic chemicals as their active ingredient shall not be used.
- Bike Shelter
    - Bike Shelter to be Edge Bike Shelter, as manufactured by MMCITE., 2905 Westinghouse Blvd, Suite 100. Phone: (704) 995-1942. Email: info@mmcite.com, or approved equal.
- Trash Receptacles and Recycling Receptacles:
    - Trash Receptacles shall be Chase Park, as manufactured by Landscape Forms, Inc., 7800 E. Mighigan Avenue, Kalamazoo, MI 49048. Phone: (800) 430-6209. Email: specify@landscapeforms.com, or approved equal.

        - Style: Side Opening
        - Mounting: Surface mounted
        - Lock: Keyed w/ 2 brass keys
        - Sand Pan: Powdercoated black finish
        - Color: Silver
        - Materials

Base: Rotationally molded linear low density polyethylene. Color is dark gray. Base is filled with concrete for stability.
Sides and Door: Cast 319 aluminum.
Hinges: Two, carbon steel with silver Magni-coat, connects sides and door.
Latch: carbon steel with silver Magni-coat
Lock Cam, and Lock Plate: Type 304 Stainless steel.
Lid: 0.100-inch thickness, spun 1100-0 aluminum.
Lid Bracket: 1-inch by 1-inch by 1/4-inch aluminum angle.
Liners: Black, formed polyethylene.
1. Single liner, side opening litter, 36 gallon capacity
Fasteners: Stainless steel.
Sand Pan: 11-inch diameter, spun steel.
Security Cable: 1/16-inch diameter, 24-inch long, nylon-coated stainless steel wire rope with eye fittings.
-Sand pan attached with security cable using aluminum blind rivets.
Recycling sign backer plates: Two 8-inch wide by 6-inch tall by 1/8-inch thick, 3003 or 5052 aluminum plates welded to back panel and door.
Recycling sign decals: Two 5-inch tall by 7-inch long, exterior-grade vinyl.

- Aluminum Flagpole
  - Flagpole shall be 40'-0" exposed height. The rate of taper shall be 1" every 5'-6". The bottom diameter shall be 6". The wall thickness shall be .188".
  - Flagpole shaft shall be 6063-T6 aluminum alloy seamless tubing.
  - Flagpole shall be natural aluminum finish.
  - The flagpole shall have an internal Halyard (Vandal Deterrent) Winch System consisting of a stainless steel cable, which shall be routed through the interior of the flagpole shaft and shall be attached to a gearless positive locking winch. Contractor shall supply and install all components necessary for the proper use of a vandal deterrent winch system. Cable shall be a 7 x 19 construction SS air-craft cable.
  - Flagpole shall be lit from a pole, ground, or building light system.
- Bike Rack:
  - Bicycle Racks shall be SC Bike Rack, as manufactured by Maglin Site Furniture., 999 18th st, Suite 3000, Denver, CO 80202. Phone: (800) 716-5506. Email: sales@maglin.com, or approved equal.
    - Materials:

    Body: Cast aluminum.
    - Mounting: Direct Burial.
    - Finish: Polyester Powdercoat – Fine textured Collection.
    - Color: Silver14.
- Bollards:
  - Metal Bollards shall be the TOR900-A, as manufactured by Hess America, P.O. Box 28, Gaffney, SC 29342, Phone: (864) 487-3535,

Email: info@hessamerica.com, or approved equal.

- Dimensions: 35.4” H x 3.2” x 1.8”.
- Mounting: Direct Embedment
- Material: I-beam profile steel stock.
- Hardware: Stainless Steel
- Finish: Hot-dipped galvanized prior to painting.
- Color: Finely textured matte Silver Gray metallic.

- HC Signs and Other Parking and Directional signage:
  - Refer to Civil Engineering specifications.
- Chain Link Fences and Gates:
  - Height: 4’, 8’, Height, backstops
  - Chain link fabric shall have a fusion bonded vinyl coating. Vinyl color shall be black. Fabric shall be #6 gauge wire core O.D. with a two inch mesh.
  - Posts, rails, gate frames and braces shall be fabricated of Class 1 (round steel sec- tions), Grade A (hot-dipped galvanized), seamless steel pipe with fusion bonded black vinyl coating. End or corner posts, 4” O.D. Line Posts 3.5” O.D. Rails and braces 1.9” O.D.
- Sports Fields (Natural)
  - Baseball Infield Mix: DuraEdge Classic Infield mix as manufactured by DuraEdge Products, Inc., Grove City, PA, Phone: (866) 867-0052, as supplied by Read Custom Soils (A.D. Makepeace), 5 Pond Park Road, Hingham, MA, 02043, phone: (781) 828-300, or approved equal.
    - Engineered soil product which is mechanically mixed off-site in a controlled environment using a pugmill-type mixer. This process ensures a thorough mixing of the sand and clay components to exact specifications.
  - Top Dressing

Topdressing: Either ProSlide Engineered Topdressing (expanded shale) or Turface Pro League Heritage Red Conditioner (calcined clay). Both products are available through DuraEdge Products, Inc., Grove City, PA, Phone: (866) 867-0052.

