CLACKAMAS COUNTY BOARD OF COUNTY COMMISSIONERS
Sitting/Acting as:
Board of Commissioners of the Housing Authority of Clackamas County

Policy Session Worksheet

Presentation Date: May 18, 2021 **Approx. Start Time:** 1:30pm **Approx. Length:** 30 min

Presentation Title: Webster Road Redevelopment Project Board Update and Closing Preparation

Department: Housing Authority of Clackamas County (HACC)

Presenters: Devin Ellin and Jill Smith

WHAT ACTION ARE YOU REQUESTING FROM THE BOARD?

Staff is providing an overview of the redevelopment project on 18000 Webster Road in Gladstone. The update will include an overview of the financing structure and the Guaranteed Maximum Price Agreement for the project.

Staff is seeking Board approval to place Resolution No. 1954 on consent agenda for May 20, 2021 confirming the Clackamas County Housing Authority Board's binding commitment to complete this project allowing the Webster Road Project to move forward on schedule.

EXECUTIVE SUMMARY:

Background

The Webster Road Redevelopment is the rehabilitation of a former congregate care facility into a mix of forty-eight studios (40) and SRO (8) units. The rehabilitated building will provide subsidized rent in all units allowing low income residents to have affordable rents that don't exceed 30% of their income. The tenant selection plan will target near-elderly (50 or older) households who have a history of residence in Gladstone. Twelve (12) of the units have a preference for people who meet the two previous preferences and are also experiencing homelessness or at risk of becoming unhoused and/or disabled. There will also be a preference for residents of Public Housing units being relocated due to a Public Housing repositioning process. Applicants for the 12 supportive housing units will be referred through the County's Coordinated Housing Access (CHA) waitlist.

Webster Road Redevelopment is a single-story wood-framed building originally constructed in the mid 1960's. It was previously used as a nursing facility and most recently as a teen rehabilitation facility. The 24,000 square foot wood-framed building has been vacant since 2017.

The Project is one that has been developed and refined by Carlton Hart Architecture as well as the Housing Developers at HACC. The project scope includes site demolition, earthwork, extensive landscaping, and parking lot modifications; the full abatement of hazardous materials including removal of all asbestos-containing materials; replacement of antiquated building systems such as the plumbing and heating systems; electrical and lighting upgrades to improve performance and energy efficiency; building code and accessibility upgrades; envelope upgrades including new insulation, weatherproofing, windows, doors, and exterior cladding; interior upgrades including new flooring, wall and ceiling finishes, plumbing fixtures, and lighting; upgrades to residential units including the addition of full bathrooms in every unit and full

kitchens or kitchenettes in most units; and renovation and redesign of common areas to best suit the proposed population. The building will be built to Earth Advantage Gold-level standards.

Activity Timeline
On June 6th, 2019, the Board of County Commissioners approved the Intergovernmental Agreement with Metro for the acquisition of the property using Metro Affordable Housing Bond resources with the understanding that HACC would apply for additional financing sources to complete the rehabilitation and modernization of the site. These additional sources include Metro Affordable Housing Bonds; Permanent Supportive Housing (PSH) resources; 4% Low Income Housing Tax Credits (LIHTC); Clackamas County HOME Funds, Project Based Section 8 (PSV) Vouchers and a Permanent Loan.

In July 2020, HACC staff updated the Board about the proposed financing plan and estimated total development costs (~$18.4MM). On July 23rd, 2020 the board approved Omnibus Resolution No. 1948 authorizing the Housing Authority to execute applications and contract documents necessary to apply for County HOME funds, Permanent Supportive Housing funds, Metro Housing Bond Funding, and OHCS for an allocation of private activity bonds and 4% federal Low Income Housing Tax Credits (LIHTCs).

Through a competitive request for proposals, the HACC Development team sought and selected Tax Credit Equity and Construction financing from US Bank Community Development Corporation (USBCDC) and Permanent financing from Citibank.

On December 17th, 2020, HACC staff provided a project update and received approval of Omnibus Resolution No. 1952 which provided HACC authorization to enter into syndication documents, tax credit and bond documents, and construction and permanent loan documents.

During the February 2nd, 2021 HACC Development Update Policy Session, HACC staff provided an in-depth overview of the project to the Board, introducing the project, programming, financing and development schedule to our new board members.

Financial Closing
The project team has arrived at a point with our financing partners from Oregon Housing and Community Services (OHCS), Metro, US Bank Community Development Corporation (USBCDC), and Citibank where we have received authorizations to move forward with a financial closing. The project's total development cost is approximately $19.4MM which includes a bank-mandated construction contingency of $1.03MM (1% of construction budget for rehabs). Given the extent of the rehabilitation proposed and the thoroughness of the pre-construction inspections conducted, the project team expects to utilize this contingency to buy down the permanent loan at conversion, further reducing the overall total development cost.

The rehabilitation of Webster Road is a vital part of the Housing Authority's development strategy in meeting its goal of creating 1,200 new units of affordable housing and advances the County's goal to produce 812 Metro bond-funded units, of which 333 must be affordable for households with income levels at 30%AMI and below.

Staff is seeking Board guidance related to financial closing. A legal Resolution will be necessary to enable documents necessary for the financial closing to be authorized and admitted to the Webster Road Housing Limited Partnership reflecting Board support of the project.

Staff recommends the approval of Resolution No. 1954 which constitutes the County's binding commitment to complete this project and will allow the Webster Road Project to move forward on schedule.

Authorization for Approval of Resolution No 1954 Authorizing the Execution, Acknowledgement and Delivery of Closing Documents for the Webster Road Redevelopment Project:

Some ***key*** components of Resolution 1954 are as follows:

- Authorization to form the General Partner and Partnership and admit all partners and beneficial financing for the rehabilitation of the Webster Road Redevelopment Project to the Limited Partnership.
- Provides Delegation of Authority to the Chair of the Board of Commissioners of the Authority and the County Administrator of Clackamas County as Authorized Representatives, to act on behalf of the Authority in its own capacity as the Special Limited Partner, and as the sole member of the General Partner to finalize the terms of, execute, acknowledge, and deliver the actions and documents authorized.

Guaranteed Maximum Price Agreement with Walsh Construction for the Webster Road Redevelopment Project:

Brought to Issues on December 17, 2019 and then to consent agenda on January 23, 2020, the HACC Board approved Procurement's request to Approve the Resolution 1952 for Exemption and Authorization to use the Request for Proposals Method to Obtain a Construction Manager/General Contractor for the Webster Redevelopment Project. Pursuant to this decision, an RFP process was initiated by County Procurement in May 2020. Walsh Construction was selected as the CM/GC for the Webster Road project on June 24, 2020. Under the guidelines of the A133 contract for CM/GC, negotiations were conducted collaboratively between Walsh Construction, County Counsel, and County Procurement.

The Guaranteed Maximum Price (GMP) establishes the maximum price Walsh may charge to perform the rehabilitation work. With the authority given in Resolution No. 1954, HACC can execute the final GMP contract once the exhibits are finalized but the contract value of Ten million two hundred ninety-six thousand three hundred twenty-one dollars ($10,296,321) will remain unchanged.

FINANCIAL IMPLICATIONS (current year and ongoing):

Is this item in your current budget? ☒ YES ☐ NO

What is the funding source?
Funding sources would include 4% Low Income Housing Tax Credits (LIHTC), Oregon Housing and Community Services Permanent Supportive Housing (PSH) Funds, HOME funds (Clackamas County), Metro Affordable Housing Bonds, Project-Based Section 8 Vouchers, Permanent Loan and Seller Financing

STRATEGIC PLAN ALIGNMENT:

- How does this item align with your Department's Strategic Business Plan goals?
  - Sustainable and Affordable Housing
  - Efficient and Effective Services

- How does this item align with the County's Performance Clackamas goals?
  - By seeking authorization to enter into this Resolution, HACC will be able to access funds to pay for additional development of affordable housing throughout

Clackamas County, which aligns with the board priority of ensuring safe, healthy and secure communities.

LEGAL/POLICY REQUIREMENTS:

PUBLIC/GOVERNMENTAL PARTICIPATION:
This is the first Clackamas County project using Metro Housing Bond and Permanent Supportive Housing funding.

OPTIONS:
1. Approve the request to allow HACC to place the Resolution #1954 on the Housing Authority Board consent agenda for May 20 “as-is”.
2. Ask staff to make suggested edits and place revised Resolution #1954 on consent agenda for May 20.

RECOMMENDATION:
Staff recommends that the Board select option 1, approve the request to allow HACC to place the Resolution #1954 on the Housing Authority Board consent agenda for May 20 “as-is”.

ATTACHMENTS:
1. Resolution #1954
2. Draft Guaranteed Maximum Price Agreement with Walsh Construction

SUBMITTED BY:
Division Director/Head Approval _____
Department Director/Head Approval _____
County Administrator Approval _____

For information on this issue or copies of attachments, please contact Jill Smith @ 503-742-5336

BEFORE THE BOARD OF COMMISSIONERS

OF THE HOUSING AUTHORITY OF CLACKAMAS COUNTY

In the Matter of Authorizing the Financing and Related Matters, for the Webster Road Project

RESOLUTION

NO. 1954

WHEREAS, the Housing Authority of Clackamas County ("***Authority***") works to provide affordable multifamily housing for persons and families of lower income pursuant to Oregon Revised Statutes ("***ORS***") 456.005 through 456.235; and

WHEREAS, ORS 456.120(18) provides that a housing authority may enter in a partnership agreement with or loan money to an individual, partnership, Housing Authority or other association to finance, plan, undertake, construct, acquire or operate a housing project; and

WHEREAS, ORS 456.065 defines "housing project" to include, among other things, "any work or undertaking ...to provide decent, safe, sanitary urban or rural housings for persons or families of lower income"; and

WHEREAS, ORS 456.055 and 456.175 provide that a housing authority may issue bonds, notes, interim certificates, debentures or other obligations for any of its corporate purposes; and

WHEREAS, the Authority has determined that it is consistent with its purpose to rehabilitate a 48-unit multifamily rental project known as Webster Road Apartments (the "***Improvements***") located at 18000 Webster Road, Gladstone, OR 97027 (the "***Property***", and together with the Improvements, the "***Project***"); and

WHEREAS, the Project is currently owned by the Authority; and

WHEREAS, for the purpose of carrying out the Project, the Authority has formed and is the sole member and manager of HACC Webster Road, LLC , an Oregon limited liability company (the "***General Partner***"), which is a general partner of Webster Road Housing Limited Partnership, an Oregon limited partnership (the "***Partnership***"); and

WHEREAS, the Authority is the initial limited partner of the Partnership; and

WHEREAS, the Authority has determined it to be in the best interests of the Authority and the Project to sell the Improvements and all related improvements, easements, rights, and privileges, belonging or appurtenant to such to the Partnership; and

WHEREAS, the Authority has determined it to be in the best interests of the Authority and the Project to hold a note from the Partnership for a portion of the approximately **$1,920,056** sales price (as such amount may change based on appraisal) of the Improvements in the amount of approximately **$1,770,056** (the "***Seller Loan***") (as such amount may change based on underwriting); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority and the Project to authorize the Authority to lease the Property to the Partnership pursuant to a ground lease (the "***Ground Lease***"), for a term and at a rental rate as shall be determined by any Authorized Representative (such determination to be conclusively demonstrated by the signature of any Authorized Representative on such document); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity and as sole member of the General Partner), the Partnership, and the Project to obtain a low-income housing tax credit ("***LIHTC***") investment in the Partnership of approximately **$6,461,285** (which amount may change based on underwriting) (the "***LP Investment***") from U.S. Bancorp Community Development Corporation, a Minnesota corporation, and/or its successors or assigns ("***USBCDC***") and to admit USBCDC as limited partner of the Partnership; and

WHEREAS, upon the admission of USBCDC as a limited partner of the Partnership, the Authority desires to reduce and retain its limited partnership interest in the Partnership as a special limited partner (the "***Special Limited Partner***"); and

WHEREAS, as part of the LP Investment, USBCDC requires that the current Agreement of Limited Partnership of the Partnership be amended and restated in its entirety to reflect the terms of the LP Investment (the "***Amended Partnership Agreement***"); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to take all actions reasonably necessary to facilitate the LP Investment in the Partnership by USBCDC by entering into all reasonably necessary agreements with USBCDC and the Partnership (collectively the "***Partnership Documents***") and by taking such further actions as are reasonably necessary as to facilitate the LP Investment in the Partnership by USBCDC; and

WHEREAS, the Authority will be required to enter into a guaranty agreement in favor of USBCDC guarantying payment and performance of the obligations and duties of the Authority under the Partnership Documents; and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the

Partnership, and the Project, to accept an award of LIHTC from the State of Oregon, acting by and through its Housing and Community Services Department ("***OHCS***"); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to enter into a 4% Low-Income Housing Tax Credit Reservation and Extended Use Agreement, 4% Low-Income Housing Tax Credit Declaration of Land Use Restrictive Covenants, 4% Tax Credit Allocation Indemnity and Hold Harmless Agreement, and such other documentation as may be reasonably required in connection with obtaining the allocation of LIHTC (collectively, the "***Tax Credit Documents***"); and

WHEREAS, the State of Oregon, acting through its Treasurer and OHCS (the "***Bond Issuer***"), Citibank, N.A., as funding lender (the "***Funding Lender***"), and U.S. Bank National Association, as fiscal agent (the "***Fiscal Agent***"), will execute and deliver a Funding Loan Agreement (the "***Funding Loan Agreement***") pertaining to the loan made to the State of Oregon acting by and through its State Treasurer and Housing and Community Services Department (the "***Governmental Lender***") by the Funding Lender (the "***Funding Loan***"), the proceeds of which will be loaned (the "***Borrower Loan***") to the Partnership, to finance the acquisition, redevelopment, construction and equipping of the Project, pursuant to a Borrower Loan Agreement (the "***Borrower Loan Agreement***"), between the Governmental Lender and the Partnership. The Funding Loan will be evidenced by a Housing Development Revenue Note, 2021 Series P (Webster Road Apartments Project) (the "***Governmental Lender Note***") in the approximate amount of **$10,000,000**, which amount may change based on underwriting. The Partnership's repayment obligations with respect to the Borrower Loan is evidenced by a Multifamily Note (the "***Borrower Note***") in a like amount as the Governmental Lender Note, delivered to the Governmental Lender by the Partnership, which Borrower Note will be endorsed by the Governmental Lender to the Funding Lender as security for the Funding Loan.

WHEREAS, U.S. Bank National Association, a national banking association (the "***Construction Lender***") has agreed to advance proceeds of a loan during construction of the Project in an approximate amount of **$10,000,000** (the "***Construction Loan***"), which amount may change based on underwriting. The Construction Loan will be repaid with proceeds of the Borrower Loan, which will provide a portion of the permanent financing for the Project in the approximate amount of **$4,700,000**, as such amount may change based on underwriting; and

WHEREAS, the Construction Loan and will be evidenced by those documents listed on **Exhibit A** attached hereto, and such other documentation as may be reasonably required in connection with the making of the Construction Loan to Partnership (collectively, the "***Construction Loan Documents***"); and

WHEREAS, the Authority deems it to be in the best interests of the Authority, as a guarantor of the Construction Loan, and as developer of the Project, to enter into any environmental indemnity, assignment and subordination of developer agreement, payment guaranty agreement and completion guaranty agreement which may be required by Construction Lender under the Construction Loan Documents; and

WHEREAS, in connection with the Construction Loan, the Authority deems it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner) to cause the Partnership to enter into a loan agreement, promissory note, mortgage, various assignments, subordination agreements, and any other agreement which may be required by Construction Lender in connection with the Construction Loan; and

WHEREAS, in connection with the Funding Loan, the Partnership, General Partner, and the Authority will be required to execute to execute the documents listed on **Exhibit A**, and such other documents as may be required by the Governmental Lender (together, the "***Note Documents***"); and

WHEREAS, in connection with the Borrower Loan, the Partnership, General Partner, and the Authority will be required to execute to execute the documents listed on **Exhibit A**, and such other documents as may be required by the Funding Lender (together, the "***Borrower Loan Documents***"); and

WHEREAS, the Authority deems it to be in the best interests of the Authority, as a guarantor of the Borrower Loan, and as developer of the Project, to enter into any environmental indemnity, assignment and subordination of developer agreement, payment guaranty agreement and completion guaranty agreement which may be required by Funding Lender under the Borrower Loan Documents; and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to cause the Partnership to enter into such agreements as are reasonably necessary to obtain a loan in the approximate amount of **$2,400,000** of Permanent Supportive Housing funds (the "***PSH Loan***") from OHCS; and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to cause the Partnership to enter into such agreements as are reasonably necessary to obtain a loan in the approximate amount of **$400,000** of HOME funds (the "***HOME Loan***") from Clackamas County, a political subdivision of the State of Oregon, through its Community Development Division (the "***County***"); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to cause the Authority to enter into such agreements as are reasonably necessary to obtain an allocation of Metro bond proceeds in the approximate amount of **$2,939,209**, as such amount may change based on underwriting, (the "***Metro Funds***") from Metro, a metropolitan service district organized under the laws of the State of Oregon ("***Metro***"); and thereafter, to lend the proceeds of such grant to the Partnership for a term and at an interest rate as shall be determined by an Authorized Representative (such determination to be conclusively demonstrated by the signature of any Authorized Representative on such document); and

WHEREAS, Metro will require either the Partnership or the Authority, or both, to enter into one or more covenants (collectively the "***Metro Covenant***") with the Authority or Metro, as the case may be, in connection with the loan of the Metro Funds to the Partnership, which such Metro Covenant will be recorded on the Project or the Property;

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to cause the Authority to utilize up to **$650,000** in Section 18 Disposition funds (the "***Section 18 Funds***") to fund pre-development expenditures for the Project;

WHEREAS, in connection with the use of the Section 18 Funds, the United States Department of Housing and Urban Development ("***HUD***") requires that the Partnership enter into a restrictive covenant with HUD and the Authority (the "***Section 18 Covenant***"), which such covenant will be recorded on the Project;

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to cause the Authority to enter into an Agreement to Enter into Housing Assistance Payment Contract and a Housing Assistance Payment Contract (collectively the "***HAP Contract***") to subsidize all units in the Project with Project-Based Section 8 rental subsidies;

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to engage the Authority as developer of the Project and to defer a portion of its developer fee for the benefit of the Project;

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to engage Home Forward, a public body corporate and politic of the State of Oregon ("***Home Forward***") as the property manager and resident services provider for the Project.

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project to authorize the execution and delivery of certain agreements for architectural, construction, property management, and technical related services related to the Project (the "***Project Documents***"); and

WHEREAS, the Authority has determined it to be in the best interests of the Authority (in its individual capacity, as sole member of the General Partner, and as Special Limited Partner), the Partnership, and the Project for the Authority to assign to the Partnership certain Project Documents the Authority entered into prior to the admission of USBCDC as the limited partner.

NOW, THEREFORE, THE AUTHORITY IN ITS OWN CAPACITY, ITS SEPARATE CAPACITY AS THE SPECIAL LIMITED PARTNER, AND AS THE SOLE MEMBER AND MANAGER OF THE GENERAL PARTNER OF THE PARTNERSHIP, ADOPTS THE FOLLOWING RESOLUTIONS:

Section 1. Authorization to Form the General Partner and Partnership.

The Authority, in its own capacity, is hereby authorized to execute and deliver such documents as may be necessary for the formation of the General Partner including but not limited to the following:

a) A Certificate of Formation of the Partnership to be filed with the Secretary of State of the State of Oregon;

b) An Operating Agreement with the Authority as the sole member;

The Authority, in its own capacity or as the sole member of the General Partner of the Partnership, is hereby authorized to execute and deliver such documents as may be necessary for the formation of the Partnership including but not limited to the following:

a) A Certificate of Limited Partnership of the Partnership to be filed with the Secretary of State of the State of Oregon identifying the General Partner as the general partner;
b) An Agreement of Limited Partnership between the General Partner as general partner and the Authority as the initial limited partner.

Section 2. Approve Amended Partnership Agreement, Admission of USBCDC; Execution of Partnership Documents.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, a letter of intent relating to an anticipated Amended Partnership Agreement of the Partnership among the Authority (as Special Limited Partner), the General Partner, and USBCDC, in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

BE IT FURTHER RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Partnership Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the closing of the LP Investment by USBCDC, all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 3. Approve Sale of the Improvements to the Partnership.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute, and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the documents as reasonably may be required in connection with the sale of the Improvements to the Partnership all in the form and for a price approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 4. Approve the Seller Loan.

BE IT RESOLVED, that in connection with the sale of the Improvements, the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Seller Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the Seller Loan all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 5. Approve the Ground Lease.

BE IT RESOLVED, that any Authorized Representative is hereby authorized to execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Ground Lease for the Land with the Partnership as lessee and the Authority as landlord with such terms and conditions as any single Authorized Representative shall approve (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 6. Approve Funding Loan.

BE IT RESOLVED that the Funding Loan is approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Note Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the Funding Loan and Borrower Loan all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 7. Approve Borrower Loan.

BE IT RESOLVED that the Borrower Loan is approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Borrower Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the Borrower Loan all in the

form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 7. Approve Construction Loan.

BE IT RESOLVED, that the Construction Loan is approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Construction Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the closing of the Construction Loan all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 8. Approve Tax Credit Documents.

BE IT RESOLVED that the LIHTCs are approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Tax Credit Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect) and such other documents as reasonably may be required in connection with the issuance of the Governmental Lender Note all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 9. Approve Use of the Section 18 Funds for Pre-Development Expenses to the Partnership and Section 18 Covenant.

BE IT RESOLVED, that the Section 18 Funds are approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, such documents, including the Section 18 Covenant, as are required to evidence the use of the Section 18 Funds for pre-development expenses, all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any Authorized Representative on such documents).

Section 10. Approve Receipt of the Metro Funds by the Authority.

BE IT RESOLVED, that the Metro Funds are approved and the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, such documents as are required to evidence and obtain the allocation of the Metro Funds all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 11. Approve Loan of the Metro Funds to the Partnership and Metro Covenant.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the Sponsor Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect), and such other documents, including the Metro Covenant, as required to evidence and secure a loan of the Metro Funds to the Partnership all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 12. Approve PSH Loan to the Partnership.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the PSH Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect), and such other documents as required to evidence and secure the PSH Loan to the Partnership all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 13. Approve HOME Loan to the Partnership.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the HOME Loan Documents listed on the attached **Exhibit A** (whether bearing the name listed or names to similar effect), and such other documents as required to evidence and secure the HOME Loan to the Partnership all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such documents).