  - Pitching Mound and Batter’s Box Surfacing
    - Pitching mound and batter’s box surfacing: DuraPitch Premium Mound Clay as manufactured by DuraEdge Products, Inc., Grove City, PA, Phone: (866) 867-0052
  - Baseball Bases, Home Plate and Pitching Rubbers
    - Bases: Base Set shall be Pro-Style ‘Hollywood’ Bases, Model # BB-500 as manufactured by Jaypro Sports LLC, 976 Hartford Tpke, Waterford, CT 06385, Phone: (800) 243-0533, or approved equal.

Set includes three (3) bases, three (3) anchors and (3) 1 ½” solid rubber plugs.

- Home plate: Home plate with anchor sleeve shall be Model # HP-200 as manufactured by Jaypro Sports LLC, 976 Hartford Tpke, Waterford, CT 06385, Phone: (800) 243-0533, or approved equal.

High durability, molded rubber construction.
Provide with anchor and plug.

- Removable Pitcher's Rubber: Removable pitcher's rubber shall be Model # PR-418 as manufactured by Jaypro Sports LLC, 976 Hartford Tpke, Waterford, CT 06385, Phone: (800) 243-0533, or approved equal.

- Team Benches:
  - Premium Team Bench, as manufactured by Beacon Athletics, 8233 Forsythia Street #120, Middleton, WI 53562. Phone: (800) 747-5985, or approved equal.
    - Materials:
      Seat: Aluminum
    - Style: No backrest
    - Color: Forest Green
    - Size: 21' Length x 10" Wide
    - Legs: 2 3/8" O.D. galvanized steel

- Play Equipment: TBD
- Basketball Outfits:
  - Basketball outfits shall be True Bounce Backboard with padding, Goal and Support Post as manufactured by True Bounce, Inc., 56 Conduit St, New Bedford, MA 02745, phone: (866) 873-3715, website: www.truebounce.com, or approved equal
  - Support Posts: True Bounce PA 665 6" x 6" x 3/16 thick, powder-coated steel pole with 5' extension. Ring height set at 9'.
    - Form rolled steel hat clamp: fully welded steel hat clamp to extension arm and attached with six (6) 2 ½" x 2 ½" 13 stainless steel bolts with flat washers each side and nylon inserted stainless steel nuts.
    - Height: Install top of support post a minimum of 8' – 9" above finish grade.
    - Color: Black
  - Backboards: True Bounce Model #XL7036 36" X 54" Clear, Regulation Size, Perforated backboard with backboard padding and Flex Rim with or equivalent.
    - 4" x 9" slotted solid aluminum corner blocks
    - ½" thick abrasive resistant polycarbonate sheet with typical Truebounce hole pattern.
    - Dual safety bolt holes through drilled to attach backboard to pole.

- 1 ½" x 6" x 7 ¾" solid aluminum rim support block with safety holes.
- Stainless steel fasteners at all points.
- Provide BLPD54 Low Profile Backboard Pad – L shaped bolt-on.

- Goal: True Bounce Model # RB1000 Adjustable Breakaway Goal.

- Paver Tree Grate:
  - Paver-Grate 6220-TGR manufactured by Ironsmith, 41-701 Corporate Way #3, Palm Desert, CA 92260 Tel (800) 338-4766 or approved equal
    - Size: 72" x 72" grate in two sections
    - Center frame designed for standard 24" round tree grate
    - Finish: Galvanized
    - Lighting: Provide two (2) thru holes with custom flanges to support in ground light fixture. Coordinate with specified fixture.
    - Grate: M2471Q METRO tree grate
      - 24" round in two sections – ¼" max slots for ADA Compliance
      - Material: 100% recycled gray iron
      - Opening: 14" tree opening
      - Finish: unfinished

G2050: Plants, Soils

- Tree Protection
  - Protect trees with fixed Chain Link fence circle surrounding the drip line of tree canopy for the duration of construction. No construction storage or compaction is allowed within the drip line.