Section 14. Approve HAP Contract.

BE IT RESOLVED, that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the documents necessary to close on the HAP Contract including but not limited to the execution and delivery of those documents identified on **Exhibit A** (whether bearing the name listed or names to similar effect) all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such document).

Section 15. Approve Home Forward as Property Manager and Resident Services Provider.

BE IT RESOLVED, that Home Forward is authorized to serve as the property manager and resident services provider of the Project and to negotiate, execute and deliver on behalf of

the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the documents necessary to engage Home Forward as property manager and resident services provider of the Project.

Section 16. Approve the Authority as Developer.

BE IT RESOLVED, that the Authority is authorized to serve as developer of the Project and to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, the documents necessary to engage the Authority as developer and to defer a portion of the developer fee.

Section 17. Approve Project Documents.

BE IT RESOLVED that the Authority is authorized to negotiate, execute and deliver on behalf of the Authority, the General Partner, the Special Limited Partner, and/or the Partnership, as the case may be, all contracts and other documents respecting the design, construction, property management, and technical assistance for the Project all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such document).

Section 18. Approve Assignment of Project Documents.

BE IT RESOLVED, that the Authority is authorized to assign to the Partnership and the Partnership is authorized to assume the Project Documents entered into by the Authority before USBCDC was admitted as limited partner, all in the form approved by any single Authorized Representative (such approval to be conclusively demonstrated by the signature of any single Authorized Representative on such document).

Section 19. Delegation.

BE IT RESOLVED, that Tootie Smith, Chair of the Board of Commissioners of the Authority, and Gary Schmidt, County Administrator of Clackamas County, or their respective successors, are each an Authorized Representative, as that term is used in these Resolutions; and

BE IT RESOLVED, that Gary Schmidt as County Administrator is authorized to approve the final form of the Documents listed in Exhibit A, and such other documents as may be required to carry out the transactions contemplated by the foregoing resolutions and the development of the Project and that upon such approval, each Authorized Representative individually may, on behalf of the Authority, in its own capacity, as the Special Limited Partner, and as the sole member of the General Partner, on behalf of the General Partner and the Partnership, and without further action by the Board, finalize the terms of, execute, acknowledge, and deliver the actions and documents authorized herein.

Section 20. General Resolutions Authorizing and Ratifying Other Actions.

BE IT RESOLVED, that any Authorized Representative is authorized to negotiate, execute and deliver on behalf of the Authority (whether in its own capacity, its capacity as Special Limited Partner, or as sole member of the General Partner) or the Partnership, as the case may be, such other agreements, certificates, and documents, and to take or authorize to be taken all such other actions any Authorized Representative shall deem necessary or desirable to carry out the transactions contemplated by the foregoing resolutions (such determination to be conclusively demonstrated by the signature of any single Authorized Representative on such document); and

BE IT FURTHER RESOLVED, that to the extent any action, agreement, document or certification has heretofore been taken, executed, delivered or performed by an Authorized Representative named in these Resolutions on behalf of the Authority (whether in its own capacity, its capacity as Special Limited Partner, or as sole member of the General Partner) or the Partnership and in furtherance of the Project, the same is hereby ratified and affirmed.

DATED THIS ____ DAY OF _____, 2021

BOARD OF COMMISSIONERS FOR THE HOUSING AUTHORITY OF CLACKAMAS COUNTY

_____
Chair

_____
Recording Secretary

EXHIBIT A

Partnership Documents

1. Amended and Restated Agreement of Limited Partnership of Webster Road Housing Limited Partnership
2. Guaranty Agreement
3. Joint Marketing Agreement
4. Partnership Management Agreement
5. Development Services Agreement
6. Addendum to Property Management Services Agreement
7. Such other documents as required in connection with the closing of the investment by USBCDC

Tax Credit Documents

1. 4% Reservation and Extended Use Agreement
2. 4% Hold Harmless Agreement
3. Such other documents as required in connection with the closing of the LIHTC

Note Documents

1. Funding Loan Agreement
2. Borrower Loan Agreement
3. Regulatory Agreement
4. Note Declaration
5. Governmental Lender Note
6. Operating Agreement and Declaration of Restrictive Covenants and Equitable Servitudes
7. Tax Certificate and Agreement
8. Priority and Subordination Agreement
9. Such other documents as are required in connection with the issuance of the Governmental Lender Note

Borrower Loan Documents

1. Construction Funding Agreement
2. Multifamily Leasehold Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing
3. Assignment of Leasehold Deed of Trust and Loan Documents
4. Ground Lessor Subordination and Joinder
5. Ground Lessor Estoppel Certificate
6. Multifamily Note
7. Assignment and Subordination of Developer Fees
8. Assignment of Architect's Agreement and Plans and Specifications
9. Assignment of Equity Investor Capital Contributions, Pledge and Security Agreement
10. Assignment of Equity Interests, Pledge and Security Agreement
11. Assignment of Construction Contract
12. Assignment of Management Agreement
13. Assignment of Project Documents
14. Agreement of Environmental Indemnification

15. Completion and Repayment Guaranty
16. Exceptions to Non Recourse Guaranty
17. Authorization to Request Advances
18. Replacement Reserve Agreement
19. Deposit Account Control Agreement
20. Assignment of HAP Contract
21. HUD Consent to Assignment of HAP
22. Title Escrow Agreement
23. UCC-1 Financing Statement – county fixture filing
24. UCC-1 Financing Statement – SOS mortgaged property filing
25. UCC-1 Financing Statement – SOS developer fee
26. UCC-1 Financing Statement – SOS equity interests
27. Joint Lending Agreement
28. Priority and Subordination Agreement
29. Intercreditor Agreement
30. Such other documents as are required in connection with the Borrower Loan.

Construction Loan Documents

1. Assignment of Development Services Agreement and Developer Fee Subordination Agreement
2. Assignment and Subordination of Management Agreement and Management Fees
3. Assignment of Partnership Interests, Capital Contributions and Credits
4. Completion Guaranty Agreement
5. Consent to Assignment of Architect/Engineer's Agreement and Certificate
6. Consent to Assignment of Contractor's Agreement and Sworn Construction Cost Statement
7. Construction Loan Agreement
8. Construction Loan Promissory Note
9. Environmental Indemnification Agreement
10. Leasehold Trust Deed, Assignment of Leases and Rents, Security Agreement and Fixture Filing
11. Payment Guaranty Agreement
12. Assignment of Rental Subsidy Agreement
13. Subordination Agreement
14. Such other documents as required in connection with the closing of the Construction Loan

Seller Loan Documents

1. Promissory Note
2. Trust Deed
3. Such other documents as required in connection with the closing of the Seller Loan

HOME Loan Documents

1. Declaration of Land Use Restrictive Covenants
2. Trust Deed

3. Loan Agreement
4. Promissory Note
5. Such other documents as required in connection with the closing of the HOME Loan

PSH Loan Documents

1. Loan Agreement
2. Note
3. Guaranty
4. Trust Deed
5. Operating Agreement
6. Project Management Agreement
7. Intercreditor Agreement
8. Such other documents as required in connection with the closing of the PSH Loan

Sponsor Loan Documents

1. Promissory Note
2. Trust Deed
3. Metro Covenant
4. Such other documents as required in connection with the closing of the Sponsor Loan

Miscellaneous

1. Agreement to Enter into Housing Assistance Payments Contract
2. Housing Assistance Payments Contract
3. Section 18 Covenant
4. Ground Lease

DRAFT AIA® Document A133™ – 2009 Exhibit A

Guaranteed Maximum Price Amendment

for the following PROJECT:
(Name and address or location)

«Webster Road Redevelopment Project»
«18000 Webster Road
Gladstone, Oregon 97027»

THE OWNER:
(Name, legal status and address)

«Housing Authority of Clackamas County»«»
«13930 South Gain Street
Oregon City, OR 97045 »

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

«Walsh Construction Co./Oregon »«»
«2905 SW 1st Ave,
Portland, OR 97201»

ARTICLE A.1
§ A.1.1 Guaranteed Maximum Price
Pursuant to Section 2.2.6 of the Agreement, the Owner and Construction Manager hereby amend the Agreement to establish a Guaranteed Maximum Price. As agreed by the Owner and Construction Manager, the Guaranteed Maximum Price is an amount that the Contract Sum shall not exceed. The Contract Sum consists of the Construction Manager's Fee plus the Cost of the Work, as that term is defined in Article 6 of this Agreement.

§ A.1.1.1 The Contract Sum is guaranteed by the Construction Manager not to exceed Ten million two hundred ninety-six thousand three hundred twenty-one dollars ($ 10,296,321), subject to additions and deductions by Change Order as provided in the Contract Documents.

§ A.1.1.2 Itemized Statement of the Guaranteed Maximum Price. Provided below is an itemized statement of the Guaranteed Maximum Price organized by trade categories, allowances, contingencies, alternates, the Construction Manager's Fee, and other items that comprise the Guaranteed Maximum Price.
(Provide below or reference an attachment.)

«Refer to Exhibit A.1 – Schedule of Values»

§ A.1.1.3 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the Contract Documents permit the Owner to accept other alternates subsequent to the execution of

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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this Amendment, attach a schedule of such other alternates showing the amount for each and the date when the amount expires.)

«Refer to Exhibit A.2 - Alternates, Allowances and Unit Pricing»

§ A.1.1.4 Allowances included in the Guaranteed Maximum Price, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price ($0.00)
Refer to Exhibit A.2 - Alternates, Allowances and Unit Pricing	

§ A.1.1.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:

«Refer to Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications»

§ A.1.1.6 The Guaranteed Maximum Price is based upon the following Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Not Applicable.			

§ A.1.1.7 The Guaranteed Maximum Price is based upon the following Specifications:
(Either list the Specifications here, or refer to an exhibit attached to this Agreement.)
«Refer to Exhibit A.4 - Enumeration of Drawings and Specifications»

Section	Title	Date	Pages

§ A.1.1.8 The Guaranteed Maximum Price is based upon the following Drawings:
(Either list the Drawings here, or refer to an exhibit attached to this Agreement.)
«Refer to Exhibit A.4 - Enumeration of Drawings and Specifications»

Number	Title	Date

§ A.1.1.9 The Guaranteed Maximum Price is based upon the following other documents and information:
(List any other documents or information here, or refer to an exhibit attached to this Agreement.)

«See Exhibit A.8 – Cost Matrix »

§ A.1.1.10 The Guaranteed Maximum Price includes an identified contingency amount of One hundred eighty-six thousand five hundred thirty-six dollars and 00/100 Dollars ($186,536), for the Construction Manager's use to cover those costs considered to be Costs of the Work under Article 6 of AIA Document A133-2009 but that are not included in the schedule of values or in a Change Order (the "Construction Manager's Contingency"). The Construction Manager's Contingency is not available for or to be used for design changes, Owner-directed scope changes, concealed or unknown conditions (as defined in Section 3.7.4 of AIA Document A201-2017), Force Majeure Events (as defined in Section 8.3.1 of AIA Document A201-2017), Unknown Pandemic Impacts (as defined in Section 11.5.11 of AIA Document A133-2009), or design errors or omissions beyond the reasonable inferences described in Section 2.2.2 of AIA Document A133-2009. The Construction Manager will document its use of the Construction Manager's Contingency and review its use with the Owner at mutually agreeable intervals.

§ A.1.1.11 The Owner and Construction Manager agree that (i) the Guaranteed Maximum Price is calculated based on the market prices for building materials at the date this Guaranteed Maximum Price Amendment is executed ("Cost Baseline"), (ii) the pricing of building materials in the marketplace is volatile, and (iii) sudden building-material price increases may occur during the course of construction that the Construction Manager cannot control or avoid. The Construction Manager will be entitled to an equitable adjustment of the Guaranteed Maximum Price if the price of any building materials increase by more than 5% of the price of the materials that was used to calculate

the Cost Baseline, but only if (a) the price increase occurs within 90 days of the date that this Guaranteed Maximum Price Amendment is executed, (b) the price increase was not caused by the fault of the Construction Manager, and (c) the Construction Manager's Contingency established in Section A.1.1.10 is insufficient to cover the price increase. But clauses (a) and (c) are inapplicable when the price increase is attributable to a Force Majeure Event (as defined in Section 8.3.1 of AIA Document A201-2017).

§ A.1.1.12 The Owner and Construction Manager agree that the termination fee is calculated pursuant to Section 14.4.3 of AIA Document A201-2017 and will not exceed $112,000.00 USD.

§ A.1.1.13 Construction Manager acknowledges that this Contract is subject to the limits of the Oregon Constitution and contingent upon appropriation of funds by the Board of Commissioners for the Housing Authority of Clackamas County. As such, if and when Owner's Contingency is exhausted, Owner must appropriate additional funds before it may approve any further changes or adjustments to the Work under Sections A.1.1.10 or A.1.1.11. Construction Manager will continue to perform the Work (but not the further changes or adjustments to the Work in question) while Owner attempts to appropriate additional funds. If the Owner is unable to appropriate additional funds in a timely manner, the parties will first negotiate, in good faith, to find a commercially reasonable alternatives prior to either party exercising its rights to terminate the Contract. Such alternatives may include, but are not limited to, deductive Change Orders, design changes, or other means to appropriately reduce the scope of the Work. Owner will direct Architect to prepare revisions to the Contract Documents that incorporate any such agreed-upon reductions to the scope of the Work. Nothing is this Section A.1.1.13 alters either party's right to terminate the Contract in accordance with Article 14 of AIA Document A201-2019.

ARTICLE A.2

§ A.2.1 The anticipated date of Substantial Completion established by this Amendment:

«Subject to adjustments of the Contract Time as provided in the Contract Documents, the Construction Manager shall achieve Substantial Completion of the entire Work not later than 356 calendar days from the date of commencement of the Work.»

§ A.2.2 Final Completion

§ A.2.2.1 Construction Manager shall achieve Final Completion of the Work within 30 calendar days from the date of Substantial Completion.

§ A.2.3 Liquidated Damages

§ A.2.3.1 Contractor acknowledges and agrees that Owner may sustain damage if Contractor fails to achieve Substantial Completion of the entire Work in accordance with Section A.2.1. Contractor further acknowledges that it will be impractical and extremely difficult to ascertain and determine the actual damage Owner will sustain in the event of such delay. Therefore, the parties agree Contractor will pay Owner, as Owner's exclusive remedy, in law or equity, the following liquidated damages for Contractor's failure to achieve Substantial Completion of the entire Work in accordance with Section A.2.1.

.1) If Contractor does not achieve Substantial Completion of the entire Work in accordance with Section A.2.1, no liquidated damages shall be assessed for the first seven (7) days of delay in Contractor's achieving Substantial Completion.

.2) Thereafter, liquidated damages shall be assessed by the Owner and paid by Contractor at the rate of $3,000 USD for each of days eight (8) to fifteen (15) of delay in Contractor's achieving Substantial Completion.

.3) Thereafter, liquidated damages shall be assessed by the Owner and paid by Contractor at the rate of $3,500 USD for each of days sixteen (16) to thirty (30) of delay in Contractor's achieving Substantial Completion.

.4) Thereafter, liquidated damages shall be assessed by the Owner and paid by Contractor at the rate of $4,000 USD for each subsequent day of delay in Contractor's achieving Substantial Completion.

§ 8.4. Notwithstanding any provision of the Contract Documents to the contrary, (i) in no event shall the total payments for liquidated damages paid by Contractor to the Owner exceed the Contractor's Fee established in

Section 5.1.1 of AIA Document A133-2009, and (ii) liquidated damages will be assessed against Contractor only to the extent caused by Contractor or those for whom Contractor is responsible, and in no case for delays or causes arising outside the scope of this Agreement.

ARTICLE A.3

§ A.3.1 The following exhibits are incorporated into the Agreement as Contract Documents and are as fully a part of the Contract as if attached to the Agreement or repeated therein;

.1 Exhibit A.1 – Schedule of Values
.2 Exhibit A.2 - Alternates, Allowances and Unit Pricing
.3 Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications
.4 Exhibit A.4 - Enumeration of Drawings and Specifications
.5 Exhibit A.5 - Wage Rates
.6 Exhibit A.6 – Construction Schedule
.7 Exhibit A.7 – Form of Lender Consent
.8 Exhibit A.8 – Cost Matrix
.9 Exhibit A.9 – Remediation Plan
.10 Exhibit A.10 – Equity Objectives

ARTICLE A.4 ADDITIONAL INSUREDS

Pursuant to Section A.3.1.3 of Exhibit B to Agreement, the Construction Manager shall cause its commercial general liability coverage to include entities listed below as additional insureds.

OWNER *(Signature)*	CONSTRUCTION MANAGER *(Signature)*
	«Ryan Wilde»«, General Manager»
(Printed name and title)	*(Printed name and title)*

Project: ***Webster Road***

Est. No: 2

Exhibit A.1 - Schedule of Values

Date: 04/08/2021

Div #	*Division*	*Webster Road*
1000	**General Requirements**	**725,850**
1000	General Requirements	695,084
1100	Final Cleaning	30,766
2000	**Site Work**	**2,322,770**
2100	Site Preparation & Demolition	576,461
2100	Abatement	492,171
2200	Excavation	419,369
2300	Retaining Walls	76,974
2500	Roads & Walks	224,789
2600	Water Distribution	41,216
2700	Drainage Systems	212,687
2800	Site Improvements	110,471
2900	Landscaping / Irrigation	168,633
3000	**Concrete**	**172,842**
3200	Reinforcement	83,944
3300	Cast-in-Place Concrete	85,898
3800	Housekeeping Pads - Electrical/Mechanical	3,000
3900	Miscellaneous	-
4000	**Masonry - NO WORK**	**-**
5000	**Metals**	**55,645**
5100	Structural Steel	10,512
5500	Metal Fabrications	45,133
6000	**Wood & Plastics**	**970,248**
6100	Rough Carpentry	556,883
6200	Finish Carpentry	178,593
6400	Architectural Woodwork	-
6700	Siding & Trim	234,771
6900	Miscellaneous Carpentry	-
7000	**Thermal & Moisture Protection**	**713,824**
7100	Waterproofing	177,920
7200	Insulation	74,406
7250	Fireproofing	3,627
7500	Membrane Roofing	363,774
7570	Traffic Coating	-
7600	Flashing & Sheet Metal	59,274
7800	Skylights	12,202

Est. No: 2

Exhibit A.1 - Schedule of Values

Walsh Estimate #2 4/8/21

Div #	*Division*	*Webster Road*
7900	Joint Sealants	22,620
8000	**Doors & Windows**	**312,904**
8100	Hollow Metal Frames and Doors	25,894
8200	Wood Doors	46,073
8300	Special Doors	1,572
8400	Storefront Assemblies	-
8500	Windows	97,064
8700	Hardware	118,271
8800	Glass & Glazing	24,030
9000	**Finishes**	**918,164**
9250	Gypsum Drywall	498,044
9300	Tile	6,020
9500	Acoustical	42,910
9600	Resilient Flooring	189,217
9700	Carpet	28,571
9720	Special Flooring	20,273
9800	Special Coatings	-
9900	Painting	133,128
10000	**Specialties**	**72,053**
10100	Display Boards - Allowance	5,000
10200	Louvers & Vents - Covered in 15500	-
10260	Corner Guards	5,275
10300	Fireplaces	6,470
10350	Flagpoles	10,384
10400	Identifying Devices	9,765
10500	Lockers - Excluded (None Shown)	-
10520	Fire Protective Devices	2,075
10530	Protective Covers	-
10550	Postal Specialties	6,205
10600	Partitions	-
10750	Telephone Specialties	-
10800	Toilet & Bath Accessories	15,415
10900	Closet Specialties	9,898
10990	Bike Racks	1,566
11000	**Equipment**	**43,215**
11010	Roof Anchors - Excluded	-
11110	Common Laundry Equipment - By Owner	-
11400	Food Service Equipment - Type 1 Hood - Install in 15500	8,500
11450	Residential Appliances	34,715

Est. No: 2

Exhibit A.1 - Schedule of Values

Walsh Estimate #2 4/8/21

Div #	*Division*	*Webster Road*
12000	**Furnishings**	**239,953**
12300	Cabinets & Countertops	211,606
12500	Window Treatment	23,991
12600	Entrance Mats	4,357
13000	**Special Construction**	**61,592**
13120	Pre-Engineered Structures	25,692
13150	Aquatic Facilities	-
13900	Radon System	35,900
14000	**Conveying Systems - NO WORK**	**-**
15000	**Mechanical**	**1,651,307**
15200	Mechanical Insulation	-
15300	Fire Protection	102,737
15400	Plumbing	690,374
15500	HVAC	858,197
15900	Controls -- in 15500	-
16000	**Electrical**	**978,241**
16200	Underground Distribution	20,650
16400	Service & Building Wiring	594,723
16500	Light Fixtures	166,994
16700	Systems	190,875
16800	Temporary Electrical - By Owner (per RFP Exhibit D)	5,000
17000	**Other**	**399,350**
	Subcontractor Bonding	20,000
	Parking rental at church	37,500
	Hoisting/Material Handling/All trade scaffold	-
	BCL #073 - Settlement found below SOG - Sub Slab Repair - Allowance	15,000
	For future	-
	MEPF Design	80,968
	Preconstruction (per RFP response & early work)	45,356
	Fire Security - cameras only - purchased with 24 mo contract by Owner	-
	Safety Plan	13,990
	Building Commissioning	-
	Permits & Fees by Owner	
	Sidewalk & Street Rental / Parking Meter Rental Fees	
	Sanitary Sewer Connection Fee	
	Storm Sewer Connection Fee/Charges	
	Water Meter/Connection Fee/Vault	
	Electrical Connection Fee	

Est. No: 2

Exhibit A.1 - Schedule of Values

Walsh Estimate #2 4/8/21

Div #	*Division*				*Webster Road*
	Off-Site Improvements				
	Certified Survey				
	Cost Certification				
	Adjustments				
	Cost Indexing (Inflation) - none				-
	Contingency - 2% Contractor's Construction				186,536
				SUB-TOTAL	**9,637,959**
	Overhead & Profit			3.75%	361,423
				SUB-TOTAL	**9,999,382**
	Liability Insurance			1.96%	195,988
	All-Risk Insurance - Excluded				
	Gross Receipts Tax			0.38%	37,998
				SUB-TOTAL	**10,233,368**
	Performance Bond	First	2,500,000	0.695%	17,496
		Next	2,500,000	0.610%	15,343
		Next	2,500,000	0.580%	14,584
		Next	12,500,000	0.565%	15,531
		Over	20,000,000	0.535%	-
				SUB-TOTAL	**10,296,321**
				TOTAL	**$ 10,296,321**
				Target	10,000,000
				Variance	296,321
				Cost per SF	369.04
				Cost per Unit	214,507
				Cost per Bed	214,507

See Attached "Estimate Exclusions, Clarifications & Allowances"

This Conceptual Estimate does not establish any contractual sum; and any recipient of this Conceptual Estimate agrees that Walsh Construction Co. does not warrant and/or guarantee the sum; and any use by the recipient of the Conceptual Estimate shall be done at the sole risk of the recipient.