- Planting Soils and Planting mulch
  - Planting soils for lawns and shrubs including testing, soil amendments, mixing, and spreading.
  - Depths per tree and per planting area is as shown on the drawings (2' min. for planting bed area, 3' deep x 8' diameter for all tree pits).
  - Top dress planting bed areas with 2" depth dark brown shredded mulch as approved by landscape architect based on sample.

- Planting: Trees, Shrubs, Groundcover and Lawns
  - Tree Planting includes tree planting in lawns and planting beds. All planting beds to be continuous depth of imported loam and are to have 2" depth mulch.
  - The following sizes have been assumed:
    - Canopy Trees (3 ½"-4" cal. typical), for parking and walkway areas.
    - Canopy Trees (3" – 3 1/2" cal. Typical) for edges and other non-pedestrian zones.
    - Specimen trees (4½"- 5" cal. Typ.)
    - Coniferous Trees (12' Typ at building, 8-10' Typ edges and other areas)
    - Ornamental trees (2 ½" – 3" Cal. Typ.)
    - 5 gal. shrubs

- Groundcovers 1 and 2 gal pots, min. in mulched continuous beds (3” mulch)
- All plant materials maintained and guaranteed for one year minimum.
- Work includes staking materials, planting soils, fertilizer, mulch for planting complete in place.
- Work includes watering through plant establishment.

- Lawns
  - Sodded lawns for key areas. Assume 6” loam in primary lawn areas.
  - Hydroseed secondary lawns areas on 6” loam depth in locations as identified on the plan.
  - Sport field lawn areas to include 12” sand sub-base for drainage

SECTION 33 10 00
WATER UTILITIES

1. Description of Work: furnish all labor, tools, equipment and materials and perform all operations necessary to install buried ductile iron pipe, valves, fittings, polyethylene services, and appurtenances as shown on the drawings and as specified herein. All materials are to conform to the requirements of the Town of Dedham Water Department.

2. Ductile Iron Pipe:

    a. All ductile iron pipe shall conform to AWWA C151, Class 52.
    b. All ductile iron pipe shall have a bituminous outside coating in accordance with AWWA C151.
    c. All ductile iron pipe shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.

3. Ductile iron fittings:

    a. Ductile iron fittings shall conform to AWWA C110 or C153, Class 350.
    b. All ductile iron fittings shall have a bituminous outside coating in accordance with AWWA C110.
    c. All ductile iron fittings shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.

4. Joints:

    a. Joints for pipe and fittings shall be restrained push-on or restrained mechanical joints conforming to AWWA C111. Gaskets shall be of SBR. Un-restrained joints may not be used.
    b. Joints shall be suitable for 250 psi working pressure and be fabricated of heavy section ductile iron casting.
    c. Bolts and nuts shall be low carbon and conforming to ASTM A307, Grade B.

5. Solid Sleeves:

    a. Solid sleeves shall be long body type, ductile iron with mechanical joints and retainer glands shall be of the solid type, long laying length.
    b. Solid sleeves shall be cement mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.

6. Flexible Couplings: Flexible Couplings shall be cast iron with rubber gaskets.

7. Retainer glands: Retainer glands shall be Ebba Iron Sales Inc. – Mega Lug or Ford Co. – 1400 Series.

8. Valves: Valves shall be resilient seated gate valves for buried service, and be manufactured in accordance with AWWA C509. Valves shall be provided with a minimum of two O-ring stem seals. Valves shall be epoxy coated, 8mm thick, interior and exterior.

9. Valve Boxes and Covers: Valve Boxes and covers shall be cast iron, tar coated, two piece adjustable sliding type which include cast iron covers.

10. Water Services:

    a. Corporation Cocks shall be ball valves, open left, with compression fittings.
    b. Curb Stops shall be ball valves, open left, with compression fittings.

c. Curb stops shall have service boxes which shall be tar coated, cast iron, sliding type with inlaid covers. Shaft shall be 2 ½ inches diameter with extension rods.
d. Service pipe shall be high density polyethylene copper tube size for use with compression fittings. The pipe shall be polyethylene #4508, SDR-9 rates for 200 psi.
e. Compression fittings shall be used for joining polyethylene tubing.
f. Coupling shall be straight coupling, 3 part, both ends pack joints for polyethylene pipe with a split locking clamp with stainless steel screw.

END OF SECTION

SECTION 33 31 00
SANITARY SEWERAGE PIPING

1. Description of Work: Furnish all labor, materials, equipment and incidentals required to install and test polyvinyl chloride (PVC) sewer pipe, fittings and appurtenances as indicated and as specified herein.

2. Polyvinyl Chloride (PVC) Gravity Pipe and Fittings:

    a. PVC solid wall gravity pipe and fittings shall be Type PSM, PVC SDR 35 and conform to ASTM 3034.
    b. Pipe shall be furnished in standard laying lengths in accordance with ASTM 3034 and fittings shall be furnished in lengths of not more than 3 feet.
    c. PVC pipe and fittings shall have bell and spigot push-on ends. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly.

3. Polyvinyl Chloride (PVC) Pressure Pipe and Fittings:

    a. PVC pressure pipe shall be SDR 21 PVC with rubber ring joints and shall conform to ASTM D2241, ASTM D1784, and ASTM F477.
    b. PVC pipe and fittings shall have bell and spigot push-on ends. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly.
    c. Restrained joints, where required, will be restraining glands. Restraining glands shall be EBAA Iron Series 2000 PV or Series 1500 by Uni-Flange or equal.
    d. PVC perforated pressure pipe shall be Schedule 40 PVC with all solvent welds.

4. Testing:

    a. All PVC pipe shall be field tested. Supply all labor, equipment, material, gauges, pumps, meter, and incidentals required for testing.
    b. Gravity pipe shall be visibly inspected for leakage.
    c. Pressure test each pressure pipe upon completion of the pipe laying and backfilling operations.

5. Cleaning: Prior to final completion of the Work, thoroughly clean all the new pipelines and remove all dirt, stones, pieces of wood or other materials.

END OF SECTION

SECTION 33 39 00
PRECAST CONCRETE DRAINAGE AND SANITARY SEWERAGE STRUCTURES

1. Description of Work: Furnish all labor, materials, equipment and incidentals required to install and test precast concrete manholes, catch basins, stormwater pretreatment separator, septic tanks, frames and covers, frames and grates, and appurtenances as indicated on the drawings and as specified herein.

2. General:

    a. Cement shall conform to ASTM C150, Type II cement or equal unless otherwise stated.
    b. Provide lifting lugs or holes in each precast section for proper handling.
    c. Like items of material/equipment shall be end products of one manufacturer.
    d. Precast sections shall be properly cured prior to shipping.

3. Precast Concrete Manhole Sections and Catch Basins: Precast concrete base sections, riser sections, transition top sections, flat slap tops and grade rings shall conform to ASTM C478 and meet the following requirements:

    a. Design precast concrete base and flat slab for their own weight, weight of soil, and a live load equal to AASHTO H-20 truck loading applied at finish grade.
    b. Bottom slab thickness shall equal the riser wall thickness or flat slab thickness, whichever is greater.
    c. Construct precast concrete base as shown on the drawings.
    d. Base, riser, and transition top sections shall have tongue and groove joints.
    e. Top section shall be eccentric cone where cover over pipe exceeds 4-feet and as shown on the Drawings. Top section shall be flat slab where cover over pipe is 4-feet or less.
    f. Provide integrally cast knock out panels in precast concrete manhole sections at locations, and with sizes shown on the drawings. Knock out panels shall have no steel reinforcing.

4. Sewage and Grease Tanks:

    a. All septic tanks shall be either:
        1. Watertight through manufacturer's specification and warranty; or
        2. made watertight by the manufacturer, equipment supplier or installer using asphalt or synthetic polymer sealer specified by the concrete or synthetic material manufacturer.
    b. Septic tanks shall be constructed on, set level to and true to grade on a 6” compacted crushed stone level stable base which has been mechanically compacted. If the component is placed in fill, proper compaction is required to ensure stability and to prevent settling.
    c. Septic tanks shall be equipped with watertight access manholes with a minimum diameter of 24 inches and constructed of durable material placed as detailed on the contract drawing.
    d. All system components shall be constructed of corrosion resistant materials.
    e. Septic tanks shall be constructed of sound and durable watertight materials not subject to excessive corrosion, decay, or frost damage, or cracking or buckling due to settlement or backfilling. Metal septic tanks are prohibited.
    f. Tank construction materials shall meet the following minimum specifications:
        1. Concrete Strength: 4,000 PSI @ 28 days. Density 140 PCF
        2. Design loading H-20
    g. Tanks, covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum H-20 loading.
    h. Manufacturers of septic tanks shall implement a quality control/quality assurance program in conformity with ASTM standard C 1227-93. Tanks shall be embossed with a seal stating that this ASTM standard has been met.
    i. Septic tanks shall have a minimum cover of nine inches.
    k. At least three 24 inch access ports with readily removable impermeable covers of durable material shall be provided for septic tanks. Access ports shall be placed at the center and over

each inlet and outlet tee. Access ports over inlet and outlet tees shall be made accessible for inspection and maintenance by providing precast concrete or equivalent watertight risers (with steps where appropriate) with covers over the access ports to finish grade.

l. Septic tanks shall be accessible for inspection and maintenance. No structures shall be located directly upon or above the septic tank access locations which interfere with performance, access, inspection, pumping, or repair.