END

EXHIBIT A.2 - ALTERNATES, ALLOWANCES AND UNIT PRICING SHEET

Project: ***Webster Road***

Bid Set GMP

04/08/2021

	EXHIBIT A.2 - ALTERNATES, ALLOWANCES AND UNIT PRICING SHEET	
5	**ALT - Resilient Sheet Flooring RST-3 - Alternate B: Mondo; Artigo Collection; Lava.**	**$ 86,571**
6	**ALT - Seal Coat Existing Paving - Fog seal coat existing asphalt paving.**	**$ 8,162**
8	**ALT - Unit Window Coverings - 1 inch horizontal mini-blinds at unit windows.**	**$ 27,724**
10	**ALT - Replace all curbs on-site in liue of patchwork repairs.**	**$ -**
11	**ALT - Replace all parking lot paving.**	**$ -**
12	**ALT - Replace asphalt paving with concrete.**	**$ -**
13	**ALT - Use formaldehyde-free doors.**	**$ -**
14	**ALT - FF&E package upgrade.**	**$ -**
15	**ALT - Add/Upgrade Lighting.**	**$ -**
16	**ALT - Site upgrades/furnishings/ mechanical screens**	**$ -**
17	**ALT - Tile backsplash in kitchen in lieu of p-lam.**	**$ -**
18	**ALT - Bullentin board wall covering for pinup/display - Allowance**	**$ 5,565**
19	**ALT - Artwork**	**$ -**
20	**ALT - Full extension, soft closing drawer and doors**	**$ 5,627**

Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications

Project: **Webster Road**	Estimate #: GMP	Date: 4/8/2021

Clarifications:

General

- Estimate assumes Davis Bacon Residential prevailed wages - Dated 2020-04
- All work assumed to be completed during normal working hours. No OT is included.
- Budget based on the following documents:
  - Architects Pricing Set plans and dated 2/01/2021 (120 sheets)
  - Architects Pricing Set specifications dated 2/01/2020 (542 pages)
  - Addendum #1 issued on 02/24/2021
  - Addendum #2 issued on 03/09/2021
- Design-Build Electrical dated 03/05/2021
- Design-Build Low Voltage dated 03/04/2021
- Design-Build HVAC dated 01/20/2021
- Design-Build Plumbing dated 01/19/2021
- Design-Build Fire Protection dated 03/01/2021
- Project is assumed to start abatement in June 2021 with other scopes starting after that.
- Estimate assumes owner's insurance underwriter requirements do not exceed those of local codes.
- WCC team will coordinate safety and traffic control with the adjacent neighbors.

Division 01000

- Walsh Construction Co. will assist the Owner and Architect in addressing Earth Advantage and other identified incentive based program requirements. However, Walsh Construction Co. makes no guarantees, expressed or implied that any type of Earth Advantage certification or incentive based program certification will be achieved.
- Budget is based on a 50 week schedule from notice to proceed to temporary certificate of occupancy. Inclusive of 14 weeks for abatement.
- Assumed Project Administrator will be located in Portland Office (not onsite per Exhibit D)

Division 02000

- Includes allowance for water and fire vaults: $ - BCL #066 & 067
- Assumes pervious concrete shown on Civil drawings is standard concrete BCL #012
- Assumes demolition/patch back of all main line sub-SOG plumbing work BCL #074 & 075
- Asbestos testing by Owner

Division 03000

Division 04000

Division 05000

Division 06000

Division 07000

- All flashings assumed to be 24 gauge prepainted (factory standard color) unless noted otherwise.
- Roofing system figured to be 60 mil, mechanically fastened, per updated spec from Carolyn on 10/12/20. BCL #023 & 024
- Carlisle conventional 2 ply hot asphalt vapor retarder/temp roof membrane over plywood roof deck. BCL #023 & 024
- Carlisle conventional 2 ply hot asphalt vapor retarder/temp roof membrane over plywood roof deck. BCL #023 & 024
- Paint on vapor retarder in lieu of Certainteed Membrain BCL #037

Division 08000

- Vinyl window budget based on VPI Endurance series in black exterior and white interior
- Unit entry doors frames are figured with Timely snap on trim in standard color

Division 09000

- Walls at back-of-house spaces assumed to be fire taped only. No paint figured.
- Budget is based on use of a non-union drywall subcontractor. Please note that the NW Carpenters Union has a long-standing wage and benefit issue with non-union drywall subcontractors which may result in bannering or other demonstration activities in public areas outside the project site or at your offices. Prior to engaging a particular drywall subcontractor we will need to discuss this situation so you can make an informed decision about the implications to project cost and your business sensitivities.

Division 10000

- Wall louvers figured with baked enamel finish UNO.
- Estimate includes 2x bike racks at the Site and 4x in building.

Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications

Project: **Webster Road**	Estimate #: GMP	Date: 4/8/2021

Division 11000

Division 12000

- Shelf supports to be locking plastic clips in lieu of metal pins (12 35 30; 2.1 A 10)
- 110 degree, self-closing hinges
- 12 35 30; 2.2 B 4 - 'Edge band exposed edges with edging of same species as face veneer'

Division 13000

Division 14000

Division 15000

- Fire sprinkler system includes:
  - Fire sprinkler assumptions/inclusions are based on ~~at~~ design-build fire suppression system included in drawings and specifications.
  - CPVC piping at concealed spaces — BCL #081
  - Preconstruction services & design
  - Code compliance per NFPA
- Plumbing & mechanical assumptions - general:
  - Plumbing and mechanical assumptions/inclusions are based on design-build plumbing and mechanical systems included in drawings and specifications.
  - Preconstruction services & design
- Plumbing assumptions - units:
  - Water piping figured as Wirsbo Aquapex.
  - Assumes deletion of 10x floor drains per CHA email 10/15/20 — BCL #068
  - Includes all main line underground piping — BCL #074 & 075
  - Includes domestic booster pump — BCL #080
- Mechanical assumptions/inclusions:
  - Ventilation only provided at electrical/IDF, data/MDF, and tel/data rooms
- Budget assumes temporary water costs are by owner. Assuming using existing services.

Division 16000

- Electrical assumptions/inclusions are based on design-build electrical and low voltage systems included in drawings and specifications.
- Preconstruction services and design
- Budget assumes bldg electrical meter and bills for same remain in the owner's name during construction
- Includes fixture VE — BCL #050 & 083
- Includes single meter for PGE — BCL #079
- Includes photometric and street lighting design — BCL #077
- Includes Door King system — BCL #086
- Street lighting work by PGE
- This is a Design Build Project and is quoted per NEC Code & Oregon Specialty Code to date of this quote. Any tariff tax put in place after the date of this quote will be addressed as a change order and must be paid by others.
- LV - Assumed run to nearest IDF.
- LV - phone equipment by Owner.

Division 17000

Allowances

• Display Boards	$	5,000
• BCL #073 - Settlement found below SOG - Sub Slab Repair - Allowance	$	15,000

Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications

Project: **Webster Road**	Estimate #: GMP	Date: 4/8/2021

Project Specific Exclusions:

General

- Fire Tank - not typically required on buildings of this height
- Sales tax - shown below the line as requested
- Use tax
- BIM coordination
- All open BCL Items on BCL Dated 4/8/21
    - BCL #10 (VE - Delete footings for planters)
    - BCL #13 VE - Flooring VE (Currently non-PVC healthcare specification)
    - BCL #17 (VE - Site Furnishings)
    - BCL #19 (VE - Reduce CCTV Scope)
    - BCL #20 (VE - 1" Mini's ilo roller shades)
    - BCL #28 (VE - Cabinets - Alternate cabinets manufacturer)
    - BCL #35 (VE - Fireplace Tile - Select cost efficient product)
    - BCL #65 (NAUF removal at doors)
    - BCL #69 (Mechanical - All residential HVAC system per bidder. Details once awarded work)
    - ~~BCL #73 (Settlement found below SOG - Sub Slab Repair)~~ ALLOWANCE
    - BCL #78 (Street Lighting (Construction Phase - by PGE)

Division 01000

- Design of acoustical systems and details.
- Design of cold formed metal framing and metal furring assemblies, or shop drawings for same.
- Design of structural steel framing or metal fabrication design
- Guardrail design
- Design of waterproofing systems, claddings, flashings, water resistive barriers, air barriers, and associated details.
- Dedicated accounting support

Division 02000

- Installed dewatering. Budget assumes water table is low enough that dewatering will not be required.
- Shoring or piling
- Survey- This estimate excludes checking or re-establishing existing property corners. This estimate includes all layout inside of the property corners.
- Property fence

Division 03000

- Gypcrete and acoustimat on concrete slabs
- Precast concrete of any kind
- Creteseal 2000 concrete cure or similar type products

Division 05000

- Seismic joints
- Steel canopies

Division 06000

- FSC wood.
- Urea formaldehyde free (UFF) materials

Division 07000

- Sound batts at dropped ceilings.
- Rigid insulation under slab-on-grade
- CertainTeed Membrain (figured as paint on vapor retarder) BCL #037
- Intumescent paint

Division 08000

- Grouting of hollow metal frames
- Interior storefront

Division 09000

- Painting of exposed ductwork, pipes, wire, conduit, etc. with the exception of kitchen and dining ductwork and exposed sprinkler piping BCL #021

Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications

Project: **Webster Road**	Estimate #: GMP	Date: 4/8/2021

- Tile at showers or bathtubs
- RSIC clips or other acoustical measures beyond those stated in these clarifications or required by code

Division 10000

- Directories - assumed to be FF&E
- Shower doors
- Bike lockers
- Enclosures for bike storage
- Bike racks for units
- Lockers (for Locker room. Assumed OFOI, not shown on drawings or called out in specification)

Division 11000

- Roof anchors BCL #021
- Trash compactor
- Commercial laundry appliances - Assumed OFOI (Coin Opp or Similar)

Division 12000

- Furnishings, Fixtures & Equipment (FF&E)
- Sub tops at cabinets.
- NAF & ULEF Cabinets BCL #025
- Salice' hinges (still providing 110 degree, self-closing)
- Valances for undercabinet lighting
- Finished bottoms for upper cabinets
- 12 35 30; 2.2 C 3
- KCMA certification

Division 13000

- Seismic monitoring equipment. Shouldn't be required for buildings of this height.

Division 14000

Division 15000

- Temporary Utility Bills (by Owner per RFP exhibit D)
- Heat trace
- Pressure reducing station
- Make-up air direct ducted to units.
- Fire pump
- Bike wash down
- Dryer booster fans
- Fire/smoke dampers at unit bathroom exhaust.
- Dryer booster fans
- Central station tie-in to the fire department
- Insulation on pex piping within units. Called out in narrative, however industry standard is no insulation on this pipe so we excluded it.
- System Failure Warning Device for Radon Mitigation System – not enough information provided. No specifications provided.

Division 16000

- Temporary Utility Bills (by Owner per RFP exhibit D)
- Utility Company Connection Fees and Offsite Infrastructure
- Revision, and/or addition of, street lighting
- City street lights. Estimate assumes that existing street lights can remain in place during course of construction.
- Primary power transformer

Division 17000

- Subcontractor bonding. Allowance included. This will be included, as necessary, during bid reconciliation.
- Security and/or fire watch guards

Exhibit A.3 - Construction Manager's Clarifications, Exclusions and Qualifications

Project: **Webster Road**	Estimate #: GMP	Date: 4/8/2021

Standard Exclusions:

	Owner to:
• Plan Check Fee	
• Building Permit	
• ~~ROW Permit~~	
• Fire Protection Permit	Carry $3,000
• Plumbing Permit	Carry $13,000
• HVAC Permit	Carry $18,000
• Electrical Permit	Carry $23,000
• Master Use Permits & Fees	
• Assessments	
• Sanitary Sewer Connection Fees	
• Storm Sewer Connection Fees	
• Water Meter & Tap	
• Water Connection Fees	
• Mitigation Fees & Expenses	
• Impact Fees	
• Construction Taxes	
• Premium for LEED certification	
• Record drawings on CAD.	
• Pest & Vector control	
• Electrical review/ permit fee	

- Window testing--WCC will coordinate with owner's 3rd party rep
- Testing, engineering, and special inspection
- Cost Certification
- Rock Excavation
- Overhead hazards/utilities located off-site
- Underground Obstructions and/or Conditions that Hinder Construction
- ~~Performance & Payment Bond~~
- All-Risk Insurance
- ~~Hazardous Material Abatement~~
- Any Warranty Beyond Manufacturers Standard Published Warranty
- Subcontractor/Suppliers Individual Lien Releases
- Printing Cost(s) for Architects Plans & Specifications
- Electric Utility Company Connection Fees
- Project Photographs
- Code interpretation--this is a design professional's responsibility
- Mold remediation
- ~~Radon gas remediation~~
- DAS system

Exhibit A.4

Index of Contract Documents

Dwg. No.	Drawing Name	Date	Add. #1	Add. #2
General by Carleton Hart Architecture, P.C.				
G1.01	Cover Sheet	02/01/21		
G1.02	General Information/Sheet Index	02/01/21	02/24/21	
G1.03	Abbreviations/Symbols	02/01/21		
G2.01	Fire Life Safety - Site Plan	02/01/21		
G2.02	Fire Life Safety - Center and North Wing	02/01/21		
G2.03	Fire Life Safety - East Wing	02/01/21		
G2.04	Fire Life Safety - West Wing	02/01/21		
G2.05	Fire Life Safety - Sections	02/01/21		
G2.11	Code Review Summary	02/01/21		
G2.12	Code Review Summary	02/01/21		
G3.01	Assemblies - Exterior	02/01/21	02/24/21	
G3.02	Assemblies - Interior	02/01/21	02/24/21	
G4.01	Accessibility Sheets - General	02/01/21		
G4.02	Accessibility Sheets - Common Areas	02/01/21		
G4.03	Accessibility Sheets - Dwelling Units	02/01/21		
Civil by Humber Design Group, Inc.				
C0.00	Civil Cover	02/01/21		
C0.01	Civil Notes	02/01/21		
C1.00	Existing Conditions and Demo Plan	02/01/21		
C2.00	Layout and Paving Plan	02/01/21		
C3.00	Grading Plan	02/01/21		
C3.01	Grading Plan	02/01/21		
C3.02	Grading Plan	02/01/21		
C3.03	Grading Plan	02/01/21		
C4.00	Utility Plan	02/01/21		
C5.00	Civil Details	02/01/21		
C5.01	Civil Details	02/01/21		
C5.02	Civil Details	02/01/21		
C5.03	Civil Details	02/01/21		
C6.00	Public Plan	02/01/21		
C6.01	Webster Road Plan - South	02/01/21		
C6.02	Webster Road Plan - North	02/01/21		
C6.03	Enlarged Plan	02/01/21		
C6.04	Public Details	02/01/21		
C6.05	Public Details	02/01/21		
C7.00	Erosion Control Cover	02/01/21		
C7.01	Existing Site Erosion Control Plan	02/01/21		
C7.02	Final Site Erosion Control Plan	02/01/21		
C7.03	Erosion Control Details	02/01/21		
Landscape by Ecotone Environmental				
L1.01	Tree Plan	02/01/21	02/24/21	
L2.01	Materials Plan	02/01/21		
L2.02	Layout Plan	02/01/21		
L3.01	Irrigation Plan	02/01/21		
L4.01	Planting Schedule & Notes	02/01/21		
L4.02	Planting Plan Enlargement	02/01/21		
L4.03	Planting Plan Enlargement	02/01/21		
L4.04	Planting Plan Enlargement	02/01/21		
L4.05	Planting Plan Enlargement	02/01/21		

Exhibit A.4
Index of Contract Documents

Landscape by Ecotone Environmental - Continued

L5.01	Site Details	02/01/21		
L5.02	Site Details	02/01/21		
L5.03	Planting Details	02/01/21		
L5.04	Irrigation Details	02/01/21		

Demolition by Carleton Hart Architecture, P.C.

D1.01	Site Demo Plan	02/01/21		
D2.00	Slab Demo Plan	02/01/21	02/24/21	
D2.01	Demo Floor Plan	02/01/21		
D2.02	Demo Plan - Center and North Wing	02/01/21		
D2.03	Demo Plan - East Wing	02/01/21		
D2.04	Demo Plan - West Wing	02/01/21		
D2.05	Demo Roof Plan	02/01/21		
D2.11	Demolition Reflected Ceiling Plan	02/01/21		

Architectural by Carleton Hart Architecture, P.C.

A1.01	Site Plan	02/01/21	02/24/21	
A2.00	Slab Plan	02/01/21	02/24/21	
A2.01	Floor Plan	02/01/21		
A2.02	Floor Plan - Center and North Wing	02/01/21	02/24/21	
A2.03	Floor Plan - East Wing	02/01/21		
A2.04	Floor Plan - West Wing	02/01/21		
A2.05	Roof Plan	02/01/21		
A2.11	Reflected Ceiling Plan	02/01/21		
A2.12	Reflected Ceiling Plan - Center and North Wing	02/01/21		
A2.13	Reflected Ceiling Plan - East Wing	02/01/21		
A2.14	Reflected Ceiling Plan - West Wing	02/01/21		
A3.01	Enlarged Floor Plans	02/01/21	02/24/21	
A3.11	Unit Plans and Reflected Ceiling Plans	02/01/21		
A3.12	Unit Plans and Reflected Ceiling Plans	02/01/21		
A3.13	Unit Plans and Reflected Ceiling Plans	02/01/21		
A4.01	Exterior Elevations	02/01/21		
A4.02	Exterior Elevations	02/01/21		
A4.03	Exterior Elevations	02/01/21		
A4.04	Exterior Elevations	02/01/21		
A5.01	Building Sections	02/01/21		
A5.02	Building Sections	02/01/21		
A5.11	Wall Sections	02/01/21		
A5.12	Wall Sections	02/01/21		
A7.01	Interior Elevations - Units	02/01/21	02/24/21	
A7.02	Interior Elevations - Common Areas	02/01/21	02/24/21	
A7.03	Interior Elevations - Common Areas	02/01/21		
A8.01	Site Details	02/01/21	02/24/21	
A8.11	Exterior Details - Foundation and Base Conditions	02/01/21	02/24/21	
A8.21	Exterior Details - Building Skin	02/01/21		
A8.22	Exterior Details - Building Skin	02/01/21	02/24/21	
A8.31	Exterior Details - Door and Window Openings	02/01/21	02/24/21	
A8.32	Exterior Details - Window Installation Sequence		02/24/21	
A8.51	Exterior Details - Roof	02/01/21	02/24/21	
A8.61	Interior Details - General	02/01/21	02/24/21	
A8.62	Interior Details - General	02/01/21		
A8.63	Interior Details - General	02/01/21		
A8.64	Interior Details - General			03/09/21
A8.71	Interior Details - Cabinetry and Casework	02/01/21		
A8.72	Interior Details - Cabinetry and Casework	02/01/21		
A9.01	Door Schedule	02/01/21	02/24/21	
A9.11	Window Schedule	02/01/21	02/24/21	
A9.21	Finish Schedule	02/01/21		03/09/21

Exhibit A.4
Index of Contract Documents

Structural by ABHT Structural Engineers

S0.01	General Structural Notes and Drawing Index	02/01/21	
S0.02	General Structural Notes	02/01/21	
S0.03	Statement of Special Inspection	02/01/21	
S1.01	Site Plan	02/01/21	02/24/21
S2.01	Roof Framing Plan	02/01/21	
S3.01	Enlarged Plans - North Wing and Center	02/01/21	02/24/21
S3.02	Enlarged Plan - East Wing	02/01/21	
S3.03	Enlarged Plan - West Wing	02/01/21	
S4.01	Framing Elevations	02/01/21	
S5.01	Concrete Details	02/01/21	02/24/21
S5.02	Concrete Details	02/01/21	
S6.01	Framing Details	02/01/21	
S6.02	Framing Details	02/01/21	
S6.03	Framing Details	02/01/21	

Radon by Radongreen, LLC

R1.00	Specifications	02/01/21	
R2.00	Slab Plan	02/01/21	
R2.10	Floor Plan	02/01/21	
R2.20	Roof Plan	02/01/21	
R3.00	Details	02/01/21	

Fire Suppression by Crown Fire Systems, Inc. (For Information Only - Design/Build Under Separate Review)

Page 1 of 4	Site Plan & Section Views	03/01/21	
Page 2 of 4	Fire Sprinkler Plan - West Wing	03/01/21	
Page 3 of 4	Fire Sprinkler Plan - North Wing & Lobby	03/01/21	
Page 4 of 4	Fire Sprinkler Plan - East Wing	03/01/21	

Plumbing by Tapani Plumbing, Inc. (For Information Only - Design/Build Under Separate Review)

P0.00	Cover Sheet - Plumbing	01/19/21	
P2.01	Level 1 - Below Grade - North Wing @ Center - Plumbing	01/19/21	
P2.02	Level 1 - Below Grade - East Wing - Plumbing	01/19/21	
P2.03	Level 1 - Below Grade - West Wing - Plumbing	01/19/21	
P2.11	Level 1 - Above Grade - North Wing @ Center - Plumbing	01/19/21	
P2.12	Level 1 - Above Grade - East Wing - Plumbing	01/19/21	
P2.13	Level 1 - Above Grade - West Wing - Plumbing	01/19/21	
P2.20	Roof Plan - Plumbing	01/19/21	
P3.00	Header Diagrams, Gas Isometric & Details - Plumbing	01/19/21	

Mechanical by American Heating, Inc. (For Information Only - Design/Build Under Separate Review)

M000	HVAC Legends & Abbreviations	01/20/21	
M201	Level 1 Overall Floor Plan - HVAC	01/20/21	
M202	Roof Plan - HVAC	01/20/21	
M210	Level 1 Floor Plan East Wing - HVAC	01/20/21	
M211	Level 1 Floor Plan North Wing & Center - HVAC	01/20/21	
M212	Level 1 Floor Plan West Wing - HVAC	01/20/21	
M301	Level 1 Overall Floor Plan - HVAC Piping	01/20/21	
M310	Level 1 Floor Plan East Wing - HVAC Piping	01/20/21	
M311	Level 1 Floor Plan North Wing & Center - HVAC Piping	01/20/21	
M312	Level 1 Floor Plan West Wing - HVAC Piping	01/20/21	

Mechanical by American Heating, Inc. (For Information Only - Design/Build Under Separate Review) - Continued

M500	HVAC Schedules	01/20/21
M501	HVAC Schedules	01/20/21
M600	HVAC Details	01/20/21
M601	HVAC Details	01/20/21
M602	HVAC Details	01/20/21

Electrical by Advanced Electric, Inc. (For Information Only - Design/Build Under Separate Review

E0.00	Cover Sheet - Electrical	03/05/21
E0.01	Schedules - Electrical	03/05/21
E1.01	Site Plan - Electrical	03/05/21
E1.02	Site Phototometric Plan	03/05/21
E2.00	Floor Plan - Overall - Power	03/05/21
E2.01	Floor Plan - North Sector - Power	03/05/21
E2.02	Floor Plan - Center Sector - Power	03/05/21
E2.03	Floor Plan - East Sector - Power	03/05/21
E2.04	Floor Plan - West Sector - Power	03/05/21
E2.05	Roof Plan - Power	03/05/21
E3.00	Floor Plan - Overall - Lighting	03/05/21
E3.01	Floor Plan - North Sector - Lighting	03/05/21
E3.02	Floor Plan - Center Sector - Lighting	03/05/21
E3.03	Floor Plan - East Sector - Lighting	03/05/21
E3.04	Floor Plan - West Sector - Lighting	03/05/21
E4.01	Enlarged Unit Plans - Electrical	03/05/21
E6.00	One-Line Diagram - Electrical	03/05/21
E7.00	Panel Schedules - Electrical	03/05/21
E7.01	Panel Schedules - Electrical	03/05/21

Low Voltage by Point Monitor Corporation (For Information Only - Design/Build Under Separate Review)

LV-1	General, Symbols & Abbreviations - Low Voltage	03/04/21
LV-2	Schedules & Calculations - Low Voltage	03/04/21
LV-3	Floor 1 - Overall - Low Voltage	03/04/21
LV-4	North Wing & Center - Low Voltage	03/04/21
LV-5	Enlarged West Wing - Low Voltage	03/04/21
LV-6	Enlarged East Wing - Low Voltage	03/04/21
LV-7	Roof Plan - Low Voltage	03/04/21
LV-8	Details - Low Voltage	03/04/21

SPECIFICATIONS (PROJECT MANUAL) DATED 2/1/21 BY CARLETON HART ARCHITECTURE, P.C

ADDENDUM NO. 1 DATED 2/24/21 BY CARLETON HART ARCHITECTURE, P.C.
ADDENDUM NO. 2 DATED 3/9/21 BY CARLETON HART ARCHITECTURE, P.C.

PROJECT MANUAL

DESIGN-BUILD MEP SPECIFICATIONS

WEBSTER ROAD HOUSING

Renovation

Gladstone, Oregon

02.01.2021

BID SET

DIVISION 21 – FIRE SUPPRESSION

DIVISION 22 – PLUMBING

DIVISION 23 – HEATING, VENITLATING, AND AIR CONDITIONING (HVAC)

DIVISION 26 – ELECTRICAL

SECTION 211313 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Sprinklers.

1.2 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm device. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.3 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Factory Mutual (FM) approved and/or UL listed for 175-psig (1200-kPa) minimum working pressure.

B. Sprinkler system design shall be approved by authorities having jurisdiction.

1. Sprinkler Occupancy Hazard Classifications:
   a. Offices including data processing [Light Hazard].
   b. Residential [Light Hazard].
   c. Hospitals [Light Hazard].
   d. Nursing and convalescent homes [Light Hazard].
   e. Institutional [Light Hazard].
   f. Educational [Light Hazard].
   g. Veterinary facilities, animal hospitals, animal shelters [Light Hazard].
   h. Churches [Light Hazard].
   i. Libraries except Stack Areas [Light Hazard].
   j. Restaurant seating areas [Light Hazard].

1.4 SUBMITTALS

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

B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.

C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

D. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping." Also include final system test data in accordance with piping manufacturer's requirements.

E. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

B. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following Installation Standards as applicable:

1. NFPA 13, "Installation of Sprinkler Systems."

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 ABOVE GROUND PIPING (2-1/2 INCH AND ABOVE)

A.

Steel Pipe: ASTM A795; Schedule 10 or approved. Domestic or Import.

1. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings; ASME B16.4, threaded fittings.
2. Malleable Iron Fittings: ASME B16.3, threaded fittings.
3. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring poc ked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe .

2.3 ABOVE GROUND PIPING (THROUGH 2 INCH)

A. Steel Pipe: Schedule 40 black steel, ASTM A-135, ASTM A135/A795 UL listed. Domestic or im port.

B. Branch Outlet Fittings:
   1. Cast Iron Fittings: ASME B16.4, threaded fittings.
   2. Malleable Iron Fittings: ASME B16.3, threaded fittings.

2.4 LIGHT HAZARD SPRINKLER PIPE AND FITTINGS

A. UL and FM listed CPVC pipe and fittings as manufactured by “BlazeMaster,” or approved.

2.5 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   1. Globe Fire Sprinkler Corporation.
   2. Reliable Automatic Sprinkler Co., Inc.
   3. Tyco Fire & Building Products LP.
   4. Victaulic Company.
   5. Viking Corporation.

B. General Requirements:

   1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
   2. Pressure Rating for Residential Sprinklers: 175 psig (1200 kPa) maximum.
   3. Pressure Rating for Automatic Sprinklers: 175 psig (1200 kPa) minimum.

C. Automatic Sprinklers with Heat-Responsive Element:

   1. Early-Suppression, Fast-Response type sprinklers must be used.
   2. Characteristics: Nominal 1/2-inch (12.7-mm) orifice with Discharge Coefficient K of 5.6 or higher, and for "Light hazard" temperature classification rating.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13, NFPA 13D, or NFPA 13R as applicable.

C. Install CPVC piping in the residential units and non-common areas only.

D. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.

E. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections unless otherwise specified.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

K. Install alarm devices in piping systems.

L. Install hangers and supports for sprinkler system piping according to NFPA 13 and manufacturer’s instructions. Comply with requirements for hanger materials in NFPA 13.

M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

N. Fill sprinkler system piping with water.

O. Install electric heating cables and pipe insulation on sprinkler piping in areas subject to freezing. Comply with requirements for heating cables in Section 210533 "Heat Tracing for Fire-Suppression Piping" and for piping insulation in Section 210700 "Fire-Suppression Systems Insulation."

P. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons.

3.2 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

C. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

3.3 SPRINKLER INSTALLATION

A. Install sprinklers in accordance with manufacturer’s installation and listing instructions.

B. If required, install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.

3.4 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance".

B. Perform tests and inspections in accordance with sprinkler piping manufacturer’s requirements.

C. Prepare test and inspection reports per NFPA 13 and sprinkler piping manufacturer’s requirements.

END OF SECTION 211313

PART 1 - GENERAL

1.1 Description

A. Work includes, but is not limited to:

1. Provide all labor, materials, equipment, tools, and perform all work to furnish the complete design and construction for plumbing of the project.
2. Design, construct and coordinate the complete system to meet the intent of the architectural design documents. Install work within the initial space accommodations or make other provisions at no additional cost the Owner and maintain the initial architectural and structural integrity.
3. Provide electrical load information to Electrical Subcontractor. Electrical Contractor to connect all plumbing equipment, includes control wiring and conduits.
4. Subcontractors are required to fully coordinate their work with other subcontractors. Any cost of remedy for lack thereof is the responsibility of these Subcontractors.
5. Complete work expeditiously and within requirements of published project schedule(s) of Architect and Owner.
6. Obtain and pay for all permits for the scope of work excluding sewer and water connection fees.
7. Arrange for and schedule all tests required by local jurisdictional authorities and utilities.

B. Code Required Fire Resistive Standards:

1. Portions of this building are required by Code to be constructed to fire resistive standards. Include in the design provisions to meet all code requirements.
2. Plastic pipe is specified in some sections that follow. Provide UL listed assemblies at locations where fire resistive construction is penetrated by plastic pipe.

C. Related Work Specified Elsewhere:

1. Advise the General Contractor of all concrete work associated with the installation of the plumbing systems. The General Contractor will provide the concrete work utilizing information provided by the Design/Build Contractor.

1.2 Quality Assurance

A. Applicable Codes and Standards:

1. Comply with all Federal, State, City and other applicable codes and ordinances including applicable provisions of the following:
   a. International Mechanical Code (IMC)
   b. Uniform Plumbing Code (UPC)
   c. Oregon specialty plumbing code 2017
   d. NFPA

2. If any conflict arises between the Specifications or codes and ordinances, immediately notify the Architect. Do not deviate from the Drawings and specifications nor install any work which may be in conflict with codes and ordinances until the conflict is resolved and the solution approved by the Architect.

B. Materials: Except as otherwise permitted by specification designation, provide new materials of standard make and current manufacture. Where applicable, conform to ASME, ASTM, NFPA or other requirements and have UL listing. Select equipment to fit space provided.

C. Workmanship: Run piping parallel to building, keep as inconspicuous as possible, and grade evenly. Set equipment plumb and true with easy access for maintenance. Off-set piping as required to provide for proper and necessary clearances. Provide adequate clearances for repair and service of plumbing equipment and valves.

1.3 Submittals

A. Drawings and Calculations: Submit for review in accordance with Section 01 30 00

1. Provide a coordinated set of construction documents ready for permit submission to the building department containing as a minimum the following:
   a. Equipment schedule sheet(s) defining performance characteristics of all items of equipment.
   b. System distribution and equipment location plans drawn at 1/4" = 1'-0" scale. Show on plans evidence of coordination with all other construction trades.
   c. Plumbing equipment room plan's and sections drawn at 1/2" = 1'-0" scale, if feasible.
   d. Miscellaneous details and large-scale plans and sections necessary to show coordination in congested areas.

2. Provide the following calculations for review:
   a. Water distribution pressure drop and sizing tables.
   b. Water Heater Sizing.

B. Submittals before construction begins: Submit for review in accordance with Section 01300

1. Plumbing Fixtures and Trim.

C. Record Drawings: Submit for review in accordance with Section 01780

1. Deviations: Record changes to plumbing systems, including locations, sizes, or arrangement.
2. Location of Concealed Work: Locate accurately to scale and dimension from building features, concealed piping.
3. Location of Valves and Cleanouts: Locate accurately to scale and dimension from building features

1.4 Coordination

A. Maintain qualified supervisory personnel on job to coordinate work and space utilization with other trades involved. Supervisor must be completely familiar with operation and requirements of equipment being installed and be responsible for job during entire construction period. Prior to request for final review, be certain that equipment and controls are functioning properly.

PART 2 - PRODUCTS

2.1 System Performance

A. Plumbing Sizing Criteria:

1. Domestic Water: Size per 2017 Oregon specialty Plumbing Code
   a. 5 psi per 100' drop, 8 f.p.s. maximum velocity for cold water and 5 f.p.s. for hot water in copper pipe as limiting criteria.
   b. 5 psi per 100' drop, 10 f.p.s. maximum velocity for cold water and 10 f.p.s. for hot water in stainless steel pipe as limiting criteria.
2. Domestic Water Booster Pump: Design for maintaining 75 psi discharge.
3. Waste and Vent: Size per 2017 Oregon Specialty Plumbing code.
4. Water Heaters: Size per ASHRAE Guide
   a. Residential Area: Central water heating with manifolded tank type water heaters with re-circulating pump.
   b. Commercial Area: Central water heating system.

2.2 Guarantees

A. Submit a single guarantee stating that all portions of the work are in accordance with Contract requirements. Guarantee all work against faulty and improper material and workmanship for a period of one (1) year from date of substantial completion, except that where guarantees or warranties for longer terms are specified, such longer term to apply within 24 hours after notification, correct any deficiencies which occur during the guarantee period at no additional cost to the Owner, all to the satisfaction of the Owner and Architect.

B. Be responsible for all leaks in all pipes for a period of one (1) year from date of acceptance of work. Repair all such leaks, at no cost to Owner, within 24 hours of notice by the Owner. Repair leaks which occur prior to the completion of this Subcontract at once. Be responsible for any damage caused by such leaks and repair thereof.

2.3 Operation and Maintenance Manuals

A. Provide Operation and Maintenance manuals in accordance with Section 01 78 00. As minimum provide the following.

1. Manufacturer's literature on all items of equipment.
2. Operating and maintenance instructions.
3. Wiring and temperature control diagrams.

PART 3 - EXECUTION

3.1 Building Commissioning

A. Provide startup, test and adjustment of each item of plumbing equipment and of complete system by qualified field personnel.

B. During final review, demonstrate system operation to Owner that each item of equipment is operating as designed, controls react as required to provide proper conditions and that adjusting have been accomplished in accordance with specifications.

END OF SECTION

PART 1 - GENERAL

1.1 General

A. Provide plumbing fixtures with necessary trim, stops, and traps per manufacturer's installation instructions. Provide fittings and faucets by fixture manufacturer per latest catalog description for specified item, or as noted. Exposed trim polished chrome plated brass. Protect against damage before and after installation.

B. Furnish stops with escutcheon plates at sinks, lavatories, water closets, and drinking fountains.

C. Trim to have replaceable and interchangeable assemblies.

D. Hot and cold valves open toward center.

E. Seal inside and around outside edge of floor mounted water closets with Dap and anchor solidly.

F. Prime floor drain trap with Precision Plumbing Products, Inc or equal mechanical primer, tail piece primer. Leave valve accessible for service.

G. Traps: concealed Units use ABS- PVC. For exposed or public use 17 gauge chrome plated brass tube.

H. Install 3/16" x 8" wide steel plates fastened to the studs for support of wall hung lavatories. Plate to extend one stud beyond each side of fixture. Or wood (2x) backing

I. Fixtures to withstand 150 lb. pressure in any direction without displacement. Install firmly fixed blocking in wall for rigid support of fixture supplies.

K. For sink sizes, first dimension is left to right, second dimension is front to back.

1.2 Description

A. Provide material, labor and complete system described and shown.

1.3 Quality Assurance

A. References:

1. American Society for Testing Materials (ASTM) publications:
   a. B32 Solder Metal
   b. B88 Seamless Copper Water Tube
2. National Electrical Manufacturers Association (NEMA)
3. International Conference of Building Officials (ICBO)
4. Underwriters' Laboratories, Incorporated (UL)

B. Materials: Except as otherwise permitted by specification designation, provide new materials of standard make and current manufacture. Where applicable, conform to ASME, ASTM, NFPA or other requirements and have UL listing. Select Equipment to fit space provided.

C. Workmanship: Run piping parallel to building, keep as inconspicuous as possible, and grade evenly. Set equipment plumb and true with easy access for maintenance. Off-set piping as required to provide for proper and necessary clearances. Provide adequate clearances for repair and service of mechanical equipment.

D. Coordination: Maintain qualified supervisory personnel on job to coordinate work and space utilization with other trades involved. Supervisor must be completely familiar with operation and requirements of equipment being installed and be responsible for job during entire construction period. Prior to request for final review, be certain that equipment and controls are functioning properly.

PART 2 - PRODUCTS

2.1 Common Motor Requirements for Plumbing Equipment

A. Electrical Connections

1. Division 26 specifies wiring, provides disconnect switches, mounts starters and makes line voltage connections to equipment furnished under Division 22, unless noted under specific item. Division 26 provides control wiring, except as indicated, to conform with Division 26 wiring methods.

B. Motor Starters

1. Supply three phase electrical equipment and single phase equipment 1/2 HP and over with magnetic starter. Control voltage to be 24 or 120 volt, coordinate with contractor installing controls. Provide internal control transformer if required. Provide hand-off-auto switch on face of enclosure. Furnish one auxiliary interlock per starter if required. Calculate starter heater coil to Class B motor curves and provide with ambient compensation. Provide protection for all three phases on three phase current under a single NEMA enclosure.
2. Provide appropriate enclosure for each starter. Unless otherwise specified, starter for each equipment item exposed to weather to be weatherproof NEMA 4 enclosure.

C. Electrical Characteristics

1. Conform with voltage, phase and current limitations shown on Division 16 drawings. Should equipment approved and furnished under these specifications require additional wiring or electrical service beyond that required by specified equipment, arrange with Division 16 to provide addition at Contractor expense.

2.2 Meters and Gages for Plumbing Piping

2.3 General-Duty Valves for Plumbing Piping

A. Minimum working pressure rating 150 psig W.O.G.

B. Manufacturer: Apollo, Hammond, Jenkins, Milwaukee, Nibco, FNW, Sioux Chief, Red and White or approved equal.

C. General Valve Requirements: Hammond valve numbers given to establish quality.

1. Gate Valve:
   a. Two inch (2") and Smaller: Bronze body, inside screw, rising stem, solid disk wedge, screwed bonnet, No. IB640.
   b. Two and half inch (2½") and Larger: Iron body, bronze trim, rising stem, flanged, No. IR1140.

2. Globe Valve:
   a. Two inch (2") and Smaller: Teflon disc, bronze body, bronze trim, No. IB413. b. Two and a half (2½") and larger: Iron body, bronze trim, bronze disc hot water, Bun-N disc cold water, No. IR116.

3. Check Valve:
   a. One inch (1") and Smaller: Bronze body, horizontal swing, screwed bonnet, renewable disc, No. IB904.
   b. One and a quarter (1¼") and Larger: Iron body, horizontal swing, bolted bonnet, renewable seat and disc, flanged, No. IR1124.
   c. Non-Slam: Wafer style, spring loaded, silent check valve. Hammond IR9253, or Jergens, FNW, Victaulic, Metraflex, Val-matic Watts. Use on pump discharges.

4. Ball Valves: Bubble tight shutoff, seats glass filled teflon to minimize seat cold flow.
   a. One inch (1") and smaller: Full port, 150 psig W.O.G., suitable for 220 F operation, two piece screwed type bronze body, One and a quarter (1¼") and larger: Full port, 150 psig W.O.G., suitable for 220 F operation, two piece screwed type bronze body. Threaded, sweat or Pro Press.

5. Butterfly Valves: Lug type (or grooved ends), ductile iron body, stainless steel disk for 150 psig shutoff, extended neck for insulated pipes.
   a. Four inch (4") and Smaller: EPT O-ring and seat, valve rated for 220 degrees F on heating systems and 200 degrees F all others, locking lever handle, No. 6201- 01/6211-01.
   b. Six inch (6") and larger: EPT O-ring and seat, valve rated for 200 degrees F, manual gear operator with memory stop, No. 6201-01-03/6211-01-03.

6. Drain Valves: Hose end gate valve or gate valve with hose connection. Do not use sillcocks in lieu of drain valves.

2.4 Hangers and Supports for Plumbing Piping and Equipment

A. Piping: Provide galvanized hangers for the pipe supported. Provide copper plated hangers and guides in contact with copper pipe. Provide 16 gauge insulation shield for 4" and larger pipe and 20 gauge for 3" and smaller. Length of the shield 6 times nominal pipe diameter except minimum length 6 inches. Hanger types permitted are as follows:

1. Clevis - for all pipes – Caddy, PHD Manufacturing 450-454.
2. "J" hanger - for all pipes – Caddy, PHD Manufacturing 970-973.
3. Swivel Ring - for non-insulated pipe – Caddy, PHD Manufacturing 141-151.
4. Swivel Ring w/ Shield - for insulated pipes 2" and smaller –Caddy, PHD Manufacturing 155.
5. Riser Clamps - for steel and iron pipe – Caddy, PHD Manufacturing 550, for copper pipe caddy, - PHD Manufacturing 552 and 554.
6. Pipe Rolls – Caddy, PHD Manufacturing 490, provide pipe covering protection saddles for 1-1/2 inch and larger insulated pipe at each roll – Caddy, PHD Manufacturing 651.
7. Pipe Guide – Caddy, PHD Manufacturing 670-678.
8. Pipe Anchors - Flexonics AC Series or Fee & Mason Fig. 140 welded to pipe.
9. Beam clamps – caddy, PHD Manufacturing 350 and 360.

B. Trapeze support systems: Hot rolled steel channel with electrogalvanized finish, clips, fasteners, and clamps with matching finish by same manufacturer.

2.5 Identification for Plumbing Piping

A. Valves: Provide numbered brass disc attached to each valve. Valve numbers in separate series for each section of specification.

B. Equipment: Provide name plates of black phenolic resin with white 1/2" high letters attached to or adjacent to each piece of equipment including but not limited to the following: pumps, starters, and switches. Do not use marking pen or Dymo.

C. Piping: Band all piping with heat resistant adhesive backed PVC material, width, frequency, color and lettering to conform to ANSI A13.1. Indicate fluid in piping and direction of flow. Provide in mechanical, fan and storage rooms and exposed in other finished areas at each valve, each change of direction, 20 feet apart on straight runs and at locations where piping enters or leaves space. In concealed areas band at valves, pipe junctions and 40 feet apart on straight runs.

PART 3 - EXECUTION

3.1 General

A. Install fixtures in accord with manufacturer's instructions.

B. Clean and flush traps. Thoroughly clean fixture surfaces with a non-abrasive cleanser.

3.2 Pipe supports

A. Locate hangers, supports, and accessories to support pipelines, valves, and additional concentrated loads.

B. Single Pipes: Support horizontal runs of steel, copper pipe under 2" and cast-iron soil pipe on suitable hangers spaced at not more than 5 feet on centers. Support all steel and copper piping 2" and larger at not more than 10 feet on centers.

1. Independently support piping at equipment, such as duct mounted coils, so that no weight is supported by equipment.
2. Do not spring or bend pipe to fit conditions or to make up joints.

Support piping in manner to prevent binding, undue swing, and transmission of vibration to structure. Provide sway bracing where hanger rods are longer than 12" and at maximum spacing of 40 feet.

3. Install minimum of one hanger or brace within two (2) feet from each change of direction in piping.

C. Trapeze Hangers: Where pipes are clustered, parallel, and in same plane, support by trapeze hangers. Provide rods and channel sized to suit load imposed.