5. Brick Masonry:

   a. Bricks for channels and shelves shall conform to ASTM C32, grade SS.
   b. Brick for raising frames to finished grade shall conform to ASTM C62.
   c. Mortar shall be composed of 1 part Portland cement, 2 parts sand, and hydrated lime not to exceed ten-pounds to each bag of cements. Portland cement shall be ASTM C150, Type II; hydrated lime shall conform to ASTM C207.
   d. Sand shall be washed, cleaned, screened, well graded with all particles passing a No. 4 sieve and conform to ASTN C33.

6. Frames and Covers and Frames and Grates:

   a. Frames and covers and frames and grates shall be cast iron. Cast iron shall conform to ASTM A48, Class 30.
   b. Frames and covers shall have a 24-inch diameter clear opening unless otherwise indicated on the drawings.
   C Frames and grate shall have a 24-inch square clear opening unless otherwise indicated on the drawings.

7. Jointing Precast Concrete Sections:

   a. Seal tongue and groove joints of precast sections with either rubber O-ring gasket or preformed flexible joint sealant.
   b. Completed joint shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.

9. Pipe Connections: Connect pipe to precast concrete structures using the following methods:

   a. Flexible sleeve- integrally cast sleeve in precast section or install sleeve in a formed or cored opening.
   b. Compression gasket – integrally cast compression gasket in precast concrete section.
   c. At the discretion of the Engineer, grout in place using non-shrink and waterproof mortar.

10. Manhole Rungs: Manhole rungs shall be steel reinforced, copolymer polypropylene, 14-inch wide, M.A. Industries Inc. Type PS2-PF-SL, or equal.

11. Damp proofing: Sanitary precast structures shall have two coats of bituminous waterproofing applied to the exterior surfaces by brush or spray and in accordance with the manufacturer's recommendations. Damp proofing shall be Hydrocide 648 by Sonneborn Building Products; Dehydratine 4 by A. C. Horn Inc., RIW Marine Liquid by Toch Brothers or equal.

END OF SECTION

SECTION 33 41 00
STORM DRAINAGE PIPING

1. Description of Work: Furnish all labor, materials, equipment and incidentals required to install high density polyethylene pipe, fittings and appurtenances as indicated and as specified herein.

2. High Density Polyethylene (HDPE) Pipe:

   a. High Density Polyethylene (HDPE) Pipe resins shall be high molecular weight, high density polyethylene with a cell classification number of 345434C in accordance with ASTM D3350.
   b. All polyethylene pipe shall meet the requirements of ASTM F714.
   c. Pipe shall be furnished in standard laying lengths not exceeding 25-ft.
   d. All high density polyethylene pipe and fittings shall be made from the same resin.

3. Pipe Identification: The following shall be continuously indent printed on the pipe and spaced at intervals not exceeding 5-ft.:

   a. Name and/or trademark of the pipe manufacturer.
   b. Nominal pipe size.
   c. Dimension ratio.
   d. The letters PE followed by the polyethylene grade in accordance with ASTM D1248, followed by the hydrostatic design basis in 100's of psi, e.g., PE 3408.
   e. Manufacturing standard reference, e.g., ASTM F714.
   f. A production code from which the date and place of manufacture can be determined.

4. Testing:

   a. All HDPE pipe shall be field tested. Supply all labor, equipment, material, gauges, pumps, meter, and incidentals required for testing. Pressure test each pipe upon completion of the pipe laying and backfilling operations.

5. Cleaning: Prior to final completion of the Work, thoroughly clean all the new pipelines and remove all dirt, stones, pieces of wood or other materials.

END OF SECTION

SECTION 33 46 00
STORM DRAINAGE UTILITIES

1. Description: Stormwater recharge system consisting of High Density Polyethylene (HDPE) modular infiltrators to capture

2. High Density Polyethylene (HDPE) Modular Infiltrators: HDPE Modular Infiltrators shall meet the requirements of ASTM F2648

3. Header System: Header system shall have a HDPE manifold with feeds to each row.

4. Each component of the HDPE system shall be designed to withstand AASHTO H-20 load rating when installed according to the manufacturer's recommendations.

5. Each modular infiltrator shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port of clean-out.

6. There is to be a minimum of 6-inches of washed crushed ½" stone between each row, under and over the infiltrators, and along the exterior.

7. 4-oz. non-woven filter fabric to envelop stone infiltration area

8. Infiltrators to be Cultec, Stormtech, or approved equal.

END OF SECTION