3.3 Sleeves

A. Provide sleeves where pipes pass through walls, floors, or ceilings. Make sleeves as follows:

1. In bearing walls, foundations, masonry or concrete walls and slabs, use schedule 40 black steel pipe poured in place or plastic schedule 40 pipe.

B. Waterproof sleeves through building exterior skin, including walls, floors and roofs, to prevent leakage.

C. Size sleeves for insulated piping to allow continuous insulation through sleeve.

D. Where sleeves pass through fire rated assemblies:

1. Pack annular space between pipe and sleeve with intumescent material capable of expanding up to 8 to 10 times when exposed to 250 degrees F temperature or higher, UL classified with I.C.B.O., B.O.C.A.I., and S.B.C.C.I. (NRB 243) approved ratings to 3 hours per ASTM E814 (UL1479).
2. Acceptable material: Hilti, 3M Fire Barrier Caulk, Putty, Strip and Sheet, or Dow Corning fire stop equivalent putty No. 2000 and 2001 foam. Install escutcheon at exposed penetrations to cover sleeve and spacing sealant.

3.4 Typical Piping

A. Provide clear flow dielectric waterway couplings to prevent electrolysis between dissimilar metals, when use of dissimilar metals cannot be avoided in one system.

B. Close openings in pipes with appropriate caps, plugs, or covers during storage and progress of work to preclude introduction of contaminants.

C. Slope pipelines and provide low point drains for piping and equipment.

D. Provide valves and unions adjacent to tanks, batteries of plumbing fixtures and equipment, for disconnect purposes. Install valves with stems vertical wherever possible, and in no case with stems below horizontal.

E. Provide ball valve and check valve on cold water supply to domestic water make-up connections.

F. Ream ends of pipe to full diameter.

G. Provide pipe anchors, swing joints, and expansion compensators as required to control expansion of pipelines.

H. Reduce pipe sizes using reducing tees or reducing fittings.

I. Provide escutcheons on pipes passing through walls, floors, and ceilings in finished areas and where piping is in counters, closets, or cabinets, and subject to view when doors are open. Cover pipe sleeve and secure plate in position.

J. Testing:

1. Test all piping to a pressure equal to 1.5 times the working pressure of the system. Hold test pressure for minimum of 4 hours without leakage, as required by local jurisdiction.
2. Leave piping exposed (unconcealed) for observation during testing. Expose any work that was covered or concealed before testing for the duration of the testing period.
3. Repair leaks & defects discovered during testing with new material and re-test until satisfactory results are obtained.
4. Testing of portions of the entire system is permitted provided clear documentation is included with the test reports showing the extent of the piping under test.

3.5 Threaded Pipe

A. Cut threads true and of depth of make up properly without leaks.

B. Make connections to show at least two threads and not more than four threads when tight.

C. Make up joints with Teflon tape only for domestic water as recommended by tape manufacturer, or as specified for individual piping systems.

D. Use approved type pipe compound for gas and oil piping.

3.6 Cleaning

A. Clean exposed, uninsulated piping to remove shipping labels, flux, solder drips, pipe dope, dirt, oil, loose scale or other contaminants.

B. Thoroughly flush out and clean each piping system. Be aware of obstructions in piping, such as flow control valves, strainers, etc., during cleaning process. Make provisions to handle these items using by-passes, back-flushing, leaving equipment out and installing temporary connections until piping is clean or whatever is required to accomplish complete cleaning.

3.7 Lubrication

A. Lubricate equipment properly per manufacturer's recommendations prior to operating and placing in service.

3.8 Sanitize Plumbing Piping

A. Thoroughly sterilize entire domestic water system with solution containing not less than 200 parts per million of available chlorine. Introduce chlorinating

materials into system in an approved manner. Allow sterilization solution to remain in system for period of 3 hours, during which time open and close valves and faucets several times. After sterilization, flush solution from system with clean water until the residual chlorine content is not greater than 0.2 parts per million. Provide certificate of test results from Abby Labs, or equal.

3.9 Special requirements for Pipe in Fire Resistive Construction:

A. The plumbing system piping must not compromise the fire resistive rating of the construction where installed. Provide fire stopping materials at each membrane or through penetration that is UL-Listed for the specific application and tested in accordance with ASTM E 814 & ASTM E 119. Whereever possible use the same manufacturer of fire stopping products as used under Section 078400 by the General Contractor.

B. Penetrations

1. Protect with fire stop systems installed as tested in accordance with ASTM E 119 or ASTM E 814 with a minimum positive pressure differential of 0.01 inches of water column.
2. Provide systems with F rating of 1 hour or higher to match assembly's rating.
3. For floor assembly penetrations not within wall cavity or not in direct contract with combustible materials, provide systems with T rating of 1 hour or higher to match assembly's rating.

C. Insulation and Coverings can only be continuous through the penetration if the UL-Listing of the system used is tested for that insulation and covering.

D. Securely fasten sleeves to fire resistant construction where used and fire stop inside (sleeve to pipe) and outside (sleeve to construction) of the sleeve.

E. Combustible to Non-Combustible piping connections within assemblies are prohibited unless transition complies with the requirements of the assemblies UL-Listing.

F. Before concealing any installations arrange for inspection from the Authority Having Jurisdiction. Authority Having Jurisdiction will determine the size of samples to be inspected and the number of installations for destructive testing (repair at no additional cost to Owner). Provide manufacturer's literature and documentation to Inspector for review at project site.

END OF SECTION

PART 1 - GENERAL

1.1 Description

A. This section describes specific requirements, products and methods of execution relating to insulation pipes and other surfaces of plumbing systems installation.

B. Provide skilled applicators directly employed and supervised by firm specializing in this type of work.

PART 2 - PRODUCTS

2.1 Fire Rating of Materials

A. Provide insulation products used aboveground in building with burning characteristics not to exceed following, rated according to NFPA 255-1972 "Methods of Test of Surface Burning Characteristics of Building Materials": Flame Spread 25, Fuel Contributed 50, Smoke Developed 50.

B. Insulation specified for use underground and aboveground away from building, might have other burning characteristics. Use such products only where specifically required.

2.2 Insulation

A. Domestic cold main line and hot water mainlines

1. Sectional glass fiber insulation, thickness as listed below, having thermal conductivity of not over 0.27 at 100°F. Provide white universal vapor barrier jacket with sealing lap.
2. Closed cell “TUBOLIT” polyolefin (polyethylene) foam insulation designed for service between -165°F and +210°F with a thermal conductivity of 0.24 at 75°F, U.V. stabilized, and suitable for direct burial underground without special protection.
3. Armaflex Tubolit

B. Schedule

1. Cold water mainlines: ½” wall insulation (closed cell foam or Fiberglass)
2. Hot water mainlines: 1” wall for 2” and smaller, 2 ½” and larger 1 ½” wall (closed cell foam or fiberglass)
3. PEX: No insulation on all runouts, and any non-recirculated hot water.

C. ADA Insulation:

1. At plumbing piping exposed under Lavatories, insulate the exposed piping and traps with product specifically designed for this application meeting ADA requirements. Provide Handi-Lav Guard or equivalent. Offset p-traps to clear wheelchair access.

PART 3 - EXECUTION

3.1 General

A. Piping:

1. Seal to hanger inserts and to wall, ceiling or floor inserts.
2. Sectional Insulation. Jacket as specified. Neatly apply insulation with joint on top or back of piping. Butt insulation tightly at all side and end joints and at sleeves. Seal longitudinal jacket laps and butt strips smoothly with Benjamin Foster 85-20 or self-seal adhesive. For vapor barrier jacket, seal terminations with Benjamin Foster 30-35.
3. Seal around each joint of all exterior metal jacketed pipe with silicone mastic.

B. Fittings:

1. Plastic fitting covers, Zeston or equal.
2. Miter joints with Mastic coating to seal joint.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes:
   1. Equipment nameplates.
   2. Access panel and door markers.
   3. Pipe markers.
   4. Stencils.
   5. Valve tags.
   6. Valve schedules.

QUALITY ASSURANCE

B. Quality Standard for Piping Identification: ASME A13.1.

1.2 PRODUCTS

A. Equipment Nameplates: Engraved or stamped metal or phenolic-resin laminate.
B. Equipment Markers: Engraved laminated plastic.
C. Equipment Signs: Engraved, phenolic-resin laminate.
D. Access Panel and Door Markers: Engraved laminated.
E. Plastic: Pipe Markers & Plastic tape.
F. Stencils: Metal or fiberboard.
G. Valve Tags: Engraved plastic or stamped metal

1.3 MANUFACTURES

A. Seton
B. Marking Systems Inc.
C. Other Manufactures: Submit substitution request.

PART 2 - EXECUTION

2 Valve Tags

A. Attach to valve with a brass chain
B. Continuous valve tag numbers throughout the building for each system involved
C. Match to a valve chart to be provide with O&M

2.2 Pipe Markers

A. Every 20 feet along continuous exposed runs
B. Every 10 feet along continuous concealed runs
C. Adjacent to each valve
D. On either side of walls or where pipe passes through concealed spaces
E. On each riser
F. On each leg of a tee.

2.3 Nameplates

A. Tag water heaters, pumps, mixing valves and expansion tanks.

END OF SECTION

PART 1 - GENERAL

1.1 Description
A. Provide following material.

1.2 Submittals
A. Manufacturer's Literature:
1. Catalog data and illustrations.
2. Pump capacity curves of selected pumps with pump operating point marked on curve.
3. Dimensions, materials, construction details.

1.3 Acceptable Manufacturers
A. Expansion Tanks: Amtrol, Watts or approved equal.
B. Mixing Valves: Lawler, Leonard, Powers, Symmons, Watts
C. Hot Water Re-circulation Pump: Bell & Gossett, Grundfos, Taco.
D. Elevator Pit Sump Pump: Liberty, Meyers, Zoeller, Paco, Peabody Barnes, Peerless, Weil.

PART 2 - PRODUCTS

2.1 Domestic Water Piping
A. Underground Domestic Water service to building:
1. Type K copper.
2. Ductile Iron with Mega lug fittings.
B. Domestic Water mainlines above grade
1. Copper Type L for mainlines larger than 2" in diameter
2. 316 Stainless Steel with Viega Press Fittings for mainlines larger than 2" in diameter
3. Pipe - Polyethylene tube with cross-linked molecular network structure per ASTM F876 & F877 with 100 psi rating at 180°F
a. AQUAPEX by Uponor, Inc. for mainlines 2" in diameter and smaller. Pex A supports can be used to increase support spacing.
5. Solder - Tin/Antimony, ASTM B32.
6. Use clearflow dielectric waterway joints between copper and steel piping.
C. Domestic Water branch piping:
1. Pipe - Polyethylene tube with cross-linked molecular network structure per ASTM F876 & F877 with 100 psi rating at 180°F
a. AQUAPEX by Uponor, Inc. Pex A supports can be used to increase support spacing. Piping installed in PT concrete deck will be in a manufactured sleeve system from Uponor, Inc.
3. Fittings – EP ProPex or Brass fittings As a system compatible with tube's manufacturer
(don't mix & match fittings and compression rings.)
a. AQUAPEX: ASTM F1960 EP engineered plastic or Brass fitting with PEX ring using expansion tool. ProPEX EP by Uponor.
4. Pex stubouts ends for Stop Valves: use metal insert for compression angle stops, or F1960 connection angle stop.

2.2 Domestic Water Piping Specialties
A. Backflow Prevention Valves
1. All devices per the requirements of USC Foundations for Cross Connection Control and Hydraulic Research, Tenth Edition.
2. Unit to be tested after installation by State certified personnel and record filed with the State within 10 days.
3. Provide gate valve on each side for isolation and appurtenances for testing pressure variations necessary across unit to assure necessary protection.

a. Double Check Valve:
(1) Double check valve backflow prevention device incorporating two or more check valves.

b. Double Detector Check:
(1) Double check valve backflow prevention device incorporating two or more check valves.
(2) By-pass line with double check valve and water meter.

c. Reduced Pressure Backflow Preventer:
(1) Reduced pressure principle backflow prevention device incorporating two or more check valves, automatically operating differential relief valve located between two check valves and air gap drain funnel for relief. Pipe to floor drain full size.
(2) Install so relief line is not trapped and line discharge is 12" minimum above grade or gravity drained area. In all cases line discharges through air gap to hub.

B. Strainers

1. "Y" pattern strainer, unless noted otherwise, provide with:
a. Removable cover and corrosion resisting sediment basket not less than 0.025" thick with total area of perforations 3.3 times cross-sectional area of pipe. Screen must be accessible without removing the strainer from the line.
b. Provide strainer with 1/16" holes for water service, 1/32" for steam service.
c. Provide blow-down with nipple and ball valve on all strainers over 2" size.
2. Bronze Body: ASTM B584 or B62 bronze Body with threaded or solder end connections.
a. Threaded: Hammond 3010, NIBCO® T-221-A, Watts 777
b. Solder: Hammond 3040, NIBCO® S-221-A, Watts S777
3. Iron Body: ASTM A126 Body & Bonnet.
a. Strainers 3 inch and smaller: Class 250 threaded, tapped screw-in bonnet with plug and stainless steel screen. Hammond 3020, NIBCO® T-751-A, Watts 77S
b. Strainers 2-1/2 inch and larger: Class 125 flanged, tapped bolted bonnet with plug and stainless steel screen. Hammond 3030, NIBCO® F-721-A, Watts 77F- DI

C. Mixing Valves
1. High-low assembly with wall support, two bronze body thermostatic mixing valves, temperature limit stops, integral check valves, outlet ball valves, ±3°F temperature control, 60 to 140°F temperature range adjustment, color-coded dial thermometer, 1 gpm minimum flow. OR USE THIS DESCRIPTION: Bronze body thermostatic mixing valve with union connections, integral check valves, stainless steel disk & springs, locking adjustable cap, ±3°F temperature control, and 60 to 120°F temperature range adjustment with flows as low as 0.5 gpm.
2. Size valve to not exceed pressure drop listed in equipment schedule.
3. See Plumbing Equipment Schedule on drawing for designator, model and capacity.

2.3 Water Hammer Arresters
A. Barrel fabricated type “K” hard drawn copper tube with piston or Bellow type, “O” ring seals, and pre-charged with air. Precision Plumbing Products, Inc., Sioux

Chief, or approved.

2.4 Domestic Water Pumps (if required)

A. Water Booster Pump with VFD, Duplex or Triplex.

1. Single package unit with 2-3 pumps, control panel, flow sensor, check valves, pressure sensor, and variable frequency drive.
2. Pump: Centrifugal type pump with brass or bronze impeller and corrosion resistant alloy steel impeller shaft or stainless steel fitted pump. Balance pump statically and dynamically at operating speed. Motor with oil lubricated bronze sleeve bearings. Below 1/2 HP provide with built-in thermal overload protection.
3. Control Panel: UL listed with HOA switch, pump disconnect, magnetic starter, battery backed-up programmable controller, and alarm indicators.
4. Bell & Gossett, PACO, Flow Therm, Grundfos, QuantumFlo or approved.

B. Hot Water Re-Circulation Pump

Bronze, in-line centrifugal pump, water lubricated, for domestic hot water. Provide with ball isolation valves at inlet and outlet or pump.

1. Bell & Gossett, Grundfos, Taco.

2.5 Drain, Waste, Vent Piping, Storm piping.

1. ABS 6" and smaller- PVC 8" and larger: all piping below slab, all garage piping and all vent piping.
3. Cast Iron: N/A
4. Pipe and fittings – service weight hubless cast iron soil pipe and fittings bearing the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International. Joints - Neoprene gaskets and stainless steel clamp-and-shield assemblies.
5. Pumped Waste - Galvanized, standard weight, steel pipe for 125 psi service meeting ASTM A53. Fittings - galvanized banded, malleable iron, screwed. As an option grooved end galvanized pipe and fittings with appropriate gasket, ABS pipe is approved too.
5. Pipe and fittings: Acrylonitrile-Butadiene-Styrene (ABS) Plastic drain, waste, and vent meeting ASTM D2661 or F628 for 6" and smaller. PVC- for 8" and larger.
6. Provide tracer wire 1' above all underground waste and sewer lines outside building.

2.6 Pumped Waste Piping

1. Galvanized, standard weight, steel pipe for 125 psi service meeting ASTM A53. Fittings - galvanized banded, malleable iron, screwed. As an option grooved end galvanized pipe and fittings with appropriate gasket, ABS pipe is approved too.
2. PVC Schedule 80 – Pipe shall be pipe size (IPS) conforming to ASTM D 1785. Fittings shall be injection molded conforming to ASTM D 2467. Pipe and fittings shall be from one manufacture. All pipe and fitting shall be manufactured in the United States and shall conform to NSF International Standard 61 and the health affects portion of NSF standard 14.

2.7 Waste Piping Specialties

A. Cleanouts

1. Provide cleanouts where shown or required by Code as follows:
   a. In floors, Sioux Chief, Watts, JR Smith.
   b. In walls of finished spaces, chrome finish.
   c. In exterior planting and paved areas, place cover plate flush with surrounding surface.

2.8 Waste Pumps

A. Elevator Pit Sump Pump

1. Submersible sump pump with self-contained level controls.
2. Motor housing of molded high impact resistant material. Cast iron pump body and bottom plate. Abrasion resistant impeller. Mechanical shaft seal of ceramic seat and carbon rotating element operating in oil. Oil-filled motor in water proof, hermetically sealed housing. Automatic, solid state level control switch.

2.8. Natural Gas piping

A. Pipe and fittings

1. Black iron schedule 40 pipe, CSST flex pipe, buried pipe to be Poly pipe
2. Fittings to be threaded, welded, or MegaPress for the black iron pipe. Fittings for the CSST and Poly pipe to be part of that system.

2.9. Emergency Generator piping

A. Vents and fuel fill line.

1. Black iron schedule 40 pipe
2. Fittings to be threaded for exposed joints in the generator room, welded for all piping outside the generator room or covered in the walls, ceilings.

PART 3 - EXECUTION

3.1 Installation

A. Install per IAPMO installation standards. Install piping where shown on plans. See details for specifics. Verify that system flow direction and pump flow direction are compatible.

END OF SECTION

PART 1 - GENERAL

1.1 Acceptable Manufacturers

A. Water Heaters, Tank Type: A.O. Smith, American, State, Bradford-White, Lochinvar, PVI, Rheem/Ruud, SuperStor.

B. Water Heaters, Instantaneous Type: Chronomite, Eemax, Hot Aqua, Intellihot.

C. Expansion Tanks: Amtrol, Watts, Proflo or approved equal.

PART 2 - PRODUCTS

2.1 Electric Domestic Water Heaters

A. Water Heater

1. Automatic electric water heater constructed of glass lined steel tank. Complete with anode, pressure and temperature relief valve and hose thread drain cock.
2. Provide dual top and bottom heating elements and thermostat. Heating elements and thermostats replaceable. Thermostat setting range 105 to 150 degree minimum.
3. Provide fiber glass tank insulation meeting latest ASHRAE standards for thermal efficiency. Provide enameled steel jacket cover over insulation. See drawings for tank capacity and wattage.
4. See Plumbing Equipment Schedule on drawing for designator, model and capacity.

2.2 Fuel-fired Domestic Water Heaters

A. High efficiency water heater

1. Gas fired water heater with 94% thermal efficiency and design for PVC flue vent and sealed combustion.
2. Provide with self-diagnostic electronic control featuring digital read out of water set point and differential.
3. Provide with stainless steel tank (or steel with glass lining and magnesium anode), temperature pressure relief, and hose bibb drain. Provide with baked enamel steel outer jacket with insulation meeting ASHRAE Standard 90.1b-1992.
4. Provide with standard manufacturer's warranty.
5. See Plumbing Equipment Schedule on drawing for designator, model and capacity.

PART 3 - EXECUTION

3.1 Installation

A. Install where indicated per manufacturer's installation instructions and recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 Acceptable Manufacturers (See approved Submittals for fixture details)

A. Faucets: Delta, Peerless, Moen, Symmons or approved equal.

B. Lavatories: Gerber, Proflo, Kohler, American Standard or approved equal.

C. Sinks, Stainless Steel: Elkay, Just, Moen or approved equal.

D. Bath/Shower Enclosures, Fiberglass: Fibercare, Everfab, Sterling, Kohler, American Standard or approved equal.

E. Bath/Shower Controls: Delta, Peerless, Moen, Symmons or approved equal.

F. Toilets: Kohler, American Standard, Gerber, Prflo, Sloan or approved equal.

G. Toilet Seats: Bemis, Olsonite

H. Washer Supply & Outlets: Sioux Chief.

I. Hose Bibbs: Jay R. Smith, Woodford, Zurn, Prier

J. Insulation Kits: Truebro, McGuire, Plumberex, Zurn.

K. Emergency Fixtures: Encon, Guardian, Haws.

L. Stops: Brasscraft, Uponor or equal, compression or F1960 connections.

M. Drainage Products: Sioux Chief, Jay R. Smith, JRS, Watts, Zurn, GON.

N. Flush valves: Delany, Sloan, Zurn, American Standard

O. Mixing Valves: Watts, Powers, Symmons, Leonard

PART 2 - PRODUCTS

2.1 Plumbing Fixtures: Reference interior drawings for specific make and models as well as the final approved submittal.

PART 3 - EXECUTION

3.1 General

A. Install fixtures in accord with manufacturer's instructions.

B. Clean and flush traps: clean and flush to ensure clear flow.

C. Cleanouts: provide where shown or required. Cover should be flush with floor or finished surface.

D. Water Supplies: Where both hot and cold water is required at a fixture, connect the hot to the left side and the cold to the right.

E. Water Hammer Arresters: Provide here shown and where required by the local code.

F. Mixing Valves: Provide at tub fill valves and public use lavatories and where required per OPSC (Oregon Uniform Specialty Code).

G. Priming Valves: Provide for floor drains, floor sinks, hub drains and similar traps. PPP, Sioux Chief or approved equal.

3.2 Sanitize Plumbing Piping

A. Thoroughly sterilize entire domestic water system with solution containing not less than 200 parts per million of available chlorine. Introduce chlorinating materials into system in an approved manner. Allow sterilization solution to remain in system for period of 3 hours, during which time open and close valves and faucets several times. After sterilization, flush solution from system with clean water until the residual chlorine content is not greater than 0.2 parts per million. Provide test results from Abby Lab or equivalent.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION / SUMMARY

A. This section provides information for the preparation and submission of operation and maintenance manuals.

B. Each section included in Division 23 incorporates this section by reference and is incomplete without the provisions stated herein.

1.02 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Section 23 05 00 – Common Work Results for HVAC

C. Section 23 05 93 – Testing, Adjusting, and Balancing HVAC

D. Section 23 33 00 – Air Duct Accessories

E. Section 23 34 00 – HVAC Fans

F. Section 23 41 00 – Particulate Air Filtration

G. Section 23 81 00 – Decentralized Unitary Air Conditioner Units

H. Section 23 81 26 – Split System Air Conditioners and Heat Pumps

1.03 PREPARATION

A. Furnish [insert quantity] copies of complete operation and maintenance instructions, service manuals, and parts list applicable to each manufactured item furnished. Bind operation and maintenance information in [insert quantity] separate loose-leaf binders and deliver to the Owner / General Contractor prior to substantial completion of the project.

B. Organize binders to contain like equipment such as pumps, piping, valves or air handlers, terminal boxes, condensers, etc., in separate sections. Provide a complete index for each binder containing an itemized list of the products by section.

C. For each section of product / equipment section, organize the data as follows:
   1. Furnish the equipment submittals containing technical data with design parameters, ratings, capacity, and other characteristics.
   2. Furnish the manufacturer Installation, Operation, and Maintenance manual(s) (IOM).
   3. Furnish suggested maintenance schedules, materials, and methods if not included in the IOM.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION / SUMMARY

A. The Bidding, General, and Supplementary components of this project specification section as noted apply to the work specified in Mechanical Division 23 which encompasses Sections 23 05 00 through 23 84 00 as applicable.

B. This Section 23 05 00 applies to all sections of Mechanical Division 23

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract Documents.

1.3 SCOPE

A. It is the intent of these specifications and the accompanying documents to describe complete mechanical system installations for all building areas, new and renovation, as applicable to the project.

B. Furnish and install all material, labor, and equipment in accordance with these documents.

C. Include all incidental items and work not specifically shown or specified by required by good practice in a complete system.

D. The drawings and specifications are complementary. What is called for in one shall be called for in both.

E. The drawings are diagrammatic but should be followed as closely as possible. Where required by jobsite conditions, relocate and provide materials, etc. as required. Provide an allowance in the contract to furnish additional materials required for coordination with structure and other construction trades.

1.4 DEFINITIONS

A. Or approved equal: Requires approval prior to bid date.

B. Indicated:
   1. The term "indicated" is a cross reference to details, notes, or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the Contract Documents.
   2. Where terms such as "shown," "noted," "scheduled," and "specified" are used instead of "indicated," it is for the purpose of helping the reader locate the cross reference, and no limitation of location is intended except as specifically noted.

C. Directed, Requested, Etc.
   1. Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Engineer," "requested by the Architect," etc. However, no such implied meaning will be interpreted to extend the Engineer or Architect's responsibility into the Contractor's area of construction supervision.

D. Approved:
   1. Where used in conjunction with the Engineer and Architect's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Engineer or Architect's responsibilities and duties as specified in the General and Supplementary Conditions.
   2. In no case will "approval" by the Engineer or Architect be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.

E. Provide: The term "provide" means to furnish and install a complete, ready, and operational system or component for the intended use.

1.5 STANDARDS AND CODES

A. Provide all equipment and material and perform all work in accordance with all applicable local, state and national codes and regulations.

B. For work on this project, comply with appropriate standards published by the following:
1. AMCA - Air Movement and Control Association.
2. ANSI - American National Standards Institute.
3. AHRI Air-Conditioning, Heating, and Refrigeration Institute.
4. ASA - Acoustical Society of America.
5. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
6. ASME - American Society of Mechanical Engineers.
7. ASTM - American Society for Testing and Materials.
8. I=B=R - Institute of Boiler and Radiator Manufacturers.
9. NEBB - National Environmental Balancing Bureau.
10. NEMA - National Electrical Manufacturers Association.
11. NFPA - National Fire Protection Association.
12. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association.
13. UL - Underwriters' Laboratories.

1.6 APPROVAL OF EQUIPMENT AND MATERIALS

A. Manufacturer's trade names, catalog numbers and material specifications used in this specification are intended to establish the quality of equipment or materials expected. Materials and manufacturers not listed require approval prior to acceptance.

B. Approval of substitute equipment or materials will be based upon performance, quality and other factors deemed important by the Engineer. The Contractor will be responsible for making all changes in this and other associated work required as a result of the substitution. Additional or modified structural calculations and roof penetrations required to accommodate the substitution will be the responsibility of the contractor.

1.7 SUBMITTALS

A. Transmit [insert quantity] sets of submittals to the Architect for review. The submittals shall be bound in three-ring binders, have major topic tabs and an index. In order to expedite approval of certain items, it is not necessary to transmit complete submittals initially. The initial transmittal will include the binder, expected tabs and an index indicating which items are included, the date each is transmitted, and which items are yet to be transmitted. Future transmittals shall include a revised index. Submittal items larger than 8 1/2" x 11 shall be a reproducible tracing.

B. Furnish performance data and technical information on all materials and equipment to be used on the project.

C. Include shop drawings with the submittals where necessary to determine clearance, where the Contractor proposes alternate equipment or material arrangements, and when requested by the Engineer, Architect, or General Contractor.

D. Items transmitted for approval must be received and approved prior to construction. All materials and equipment must be approved by the Engineer prior to installation or use.

1.8 QUALITY ASSURANCE

A. Maintain the highest standards of workmanship throughout the project.

B. Use the latest editions of applicable and specifically referenced standards.

C. Inspect all material and equipment upon arrival at the site and return any which is not in new condition.

D. WARRANTY
   1. Provide one year parts and labor warranty for all equipment, materials, and services included.
   2. Warranty is contingent on proper maintenance in accordance with the manufacturers Installation, Operation, and Maintenance manual and other industry standard practice.
   3. Extended parts warranties may be included by the manufacturer; refer to submittals, contract, and other project documents for additional information.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Receive all material and equipment at the jobsite or shop.

B. Use proper and sufficient equipment to handle all products employed in the project.

C. Where storage of material or equipment is necessary, maintain a clean and weatherproof area. Seal any openings and cover the product to assure that there will be no corrosion or foreign matter introduced. Assure that it will be in new condition when placed in service.

D. Protect all work, material and equipment from loss or damage until the Owner accepts the project.

E. As the work progresses, keep all equipment covered and cap all ducts and piping that may temporarily be left unconnected.

F. Notify all other trades of any required precautions necessary to protect the work.

3.2 EXAMINATION / PREPERATION

A. COORDINATION
   1. Cooperate with other trades to assure that construction proceeds in an orderly and timely manner.
   2. Study the new and existing architectural, structural, electrical, shop and any specialty drawings as appropriate and specifications to determine required coordination.
   3. Prepare detailed shop drawings where necessary to assure proper fit and necessary clearance.
   4. Refer to electrical drawings to verify voltage and phase of mechanical equipment

B. PERMITS, FEES, AND INSPECTIONS
   1. Schedule any required inspections.

C. MATERIALS AND WORKMANSHIP
   1. Furnish all materials and equipment in new condition, free from defects. Provide size, make, type and quality specified. Installation shall be completed in a neat and workmanlike manner.

D. MEASUREMENTS
   1. Take all measurements from reference datum's established by the General Contractor.

3.3 INSTALLATION

A. EQUIPMENT / MATERIALS / ACCESSORIES
   1. Install all equipment in accordance with the manufacturer's instructions unless otherwise indicated and approved.
   2. The drawings in general are based upon one of the specific manufacturers listed for a particular equipment item. Installation of other specified or approved manufacturer's equipment may require deviation from the drawings to properly install the product. Complete installation in accordance with the manufacturer's recommendations to provide the system results required.
   3. Where the installation shown or specified is contrary to the manufacturer's instructions, advise the Architect in writing of the differences before proceeding with the installation.
   4. Provide supports for all apparatus as specified, detailed, and required by the manufacturers of specific equipment and the project governing code authorities. Anchor all roof equipment with size and spacing of anchor bolts as recommended by the respective equipment manufacturer. Provide seismic restraint details and calculations as required.
   5. Maintain a copy of the manufacturer's installation instructions at the jobsite for all equipment.

B. ACCESSIBILITY
   1. Provide convenient access to all equipment requiring periodic service or maintenance.

C. FIRESTOPPING PENETRATIONS IN FIRE-RATED WALL/FLOOR ASSEMBLIES
   1. Contractors shall provide sizing for coordination of cutting, coring, or patching of penetration openings
   2. All penetrations in fire rated assemblies shall be appropriately fire-stopped in accordance with listed UL Through Penetration Details or alternate method approved by the authority having jurisdiction.

D. CLEANING
   1. Maintain premises and public properties free from accumulations of waste, debris and rubbish during construction.
   2. Clean all mechanical equipment and components of dust, grease, iron cuttings, unnecessary stamps or shipping labels, etc.
   3. Touch up factory-painted surfaces, as necessary, with paint of matching color.

3.4 START-UP

A. Equipment start-up shall be performed by factory trained or otherwise qualified technicians.

B. Start-up forms shall be completed for each piece of equipment and at a minimum shall include:
   1. Nameplate Identification and Performance Data
   2. Electrical Voltage, Phase, and Amperage
   3. Design Data and Operation Setpoints
   4. Notes of conditions relevant to start-up and operation of the equipment

C. Refer to each equipment specification section for additional requirements.

3.5 DEMONSTRATION / TRAINING

A. Schedule a meeting between the Contractor's representative and the Owner for the purpose of reviewing operation and maintenance of the building mechanical systems. The Contractor's representative shall be well qualified and knowledgeable of the systems in this facility.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Section includes hangers and supports for mechanical system piping, ductwork, and equipment.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract
B. Common Work Results for HVAC, Section 23 05 00.
C. Expansion Fittings and Loops for HVAC Piping, Section 23 05 16
D. Vibration and Seismic Controls for HVAC Piping and Equipment, Section 23 05 48
E. Refrigerant Piping, Section 23 23 00
F. HVAC Ducts and Casings, Section 23 31 00
G. HVAC Fans, Section 23 34 00
H. Packaged Outdoor Units, Section 23 74 00
I. Split System Air Conditioners and Heat Pumps, Section 23 81 26
J. Decentralized Unitary Air Conditioner Units Section 23 81 00

1.3 PUBLICATIONS / REFERENCES

A. AWS D1.1, Structural Welding Code – Steel
B. ASME BPVC, ASME Boiler and Pressure Vessel Code
C. 2012 ASHRAE Handbook, Systems and Equipment

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00
B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.
   2. Indicate service for each type of hanger.
   3. Submit literature or describe duct supporting method.

1.5 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Weld Code – Steel."
B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. M-CO, Grinnell, Super Strut, Anvil International, Michigan Hanger, B-Line, and approved alternate

2.2 MINIMUM REQUIREMENTS

A. PIPE ATTACHMENTS:
   1. Non-insulated copper pipe: Provide dielectric protection where ferrous hangers or supports are used.
   2. Plastic pipe: Compression attachment
   3. Riser clamp, copper pipe: Provide dielectric protection where ferrous clamps are used.

B. Structural Attachments: Provide all necessary structural attachments such as concrete anchors, beam clamps, hanger flanges and brackets, Hangers shall not be suspended from other piping, equipment, etc.

C. Miscellaneous items such as hanger rod, rod couplings, turnbuckles, etc. shall be accounted for and compatible with the piping system.

2.3 VIBRATION ISOLATORS

A. Vibration isolators shall be provided near outdoor equipment to prevent transmittance to the building piping system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide hangers and supports in accordance with the instructions furnished by the manufacturers of these devices. Support ductwork as required by the UMC, OMSC, and per SMACNA recommendations.

B. For horizontal piping install pipe hangers with maximum hanger spacing and maximum hanger rods as recommended in the 2012 edition of the ASHRAE Handbook, Systems and Equipment Chapter 46. Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components.

C. Horizontal banks of piping may be supported on a common steel channel strut member spaced not more than the shortest allowable span required on the individual pipe. Piping to be maintained at these relative lateral positions using clamps, slips or free to roll axially or slide using an insulated protector at all points of support for insulated lines.

D. Provide additional structural members where required to support piping or ductwork.

E. Provide hangers and support devices in accordance with the equipment manufacturer's instructions for all equipment.

F. Provide seismic bracing and supports per the Oregon Structural Specialty Code and SMACNA Seismic Restraint Manual Guidelines as required by the governing jurisdiction. Provide seismic restraint details and calculations as required by the governing code jurisdiction.

G. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Identification systems for mechanical equipment and piping.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

Common Work Results for HVAC, Section 23 05 00

B. Metal Ductwork, Section 23 31 13

C. Fans, Section 23 34 10

1.3 PUBLICATIONS / REFERENCES

A. ANSI A 13.1, Standard for Piping Identification

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. List of proposed equipment tags
   2. Product information on piping markers

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. W.H. Brady Co, Seton, Rowmark, Hanply, or Approved Alternate

2.2 MINIMUM REQUIREMENTS

A. Equipment Identification: Equipment identification tags shall be three ply, white center, black face plastic plates with ½" high letters.

PART 3 - EXECUTION

3.1 EXAMINATION / PREPERATION

A. Review identification markings for conformance to ANSI A 13.1 prior to installation.

B. Coordinate installation of identification devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

3.2 INSTALLATION

A. Provide each piece of equipment with a manufacturers standard nameplate indicating manufacturer's name, model number, capacities and characteristics.

B. In addition (not including residential dwelling equipment), provide each piece of equipment with a plastic tag indicating its designation on this project (such as EF-1, RTU-1) and the area served. Mount this tag with screws, where possible, in a clearly visible location.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Pressure Testing of Ductwork and Piping

B. System Balance of Air and Water HVAC systems.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Operations and Maintenance for HVAC, Section 23 01 00

C. Common Work Results for HVAC, Section 23 05 00

D. Air Duct Accessories, Section 23 33 00

E. HVAC Fans, Section 23 34 00

F. Air Outlets and Inlets, Section 23 37 00

G. HVAC Ducts and Casings, Section 23 31 00

H. Particulate Air Filtration, Section 23 41 00

I. Decentralized Unitary Air Conditioner Units, Section 23 81 00

J. Split System Air Conditioners and Heat Pumps, Section 23 81 26

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Default forms for Testing, adjusting, and balancing.
   2. Certificate of balancer by nationally recognized testing agency (see Quality Assurance).

1.4 OPERATIONS AND MAINTENANCE DATA

A. Provide O&M data in accordance with Section 23 01 00

B. O&M data shall include certificate of completion, inspection and test by authority having jurisdiction on required systems

1.5 QUALITY ASSURANCE

A. All testing, adjusting, and balancing to be performed by a certified balancer. Acceptable certifications include:
   1. National Environmental Balancing Bureau (NEBB)
   2. National Balancing Council (NBCTAB)
   3. Testing, Adjusting, and Balancing Bureau (TABB)

B. Code Compliance: Perform tests where required in the presence of the authority having jurisdiction as required.

PART 2 - PRODUCTS

2.1 MINIMUM REQUIREMENTS

A. Contractor shall furnish required instruments, gauges, meters, and necessary connection points for performance of the testing, adjusting, and balancing.

PART 3 - EXECUTION

3.1 GENERAL

A. ADJUSTING AND BALANCING:
1. Conduct the systems balance work in accordance with standard procedures and recognized practices outlined by ASHRAE and nationally recognized certification bodies Record all actual equipment nameplate, drive and operating data at the site.
2. After all adjustments are made, check the space for noise, vibration and drafts and eliminate if possible.
3. Document any problems or operating difficulties that could not be rectified.
4. Upon completion of balancing work, submit one copy of final report to Engineer for approval. Make corrections as requested. Submit four (4) copies of final report to the contractor for inclusion in the O&M manuals.
5. Provide sets of marked balancing drawings showing air opening numbers that correspond to the numbering system in the balancing logs with the final reports.

3.2 EXECUTION

A. Fan Coils:
1. Assure that air filters are clean, if not new, prior to beginning air balance work.
2. Adjust fan drives to obtain fan speed required for air volumes. Speed shall be set to the minimum to provide required air volume at furthest run without excessive static pressure.
3. Adjust minimum outside air volume to that shown on the plans.
4. Include the following in the logs:
   a. Supply, return and outside air volumes. Static pressure drops across fan, filters and coil.
   b. Total pressure drops for supply and return system.
   c. Fan speed or RPM.
   d. Actual motor voltage, amperage, RPM and overload heater sizes.

B. Fans:
1. Make adjustments and record data in same manner as Rooftop units.
2. Adjust drive or motor speed as available on fans to obtain fan speed required for air volumes. Speed shall be set to the minimum required to provide air volume without excessive static pressure.
3. Include the following in the logs:
   a. Individual CFM with all air handling units in normal mode during individual fan testing.
   b. Actual motor voltage, amperage, RPM and overload heater sizes, as well as nameplate data.
   c. Individual dryer booster fan cut-in pressure.

C. Air Distribution System:
1. Adjust air volumes at diffusers and grilles to within plus or minus 10% of the values shown on the plans.
2. Adjust diffusers and grilles for proper direction and throw.
3. Log all readings taken.
4. Mark final position of all balancing dampers.

END **OF SECTION**

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Providing of all required thermal and acoustical duct insulation as specified or shown on the drawings.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Metal Ducts, Section 23 31 13

D. Identification for HVAC Piping and Equipment, Section 23 05 53

1.3 PUBLICATIONS / REFERENCES

A. ASTM C 553, Mineral Fiber Blanket and Felt Insulation

B. ASTM C 423, Sound Absorption of Fibrous Glass Duct Insulation Liner

C. UL 181, Factory-Made Air Ducts and Air Connectors

D. ASTM E84, Standard Test Method for Surface Burning

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer’s technical literature for all products used including weights, dimensions, and performance.

1.5 QUALITY ASSURANCE

A. Installer shall have previous experience and are skilled and proficient at installing the specified insulation products and types

B. All materials (to include, but not limited to, insulation, jackets, facings, coatings, mastics, adhesives, sealants, etc.) installed inside the building must have a certified and tested composite flame spread/smoke developed rating of 25/50 in accordance with ASTM E84

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Armacell, Atco, rFoil, Thermaflex, Johns Manville, Owens-Corning, Certainteed, Knauf, or approved alternate.

2.2 MINIMUM REQUIREMENTS

A. Duct insulation R-value shall be consistent with applicable local energy codes and standard practice.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Store all insulation materials in a protected, dry location.

3.2 EXAMINATION / PREPERATION

A. Verify that ductwork has been tested before applying insulating materials.

B. Verify that surfaces are clean, foreign materials removed, and dry.

C. Maintain required ambient temperature during and after installation for a minimum period of 24 hours.

3.3 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state, and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with the manufacturer's published recommendations.

C. Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken that the vapor barrier is unbroken. Joints, etc. shall be sealed. Where insulation with a vapor barrier terminates, it shall be sealed off with the vapor barrier being continuous to the surface being insulated. Ends shall not be left raw.

D. Extreme care shall be taken in insulating high and medium pressure ductwork including all ductwork between the fan discharge and all mixing boxes to ensure the duct is not pierced with sheet metal screws or other fasteners. All high and medium pressure ducts in these specifications are classified as high velocity ductwork.

E. Flexible round ducts shall be factory insulated

3.4 INSPECTION

A. Visually inspect the completed insulation installation per manufacturers recommended materials, procedures and repair or replace any improperly sealed joints.

B. Where there is evidence of vapor barrier failure or “wet” insulation after installation, the damaged insulation shall be removed, duct surface shall be cleaned and dried and new insulation shall be installed.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Providing of all required thermal and acoustical pipe insulation as specified or shown on the drawings.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Identification for HVAC Piping and Equipment, Section 23 05 53

1.3 PUBLICATIONS / REFERENCES

A. ASTM E84, Standard Test Method for Surface Burning

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.

1.5 QUALITY ASSURANCE

A. Installer shall have previous experience and are skilled and proficient at installing the specified insulation products and types

B. All materials (to include, but not limited to, insulation, jackets, facings, coatings, mastics, adhesives, sealants, etc.) installed inside the building must have a certified and tested composite flame spread/smoke developed rating of 25/50 in accordance with ASTM E84

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Armacell, Atco, rFoil, Thermaflex, Johns Manville, Owens-Corning, Certainteed, Knauf, or approved alternate.

2.2 MINIMUM REQUIREMENTS

A. Pipe insulation R-value shall be consistent with applicable local energy codes and standard practice.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Store all insulation materials in a protected, dry location.

3.2 EXAMINATION / PREPERATION

A. Verify that piping has been tested before applying insulating materials.

B. Verify that surfaces are clean, foreign materials removed, and dry.

C. Maintain required ambient temperature during and after installation for a minimum period of 24 hours.

3.3 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state, and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with the manufacturer's published recommendations.

C. Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken that the vapor barrier is unbroken. Joints, etc. shall be sealed. Where insulation with a vapor barrier terminates, it shall be sealed off with the vapor barrier being continuous to the surface being insulated. Ends shall not be left raw.

3.4 INSPECTION

A. Visually inspect the completed insulation installation per manufacturers recommended materials, procedures and repair or replace any improperly sealed joints.

B. Where there is evidence of vapor barrier failure or “wet” insulation after installation, the damaged insulation shall be removed, pipe surface shall be cleaned and dried and new insulation shall be installed.

END OF SECTION

INTRODUCTION:

Webster Road Housing is a single story, 26,000 SF, 48-unit elderly housing facility. The mechanical systems are comprised of (8) 6-ton & 8-ton Mitsubishi VRF heat pump systems with (8) ERV's providing ventilation air & primarily tenant kitchen & bathroom exhaust, (2) Mitsubishi VRF central controllers, (1) unit heater, (1) ceiling electric heater, (1) electric wall heater, (4) general exhaust fans & (1) commercial kitchen grease exhaust fans. Except for the commercial kitchen exhaust and make-up air, all the mechanical systems shall have 24/7 operations with no set-backs & no motorized dampers.

A. OPERATING MODES -
   1. OCCUPIED: All mechanical units except for the commercial kitchen exhaust and make-up air system to remain in the occupied mode continually.
      a. The following items shall occur when the system is operating in occupied mode:
      a) SETPOINTS – All spaces occupiable by residences temperature room thermostats shall be set for 75°F Cooling (adj.) and 70°F Heating (adj.) with a minimum 5°F deadband. The electric unit & wall heater EUH-1 & EWH-2 shall have freeze protection setpoints of 45°F (adj.). The ceiling electric heater ECH-3 shall have a heating setpoint of 70°F (adj.).
      b) VENTILATION SYSTEM: All ventilation systems (ERV's) shall be operated to provide code required ventilation rates.

B. VRF GENERAL: All General requirements (listed previously in Section A) shall be met under all circumstances during system operation.
   1. CONTROLS:
      a) This sequence is to be read in conjunction with the controls drawings and points list.
      b) The Mitsubishi system central controller models AE-200A & EW-50A shall determine outdoor unit equipment mode based on building demand and fan coil operation utilizing the Individual Method.
      c) The Mitsubishi Simple MA Remote Controller (Model #PAC-YT53CRAU-J) room thermostats shall determine whether cooling, heating, fan or dry equipment mode is required. This will be allowed via the default "Auto" mode of fan coil operation.
      d) The AE-200A & EW-50A shall automatically change equipment mode to defrost when required.
      e) The AE-200A & EW-50A shall monitor VRFZ system operation and enter equipment Emergency mode if required.
   2. AVAILABLE EQUIPMENT MODES:
      a) PURY, PUMY CONDENSING UNIT MODES:
         i. COOLING ONLY: All operating indoor units are in cooling mode.
         ii. HEATING ONLY: All operating indoor units are in heating mode.
         iii. COOLING MAIN: Cooling dominant simultaneous heat/cool mode.
         iv. HEATING MAIN: Heating dominant simultaneous heat/cool mode.

v. STOPPING: All indoor units are in fan mode or stopping mode.

vi. DEFROST: System has determined that a defrost cycle is required.

vii. EMERGENCY: System fault has been detected via integral controls and emergency mode is initiated.

b) FAN COIL UNIT MODES:

i. COOLING ONLY: Thermostat signals a call for cooling; heating is disabled.

ii. HEATING ONLY: Thermostat signals a call for heating; cooling is disabled.

iii. DRY: Dehumidification via reduced fan speed and low coil temperature.

iv. AUTO: System determines Heat / Cool / Dry / Fan (default)

v. FAN: Fan only. Heat / Cool / Dry disabled.

vi. STOPPING: Fan coil is shutting down.

vii. DEFROST:

a) VRF fan coil's shall continue the blower operation by toggling the SWE switch.

b) The PURY outdoor unit shall be programmed for hot gas defrost via the outdoor unit PCB for heat pump operation down to 23F. On the PCB switch 6-10 to Off & switch 4-10 to On.

viii. EMERGENCY: System fault has been detected via integral controls and emergency mode is initiated.

C. EXHAUST EF-1– Continuous operation.

D. EXHUST EF-2 – Thermostat 95°F (adj.) setpoint.

E. EXHAUST EF-3, EF-4 – Light switch.

F. EXHAUST KEF-1 – Type I hood H-1 control panel.

1. Motorized damper MD 1-1 to be interlocked with KEF-1.

G. FREEZE PROTECTION ELECTRIC HEATERS (EUH-1, EWH-2) Heating setpoint shall be set for 45°F (adj.) for 24-hour operation.

H. COMFORT ELECTRIC HEATER (ECH-3): Heating setpoint shall be set for 70°F (adj.) for 24-hour operation.

- END -

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. This section includes refrigerant piping used for air-conditioning applications

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Split System Air Conditioners and Heat Pumps, Section 23 81 26

D. Decentralized Unitary Air Conditioner Units, Section 23 81 00

1.3 PUBLICATIONS / REFERENCES

A. ASME BPVC, ASME Boiler and Pressure Vessel Code

B. ASHRAE 15, Safety Standard for Refrigeration Systems

C. ASME B31.5, Refrigeration Piping and Heat Transfer Components

D. ASTM B88, Standard Specification for Seamless Copper Tube

E. ASTM B280, Seamless Copper Tube for Air Conditioning and Refrigeration

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.
   2. Welding certificates
   3. Field quality-control test reports

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Mueller, Dayco, or approved alternate

2.2 MINIMUM REQUIREMENTS

A. Pressure rated to minimum 700 PSIG

B. Type L or K Copper Tube per ASTM B88

C. Type ACR Copper Tube per ASTM B280

D. Alternate materials per ASME B31.5

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure the piping interior and exterior are clean when installed.

3.2 INSTALLATION

A. Hard drawn pipe shall be utilized for piping between the branch controllers and outdoor heat pumps.

B. Coil tube may be used for piping between the branch controllers and fan coils.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports

B. Tests and Inspections:
   1. Comply with ASME B31.5, Chapter VI
   2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in 2.2 “Minimum Requirements” or as required by the AHJ, up to 150% of the maximum operating pressure or the pressure relieving device, whichever is greater.
      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of the test
      c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
      d. Remake leaking joints using new materials and retest until satisfactory results are achieved.

3.4 SYSTEM CHARGING

A. Charge each system using the following procedures:
   1. Install core in filter dryers after leak test but before evacuation.
   2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
   3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
   4. Charge system with a new filter-dryer core in charging line.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Hangers and Supports for HVAC Piping and Equipment, Section 23 05 29

D. Duct Insulation, Section 23 07 13

E. Air Duct Accessories, Section 23 33 00

F. Air Outlets and Inlets, Section 23 37 00

G. Testing, Adjusting, and Balancing for HVAC, Section 23 05 93

1.3 PUBLICATIONS / REFERENCES

A. NFPA 90A, Standard for Installation of Air Conditioning and Ventilation Systems

B. NFPA 90B, Standard for Installation of Warm Air Heating and Air-Conditioning Systems

C. UL 181, Factory-Made Ducts and Air Connectors

D. SMACNA “HVAC Duct Construction Standards”

E. ASHRAE Handbook

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Submittals shall include Shop Drawings of any proposed revisions to the ductwork as shown on the drawings.

1.5 QUALITY ASSURANCE

A. Provide ductwork in accordance with NFPA 90A and NFPA 90B

B. Provide a copy of the applicable HVAC Duct Construction Standards, Metal and Flexible on site

PART 2 - PRODUCTS

2.1 MINIMUM REQUIREMENTS

A. Noncombustible, Class 0 in accordance with NFPA 90A or meeting requirements for Class 1 air duct materials in accordance with UL 181

B. Steel Ducts: Residential and Low Pressure – Snaplock.

C. Insulated Flexible Ducts: Flexible duct, wrapped with minimum 1-inch thick flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 “k” value at 75 degrees F.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary closures of metal or taped plastic on open ductwork during construction to prevent construction dust from entering ductwork system.

3.2 INSTALLATION

A. Construct and assemble all sheet metal supply, return, outside air, and general exhaust duct systems in accordance with the latest edition of the “HVAC Duct Construction Standards” published by SMACNA, Chapter Sixteen “Duct Construction” of the ASHRAE Handbook, and the appropriate chapters of the latest edition of the Uniform Mechanical Code.

B. Cross brace and reinforce ductwork and plenums with structural steel members to prevent breathing or ballooning.

C. All joints in the general building air distribution systems (supply, return, and exhaust) shall be sealed airtight with Hardcast or Approved duct sealant.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Providing of all required ductwork accessories specified or shown on the drawings.

B. Section includes manual volume dampers, control dampers, fire dampers, ceiling dampers, turning vanes, flexible connectors, flexible ducts, etc.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Fire Detection and Alarm, Division 28 for duct-mounted fire and smoke detectors.

1.3 PUBLICATIONS / REFERENCES

A. NFPA 90A, Standard for Installation of Air Conditioning and Ventilation Systems

B. NFPA 90B, Standard for Installation of Warm Air Heating and Air-Conditioning Systems

C. UL 181, Factory-Made Ducts and Air Connectors

D. SMACNA “HVAC Duct Construction Standards”

E. AMCA 500D, Laboratory Method of Testing Dampers for Rating

F. UL 555, Fire Dampers

G. UL 555S, Smoke Dampers

H. UL 555C, Ceiling Dampers

I. NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

J. NAIMA AH116, Fibrous Glass Duct Construction Standards

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer’s technical literature for all products used including weights, dimensions, and performance.

1.5 OPERATIONS AND MAINTENANCE DATA

A. Provide any operation and maintenance data for provided duct accessories.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 90A, “Installation of Air Conditioning and Ventilating Systems,” and with NFPA 90B, “Installation of Warm Air Heating and Air Conditioning Systems.”

B. Comply with AMCA 500-D testing for damper ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ruskin, Air Balance Inc, Flexmaster, Trox, Greenheck, Nailor, McGill Airflow LLC, Pottorff, Young Regulator, or approved alternates.

2.2 MINIMUM REQUIREMENTS

A. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Volume Dampers:
   1. Standard leakage rating, with linkage outside airstream.
   2. Suitable for horizontal or vertical applications.

C. Fire Dampers:
   1. Rated and labeled according to UL 555 by a national rating and testing laboratory.
   2. Closing rating in ducts up to 4 inch wg static pressure class and minimum 4000 fpm velocity.
   3. Fire ratings of 1-1/2 and 3 hour.
   4. Frame: Curtain type with blades outside airstream except when located behind a grille
   5. Mounting: Vertical or Horizontal as indicated.
   6. Heat-Responsive Device: Replaceable 165F rated fusible link or electric resettable link and switch package 165F to 212F rated.

D. Turning Vanes:
   1. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" Figure 2-3 "Vanes and Vane Runners," and 2-4 "Vane support in Elbows."
   2. Vane construction shall be single wall for up to 48" wide ducts and double wall for larger dimensions.

E. Duct-Mounted Access Doors:
   1. Fabricate according to SMACNA's "HVAC Duct Construction Standards – Metal and Flexble; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels – Round Duct."
   2. Fabricate doors airtight and suitable for duct pressure class.
   3. Frame: Galvanized steel with bend-over tabs and foam gasket.

F. Grease Duct Access Panel Assemblies:
   1. Rated and labeled according to UL 1978 by a National Rating and Testing Laboratory.
   2. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000F.

G. Flexible Duct Connectors:
   1. Materials: Flame-retardant or non-combustible
   2. Coatings and Adhesives: Comply with UL 181, Class 1
   3. Mechanical attachment to ductwork

H. Flexible Ducts:
   1. Comply with UL 181, Class 1
   2. Insulate per local codes or as specified in the design documents.
   3. Mechanical attachment to ductwork

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Store all duct accessories in a dry, clean location prior to installation.

3.2 EXAMINATION / PREPERATION

A. Examine products for defects prior to installation. Replace as required.

3.3 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

D. Assure that all dampers are aligned with their regulator pointers and left open for the air balance contractor. Permanently mark full open and full closed positions.

E. Install turning vanes in all mitered elbows.

F. Install flexible connections between all fans and connected ducts or plenums. Install with 2-inch space between the fan and connecting duct. Fabric should be snug, but not tight. Secure with flanged connections with accurate alignment between the fan and duct.

G. Install volume dampers in all branch ducts to outlets where shown on drawings. Provide opposed blade dampers at all air inlets and outlets (grilles).

3.4 QUALITY CONTROL

A. Operate dampers to verify full range of movement.

B. Inspect locations of access doors and verify that purpose of access door can be performed.

C. Inspect turning vanes for proper and secure installation.

D. Operate remote damper operators to verify full range of movement operator and damper.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Providing of all fans as noted in the contract documents. Includes axial / mixed flow fans, centrifugal fans, power ventilators

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Anchors, Hangers and Supports, Section 23 05 29

D. Vibration Control, Section 23 05 53

E. System Balance, Section 23 05 95

1.3 PUBLICATIONS / REFERENCES

A. ACMA 210, Laboratory Method of Testing Fans for Certified Aerodynamic Performance Rating

B. ACMA 300, Reverberant Room Method for Sound Testing of Fans

C. ACMA 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data

D. ACMA 99, Standards Handbook

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.
   2. Certified fan performance curves and system operating curves
   3. Motor ratings and electrical characteristics

1.5 OPERATIONS AND MAINTENANCE DATA

A. Provide Installation, operation, and maintenance data with IOM.

1.6 QUALITY ASSURANCE

A. Fan Performance Ratings shall conform to AMCA 210 and bear the AMCA Certified Rating Seal

B. Sound Ratings per AMCA 301, tested to AMCA 300

C. Fabrication shall conform to AMCA 99

1.7 WARRANTY

A. Parts: One year parts warranty from the date of substantial completion

B. Labor: One year labor warranty from the date of substantial completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Greenheck, Loren Cook, Twin City Fans, Soler & Palau, Broan, Panasonic, Captive Aire or approved alternate.

2.2 MINIMUM REQUIREMENTS

A. Fans shall be provided such that they are capable of accommodating static pressure variations of plus or minus 10 percent from design without increasing motor size or fan size.

B. Fans shall be statically and dynamically balanced to eliminate vibrations or noise transmission to occupied areas.

C. Fans provided for use in Fire / Life / Safety Systems shall have 1.5x the number of belts required for operation, emergency power, and shall be rated to operate under the conditions anticipated at the fan during an emergency.

D. Direct Drive Ceiling or Cabinet Fans: Packaged forward curved, direct driven cabinet fan designed for horizontal application. Internally isolated fan and motor assembly with solid-state speed control (as scheduled) mounted in an accessible location. Removable standard grille (ceiling fan) or flanged inlet as indicated by scheduled model number. One-half inch thickness fiberglass type insulation securely fastened to inside surfaces of cabinet.

E. In-line, belt driven cabinet fans: Packaged backward inclined wheel, cabinet fan designed for horizontal application, flanged inlet/outlet, bolted access panels, galvanized housing.

F. Dryer Booster Fan: In-line, direct driven booster fan kit, listed for dryer service with interlock and lint trap.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. All fans shall be stored prior to delivery to jobsite.

3.2 EXAMINATION / PREPERATION

A. Prior to installation review product for shipping damage, replace as required.

3.3 INSTALLATION

A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings are lubricated, and fan has been test run under observation.

B. Install fans as indicated or specified with resilient mountings and flexible electrical leads.

C. Install flexible connections specified between fan inlet and discharge ductwork.

D. Install fan restraining snubbers as required.

E. Provide sheaves required for final air balance.

F. Provide safety screen where inlet or outlet is exposed.

G. Provide backdraft or motorized dampers on discharge of exhaust fans as indicated.

3.4 START-UP

A. Complete start-up forms for each piece of equipment

3.5 DEMONSTRATION / TRAINING

A. Provide owners training by authorized personnel showing operating and maintenance procedures.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Section includes all required grilles, diffusers, louvers, roof hoods, louver penthouses, and other inlets and outlets specified or shown on the drawings.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

C. Testing, Adjusting, and Balancing for HVAC, Section 23 05 93

1.3 PUBLICATIONS / REFERENCES

A. ASHRAE 70, Method of Testing the Performance of Air Outlets and Air Inlets

B. ACMA 500D, Laboratory Methods of Testing Dampers for Rating

C. NFPA 90A, Standard for Installation of Air Conditioning and Ventilation Systems

D. NFPA 90B, Standard for Installation of Warm Air Heating and Air Conditioning Systems

E. SMACNA “HVAC Duct Construction Standards – Metal and Flexible”

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer’s technical literature for all products used including weights, dimensions, and performance.
   2. Noise level data shall also be provided.

1.5 QUALITY ASSURANCE

A. Test and rate performance of air outlets and inlets in accordance with ASHRAE 70

B. Test and rate performance of louvers in accordance with AMCA 500D

C. Conform to NFPA 90A and 90B

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Diffusers: Titus, Price, Krueger, or approved alternate.

B. Wall Louvers: Greenheck, Ruskin, or approved alternate.

C. Roof Hoods: Greenheck, Cook, or approved alternate.

D. Goose Neck: Field or Shop Fabricated.

2.2 MINIMUM REQUIREMENTS

A. Rectangular Ceiling Diffusers
   1. Rectangular, adjustable pattern, stamped, multicore type diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.
   2. Provide appropriate mount/frame type for application
   3. Provide with standard factory finish unless otherwise indicated
   4. Provide radial opposed blade damper and mulit-louvered equalizing grid with damper adjustable from diffuser face.

B. Perforated Face Ceiling Diffusers:
   1. Perforated face with fully adjustable curved blade pattern controller in the diffuser neck.
   2. Proved appropriate mount/frame type for application.
   3. Provide with standard factory finish unless otherwise indicated
   4. Provide with opposed blade damper adjustable from diffuser face and multi-louvered equalizing grid.

C. Perforated Face Return/Exhaust Grilles:
   1. Perforated face with back pan, removable face, and neck sizes as indicated on drawings.
   2. Provide appropriate frame/mount type for application.
   3. Provide with standard factory finish unless otherwise indicated.

D. Sidewall Supply Grille:
   1. Double deflection type with fully adjustable blades.
   2. Rectangular steel construction grille.
   3. Provide with standard factory finish unless otherwise indicated.

E. Sidewall Return Air Grille
   1. Rectangular steel construction grille.
   2. 45 degree blade setting.
   3. Provide with standard factory finish unless otherwise indicated.

F. Louvered-Penthouse Ventilators:
   1. Construction: All-welded assembly with 4-inch-deep louvers, mitered corners, and galvanized steel.
   2. Roof Curbs: Galvanized steel sheet; with mitered and welded corners. Size as required to fit roof opening and ventilator base.
   3. Provide with ½ inch square mesh bird screening, galvanized steel, 0.041-inch wire

G. Roof Hoods:
   1. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figures 5-6 and 5-7.
   2. Materials: Galvanized-steel sheet, minimum 0.064-inch, suitably reinforced.
   3. Roof Curbs: Galvanized-steel; with mitered and welded corners. Size as required to fit roof opening and ventilator base.
   4. Provide with ½ inch square mesh bird screening, galvanized steel, 0.041-inch wire

H. Wall Louvers:
   1. Construction: Extruded aluminum louver with stationary blades.
   2. Provide with flanged frame.
   3. Provide with ½ inch square mesh bird screening, galvanized steel, 0.041-inch wire

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Store in a dry, clean location prior to installation.

3.2 EXAMINATION / PREPERATION

A. Review product for defects prior to installation, replace as necessary.

3.3 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with the architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers, grilles, and registers.

E. Provide specialties and frames for air devices as required for the installation.

F. Verify any special color requirements prior to ordering.

3.4 START-UP

A. Provide an air balance per Testing, Adjusting, and Balancing for HVAC, Section 23 05 93

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Providing of all disposable filters.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00.

1.3 PUBLICATIONS / REFERENCES

A. ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality

B. ASHRAE 52.1 and 52.2, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

C. NFPA 90A, Standard for Installation of Air Conditioning and Ventilation Systems

D. NFPA 90B, Standard for Installation of Warm Air Heating and Air-Conditioning Systems

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.

1.5 QUALITY ASSURANCE

A. Comply with applicable requirements in ASHRAE 62.1 Section 4 – "Outdoor Air Quality": Section 5 – "Systems and Equipment"; and Section 7 – "Construction and Startup."

B. Comply with ASHRAE 52.1 for arrestance and ASHRAE 52.2 for MERV rating

C. Comply with NFPA 90A and NFPA 90B

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Camfil Farr, American Filter, Continental, Eco-Air, or approved equal.

2.2 MINIMUM REQUIREMENTS

LOCATION	FILTER TYPE
TENANT FAN COILS	HONEYCOMB MESH
DUCTLESS FAN COILS	FACTORY WASHABLE
DUCTED FAN COILS	MERV 8
ERV SUPPLY	NON-WOVEN FABRIC
ERV EXHAUST	NON-WOVEN FABRIC

EXECUTION

2.3 DELIVERY, STORAGE, AND HANDLING

A. Store filters in a clean, dry location prior to installation

2.4 EXAMINATION / PREPERATION

A. Verify sufficient access and clearance is available for normal service and maintenance.

2.5 INSTALLATION

A. Install filters in position to prevent the passage of unfiltered air.

B. Install filters in filter racks, grilles, or other required locations prior to system start-up or operation.

C. Replace all non-washable filters with a clean set after construction is completed prior to occupancy

2.6 START-UP

A. Verify appropriate filters are in place prior to equipment startup.

END OF SECTION

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

PART 1 GENERAL

1.01 APPLICABLE REQUIREMENTS

A. All work to be furnished and installed under this section shall comply with all the requirements of General Conditions, Supplemental Conditions, Division 01 – General Requirements, Section 230500 – Basic Materials and Methods, and other Sections in Division 23 specified herein.

1.02 SCOPE

A. All work to be furnished and installed under this section shall comply with all the requirements of Division 01, and shall include, but not necessarily be limited to, the following:
   1. Ductless split systems
   2. Variable Refrigerant Flow System.
   3. Controls and control connections.
   4. Electrical power connections.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 230500: Basic Materials and Methods

B. Section 230595: System Balance

C. Division 26: Electrical

1.04 QUALITY ASSURANCE

A. EQUIPMENT: Provide packaged units that are the standard product of an equipment manufacturer regularly engaged in the production of such units who issues complete catalog information on such products. Units shall not be fabricated by the Contractor.

1.05 SUBMITTALS

A. Manufacturers' catalog or technical data substantiating performance required. Mark up literature to indicate operating points and all specified options.

B. Show all dimensions and describe materials and methods of construction.

C. Show and describe recommended methods of installation.

1.06 OPERATION AND MAINTENANCE DATA

A. Furnish O&M data including manufacturer's literature and maintenance instructions.

B. Furnish complete operation and maintenance manuals noting service points and recommended service schedules. Note specific techniques and equipment recommended for this equipment service.

PART 2 PRODUCTS

2.01 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

A. Acceptable Manufacturers: Mitsubishi, Sanyo, or approved equal

B. Indoor Fan Coil Unit:

   1. General
      a. Factory fabricated fan coil units of the size, type configuration and capacity as scheduled on the drawings. Units shall be self-contained, factory assembled and pre-wired with condensate pump.
      b. All pressure drops, horsepower and dimensions shown are maximum allowable. All units must have AMCA certified performance data for fans tested in the unit casings. Bare fan certification without casing is not acceptable.

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

2. Unit Cabinet Shall be galvanized steel with powder coated baked enamel finish.
3. Fan Assembly
   a. Direct-drive, double inlet fan wheels shall have forward-curved blades, and be statically and dynamically balanced, with scrolls and fans constructed of galvanized steel.
   b. Rotating assembly shall provide a rigid support for motor and fan assembly. Assembly shall be accessible and entire assembly shall be removable for maintenance.
   c. Motor shall be minimum two speed permanent split capacitor type.
4. Coils shall be ARI Certified. All coil shall be constructed of non-ferrous seamless copper and pressure tested in the factory
5. Unit suspension: Units shall be provided with factory welded mounting clips for mounting units.
6. Electrical: The unit electrical power shall be per the schedule.
7. Controls
   a. Unit shall have a wired controller to perform input functions necessary to operate the system.
   b. The controller shall consist of an On-Off switch, Cool/Dry-Fan selector, Thermostat setting, Timer Mode, High-Low fan speed, Auto Vane selector, Test Run Switching and check Mode switching.
   c. Temperature changes shall be by 2^{o}F increments with a range of 65 - 87^{o}F.
   d. The control system shall consist of two (2) microprocessors interconnected by a single non-polar two wire cable.
   e. Wiring shall run direct from the indoor unit to the controller with no splices.
   f. Manufacturer shall provide 2-conductor 18 Ga. Stranded wire for connection to remote controller.
   g. The microprocessor located in the indoor unit shall have the capability of sensing room temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.
   h. The Control voltage from the controller to the indoor unit shall be 12 volts, DC.
   i. The control voltage between the indoor unit and the outdoor unit shall be 12 volts, DC.
   j. The system shall be capable of automatic restart when power is restored after power interruption.
   k. The system shall include self-diagnostics including total hours of compressor run time.
   l. The microprocessor within the wall mounted remote controller shall provide automatic cooling, display set point and room temperature, 24 hour on/off timer so that automatic operation function display, check mode for memory of most recent problem.

C. Outdoor Condensing Unit:
   1. General: Provide remote outdoor compressor units consisting of hermetic compressor with overload protection, direct drive condenser fan, aluminum fin/seamless copper tube coil, strainer, high and low pressure switches, accumulator, and thermostatic expansion valve.
   2. Low Ambient Control: System shall be capable of operating at 0^{o}F ambient temperature.
   3. Unit Cabinet: Galvanized steel with powder coat enamel finish.
   4. Condenser Fans: Direct drive propeller type. Motors to be totally enclosed, single phase, with Class B insulation and permanently lubricated bearings. Fan shall be mounted for low noise. Fan blades to be statically and dynamically balanced.
   5. Coil: Aluminum fins mechanically bonded to copper tubes.

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

6. Refrigerant Components: Liquid tube shutoff valve with sweat connection, suction tube shutoff valves with sweat connection, R-410A refrigerant, and accumulator.
7. Compressor: Hermetically sealed two-speed compressor mounted on rubber mountings. Protection to include internal thermal overloads. An internal pressure relief valve to provide high-pressure protection to the refrigerant system. Provide external service valves for the refrigerant circuit. A crankcase heater shall be factory mounted on the outside of the compressor.
8. Electrical: Unit electrical power shall be per schedule. The outdoor unit shall be controlled by the microprocessor located in the indoor unit. The control voltage between the indoor unit and the outdoor unit shall be 12 volts, DC.

2.02 VARIABLE REFRIGERANT FLOW SYSTEM

A. Acceptable Manufacturers:
   1. Mitsubishi (City Multi), Daikin (VRV).
   2. The basis of design is Mitsubishi (City Multi).

B. Indoor Unit – Ceiling Ducted, 1-Way throw & Highwall Ductless:
   1. Description: The unit shall be a ceiling ducted fan coil designed to mount above the ceiling with a 2-position, field adjustable return and a fixed horizontal discharge supply. Furnish complete unit including cabinet, mounting kit and accessories, refrigerant line set, electronic expansion valve, fan and motor assembly, cooling coil, condensate drain pan and filter. Unit as scheduled on drawing, factory-tested and assembled, factory wired, refrigerant-to-air heat exchanger, fan/motor assembly, compressor, controls and safety devices, control circuit transformer, shipped in one piece with ARI certification and UL listing.
   2. Cabinet: The cabinet shall be space saving, ceiling concealed, ducted and shall have provisions for a field installed filtered outside air intake. Constructed of 18 gauge steel, removable panels for access to components. Provide drain connection. Provide low profile 15” deep maximum.
   3. Fan and Motor: The evaporator fan shall be an assembly with one or two lines-flow fan(s) direct driven by a single motor. The fan shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings. The fan shall consist of two (2) speeds, high and low.
   4. Coil/Piping: The indoor coil shall be direct expansion type of nonferrous construction with smooth plate fins on copper tubing. A condensate pan shall be located under the coil. Both refrigerant lines shall be insulated.
   5. Filter: Provide return filter box with Merv 8 filters for ceiling ducted fan coils.
   6. Electrical: Furnish all starters and contactors. Arrange for single point electrical connection.
   7. Condensate Pump: Provide condensate pump with hard-wired electrical connection when required; pipe drain per plan.

C. Indoor Unit – Controls:
   1. Provide a complete, factory-installed VRF control system with all operating and safety controls, consisting of remote controllers and centralized controllers. Network together using a high-speed communication bus and wiring as recommended by manufacturer. Provide all control wiring for a complete and operational system. Provide all required controllers for stand-alone temperature sensors. The controls network to support operation monitoring, scheduling, error email distribution, personal browsers, and online maintenance support. Refer to Section 23 09 13 Sequence of Operations for HVAC Controls for required controls, control functions and sequences of operation for the factory installed controls.

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

2. Standard Room Thermostat: Simple MA Remote Controllers, with ability to allow the user to change on/off temperature setting, and fan speed setting. The room temperature shall be sensed at either the Simple MA Remote Controller or the Indoor Unit dependent on the indoor unit dipswitch setting. Provide display of a four-digit error code in the event of system abnormality/error.
3. Centralized Controller: Capable of controlling via a PC a maximum of 50 indoor units with multiple outdoor units. The Centralized Controller shall be able to override remote controllers every 2 hours, system configuration, daily/weekly/annual scheduling, monitoring of operations status, error email notification, online maintenance tool and malfunction monitoring. Provide basic operation controls which can be applied to an individual indoor units, a group of indoor units (up to 50 indoor units) or all indoor units (collective batch operation) including on/off operation mode selection (cool, heat, auto, dray and fan) temperature setting., fan speed setting, airflow direction setting, error email notifications and online maintenance.
4. Power Supply: Provide 12V power supply for centralized controllers.

D. Outdoor Unit:
1. Description:
   a. Provide air cooled heat pump (with heat recovery system for simultaneous heating and cooling) designed for outdoor installation with factory supplied supports, properly assembled and tested at the factory.
   b. Unit shall be completely weatherproofed and include compressor, condenser coils, condensing fans, motor, refrigerant reservoir, charging valve, all controls and a holding charge of refrigerant.
   c. Provide guards on condenser fans and coil guard. Unit shall have a power coated finish.
   d. Unit shall be completely factory assembled, piped, wired and tested.
   e. Both refrigerant lines shall be insulated between the outside and inside units.
   f. Unit shall have a sound rating no higher than 63 db(a).
   g. The units shall be modular in design and allow for side-by-side installation with minimum spacing.
   h. Provide accessories and kits required for a complete installation including field connection of heat pump units.
2. Cabinet: The casing(s) shall be fabricated of galvanized steel, bonderized and finished with baked enamel.
3. Condenser Fans and Motors: Direct driven variable speed propeller type fans with permanently lubricated motors. All fans shall be provided with a raised guard to prevent contact with moving parts. The outdoor unit shall have vertical discharge airflow.
4. Refrigerant Circuits: Units shall hold a charge of R410A refrigerant. Unit shall include back seating service valve and gauge ports in liquid and suction lines. Provided refrigerant filter-dryer. The refrigeration circuit of the condensing unit shall consist of a scroll compressor, motors, fans, condenser coil, electric expansion valve, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut-off valves, oil separators, service parts, liquid receivers and accumulators.
5. Coil: The outdoor coil shall be of nonferrous construction with lanced or corrugated plat fins on copper tubing.
6. Compressors: Furnish inverter driven scroll hermetic sealed compressor isolation and sound muffling. Units shall have overload and inherent winding thermostat protection to prevent burn out. Provided crankcase heater. Multiple compressors shall be manifolded for single joint connection on liquid and suction lines. The capacity shall be completely variable down to 16% of rated capacity.
7. Electrical: Furnish all starters and contactors.
8. Controls: Provide high and low pressure cutouts, contactors and internal overload protection on all motors. Provide low ambient operation to 0°F outside to maintain condensing temperature on part load operation. Provide short cycle timer.

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

9. Controls: Complete factory installed control system with all operating and safety controls. Include all remote sensors and devices for field installation. Refer to Section 23 09 13 Sequence of Operations for HVAC Controls for required controls, control functions and sequences of operation for the factory installed controls.

E. Branch Circuit Controller:
   1. General: The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors. Unit shall operate so that different zones served by each controller can be in heating and cooling mode simultaneously.
   2. Cabinet:
      a. The casing shall be fabricated of galvanized steel.
      b. Each cabinet shall house a liquid gas separator and multiple refrigeration control valves.
      c. The unit shall contain tub-in-tube heat exchangers.
   3. Refrigerant Valves:
      a. The unit shall be furnished with multiple two position refrigerant valves.
      b. Each circuit shall have a two-position liquid line valve and a two-position suction line valve.
      c. When connecting a 54,000 BTU/hr or larger indoor unit section, two branch circuits shall be joined together at the branch controller to deliver an appropriate amount of refrigerant. The two refrigerant valves shall operate simultaneously.
      d. Linear electronic expansion valves shall be used to control the variable refrigerant flow.
   4. Integral Drain Pan: An integral condensate pan and drain shall be provided.
   5. Controls: The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.
   6. Controls: Provide a factory packaged control system for all components of the Variable Refrigerant Flow system and for related Exhaust Fans. Include all remote sensors and devices for field installation. Provide all devices, materials, equipment, software, wiring, labor and engineering necessary to achieve the Sequences of Operation described in Section 23 09 13 Sequence of Operation for HVAC Controls.

PART 3 EXECUTION

3.01 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS INSTALLATION

A. Install in accordance with the manufacturer's instructions.

B. Provide layout drawings of units, locations and power requirements to electrical installer.

C. Provide 4: high rails.

D. Install condensate drain piping and traps in accordance with manufacturer’s instructions.

E. Install copper refrigerant piping and insulate lines.

C. Install controller and all wiring associated with control signals between air handling unit and condensing unit. Conceal low voltage wiring in building structure, or inside the refrigerant pipe insulation, or in conduit.

C. Electrical installer shall install all line voltage power wiring and conduit. Coordinate with Division 26 work.

DECENTRALIZED UNITARY AIR CONDITIONING UNITS

3.02 VARIABLE EFRIGERANT FLOW SYSTEM

A. Installation:
   1. Install in location shown on drawings. Level unit and secure to structure.
   2. Make piping connections and unit installation per manufacturer's recommendations and installation guide.
   3. Size and run refrigerant piping between fan coil unit and air-cooled condensing unit per manufacturer's recommendations. Provide double suction and/or discharge risers if recommended by the manufacturer.
   4. Insulate all refrigerant piping.
   5. Pipe condensate pan to floor drain per manufacturer's installation guide.
   6. Make refrigerant piping connections. Install refrigeration accessories and charge system. Provide additional refrigerant as required for proper operation at design capabilities.

B. Controls: Install controls. Provide all devices, materials, equipment, software, wiring, interconnecting power, labor and engineering necessary to achieve the Sequences of Operation describe in Section 23 09 13 Sequence of Operation for HVAC Controls.

C. Start-up:
   1. General: Comply with manufacturer's instructions.
   2. Install filters before operating unit.
   3. Ensure proper refrigerant and air flow before operating unit compressor.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION / SUMMARY

A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.2 RELATED WORKS

A. Mechanical Plans and General Provisions of the Contract

B. Common Work Results for HVAC, Section 23 05 00

C. Refrigerant Piping, Section 23 23 00

1.3 PUBLICATIONS / REFERENCES

A. NFPA 70, National Electric Code

B. ASHRAE 15, Safety Standard for Refrigeration Systems

C. ASHRAE 62.1, Standard for Ventilation and Indoor Air Quality

D. ASHRAE 62.2, Ventilation And Acceptable Indoor Air Quality In Low-Rise Residential Building

E. AHRI 210 / 240, Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 23 05 00

B. Submittals shall include:
   1. Manufacturer's technical literature for all products used including weights, dimensions, and performance.
   2. Show or describe the recommended methods of installation.

1.5 OPERATIONS AND MAINTENANCE DATA

A. Furnish Operation and Maintenance data including manufacturer's literature and maintenance instructions.

B. Furnish complete operation and maintenance manuals noting service points and recommended service schedules. Note specific techniques and tools recommended for this equipment service.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:
   1. Fabricate refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
   2. Applicable requirements in ASHRAE 62.1, Section 4 – "Outdoor Air Quality," Section 5 – "Systems and Equipment," Section 6 – "Procedures," and Section 7 – "Construction and System Start-Up."

C. Code Compliance:
   1. Comply with all applicable requirements in 2019 Oregon codes, including but not limited to the Oregon Mechanical Specialty Code, Oregon Structural Specialty Code, and Oregon Energy Efficiency Specialty Code.

D. Equipment: Provide packaged units with paired indoor and outdoor components that are a standard product of a manufacturer regularly engaged in the production of such units who issues complete catalog information on such products. Units shall not be fabricated by the contractor.

1.7 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of the split-system air-conditioning units that fail in materials or workmanship within the specified warranty period.

B. Warranty Period:
   1. One year parts warranty from the date of Substantial Completion
   2. One year labor warranty from the date of Substantial Completion
   3. Extended Compressor warranty if included in contract documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Mitsubishi, LG, Sanyo, Daikin, or approved alternate

2.2 MINIMUM REQUIREMENTS

A. Indoor Fan Coil Unit:
   1. General
      a. Factory fabricated fan coil units of the size, type, configuration, and capacity as scheduled on the drawings. Units shall be self-contained, and factory assembled.
      b. All pressure drops, horsepower, and dimensions shown are maximum allowable. All units must have AMCA certified performance data for fans tested in the unit casing.
      c. Provide condensate pumps where required.
   2. Fan Assembly
      a. Direct-drive, double inlet fan wheels shall have forward-curved blades, and be statically and dynamically balanced, with scrolls and fans constructed of galvanized steel.
      b. Rotating assembly shall provide a rigid support for motor and fan assembly. Assembly shall be accessible and entire assembly shall be removable for maintenance.
      c. Motor shall be minimum two speed.
   3. Coils shall be constructed of non-ferrous seamless copper tubing and pressure tested at the factory. Fins may be aluminum or copper and bonded to the tubing.
   4. Unit shall be provided with factory mounting clips for suspension.

B. Outdoor Condensing Unit:
   1. General
      a. Provide remote outdoor compressor unit consisting of compressor with overload protection, direct drive condenser fan, seamless copper tune with aluminum or copper fin coil, strainer, high and low pressure switches, accumulator, and thermostatic or electronic expansion valve.
   2. Low Ambient Control: System shall be capable of operating at 0F ambient temperature.
   3. Condenser Fans: Direct drive propeller type. Motors to be totally enclosed, single phase with Class B insulation and permanently lubricated bearings. Fan shall be mounted for low noise. Fan blades to be statically and dynamically balanced.
   4. Refrigerant Components: Liquid shutoff valve, suction shutoff valve, R-410a refrigerant, and accumulator.
   5. Compressor Protection to include internal thermal overload, internal pressure relief valve, and external service valves for the refrigerant circuit.

C. Energy Performance to be tested and listed in accordance with AHRI Standard 210 / 240.

D. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Equipment shall be stored in a clean, dry area prior to delivery to the job-site.

3.2 EXAMINATION / PREPERATION

A. Prior to installation evaluate equipment for shipping damage, replace as required.

3.3 INSTALLATION

A. Install in accordance with the manufacturer's instructions.

B. Provide layout drawings of units, locations and power requirements to electrical installer.

C. Provide 4: high pad or rails extending 6” beyond edge of condensing unit on all sides. Attach condensing unit to concrete pad with concrete anchors and angle brackets.

D. Install condensate drain piping and traps in accordance with manufacturer’s instructions.

E. Install copper refrigerant piping and insulate lines.

F. Install controller and all wiring associated with control signals between air handling unit and condensing unit. Conceal low voltage wiring in building structure, or inside the refrigerant pipe insulation, or in conduit.

G. Electrical installer shall install all line voltage power wiring and conduit. Coordinate with Division 26 work.

3.4 START-UP

A. Charge system and perform leakage testing prior to system start-up.

B. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

3.5 COMMISSIONING

3.6 DEMONSTRATION / TRAINING

A. Engage an authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain units.

END OF SECTION

Division 26 - Electrical

Section 260505 - Selective Demolition for Electrical

MATERIALS AND EQUIPMENT

Materials and equipment for patching and extending work: As specified in individual sections.

Section 260519 - Low-Voltage Electrical Power Conductors and Cables

CONDUCTOR AND CABLE APPLICATIONS

Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

Nonmetallic-sheathed cable is permitted only as follows:

Where not otherwise restricted, may be used:

For branch circuit wiring in dry locations within one- and two-family dwellings and their attached or detached garages, and their storage buildings.

For branch circuit wiring in dry locations within multifamily dwellings permitted to be of Types III, IV, and V construction.

Service entrance cable is permitted only as follows:

Where not otherwise restricted, may be used:

For dwelling unit feeders in dry locations within multifamily dwellings permitted to be of Types III, IV, and V construction.

In addition to other applicable restrictions, may not be used:

Where exposed to damage.

Metal-clad cable is permitted only as follows:

Where not otherwise restricted, may be used:

Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

Maximum Length: 6 feet (1.8 m).

Where concealed in hollow stud walls, above accessible ceilings and under raised floors for branch circuits up to 20 A.

Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

In addition to other applicable restrictions, may not be used:

Where exposed to damage.

For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

For patient care areas of health care facilities requiring redundant grounding.

CONDUCTOR AND CABLE GENERAL REQUIREMENTS

Provide products that comply with requirements of NFPA 70.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

Comply with NEMA WC 70.

Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.

Conductor Material:

Provide copper conductors except where aluminum conductors are specifically indicated or permitted for substitution. Conductor sizes indicated are based on copper unless specifically indicated as aluminum. Conductors designated with the abbreviation "AL" indicate aluminum.

Substitution of aluminum conductors for copper is permitted, when approved by Owner and authority having jurisdiction, only for the following:

Services: Copper conductors size 1/0 AWG and larger.

Feeders: Copper conductors size 1/0 AWG and larger.

Where aluminum conductors are substituted for copper, comply with the following:

Size aluminum conductors to provide, when compared to copper sizes indicated, equivalent or greater ampacity and equivalent or less voltage drop.

Increase size of raceways, boxes, wiring gutters, enclosures, etc. as required to accommodate aluminum conductors.

Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

Tinned Copper Conductors: Comply with ASTM B33.

Aluminum Conductors (only where specifically indicated or permitted for substitution): AA-8000 series aluminum alloy conductors recognized by ASTM B800 and compact stranded in accordance with ASTM B801 unless otherwise indicated.

Minimum Conductor Size:

Branch Circuits: 12 AWG.

Exceptions:

20 A, 120 V circuits longer than 100 feet: 10 AWG, for voltage drop.

20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

20 A, 277 V circuits longer than 250 feet: 10 AWG, for voltage drop.

Residential applications only, 15A, 120V circuits: 14 AWG..

Control Circuits: 14 AWG.

SINGLE CONDUCTOR BUILDING WIRE

Description: Single conductor insulated wire.

Insulation Voltage Rating: 600 V.

Insulation:

Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

Size 4 AWG and Larger: Type XHHW-2.

Installed Underground: Type XHHW-2.

Aluminum Building Wire (only where specifically indicated or permitted for substitution): Type XHHW-2.

NONMETALLIC-SHEATHED CABLE

Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719, Type NM-B.

Insulation Voltage Rating: 600 V.

SERVICE ENTRANCE CABLE

Service Entrance Cable for Above-Ground Use: NFPA 70, Type SE multiple-conductor cable listed and labeled as complying with UL 854, Style R.

Insulation Voltage Rating: 600 V.

METAL-CLAD CABLE

Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

Insulation Voltage Rating: 600 V.

Insulation: Type THHN, THHN/THWN or THHN/THWN-2.

Grounding: Full-size integral equipment grounding conductor.

Armor: Steel, interlocked tape.

Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

WIRING CONNECTORS

Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

Wiring Connectors for Splices and Taps:

Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

Connectors for Aluminum Conductors: Use compression connectors or mechanical connectors.

Wiring Connectors for Terminations:

Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.

Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

Aluminum Conductors: Use compression connectors or mechanical connectors for all connections.

Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.

Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

Mechanical Connectors: Provide bolted type or set-screw type.

Compression Connectors: Provide circumferential type or hex type crimp configuration.

Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

ACCESSORIES

Electrical Tape:

Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion,

and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.

Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

Cable Ties: Material and tensile strength rating suitable for application.

Section 260526 - Grounding and Bonding for Electrical Systems

GROUNDING AND BONDING REQUIREMENTS

Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

Do not use products for applications other than as permitted by NFPA 70 and product listing.

Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

Grounding System Resistance:

Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.

Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.

Grounding Electrode System:

Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.

Provide continuous grounding electrode conductors without splice or joint. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

Metal Underground Water Pipe(s):

Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.

Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.

Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.

Metal In-Ground Support Structure:

Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.

Concrete-Encased Electrode:

Provide connection to concrete-encased electrode consisting of not less than 20 feet (6.0 m) of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.

Ground Rod Electrode(s):

Provide two electrodes unless otherwise indicated or required.

Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.

Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.

Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.

Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.

Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:

Provide grounding electrode system for each separate building or structure.

Provide equipment grounding conductor routed with supply conductors.

For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.

Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.

Bonding and Equipment Grounding:

Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.

Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.

Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.

Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

Communications Systems Grounding and Bonding:

Provide bonding jumper from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.

Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.

Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.

GROUNDING AND BONDING COMPONENTS

General Requirements:

Provide products listed, classified, and labeled as suitable for the purpose intended.

Provide products listed and labeled as complying with UL 467 where applicable.

Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:

Use insulated copper conductors unless otherwise indicated.

Exceptions:

Use bare copper conductors where installed underground in direct contact with earth.

Use bare copper conductors where directly encased in concrete (not in raceway).

Connectors for Grounding and Bonding:

Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.

Unless otherwise indicated, use mechanical connectors, compression connectors or exothermic welded connections for accessible connections.

Ground Bars:

Description: Copper rectangular ground bars with mounting brackets and insulators.

Size: As indicated.

Holes for Connections: As indicated or as required for connections to be made.

Ground Rod Electrodes:

Comply with NEMA GR 1.

Material: Copper-bonded (copper-clad) steel.

Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

Section 260529 - Hangers and Supports for Electrical Systems

SUPPORT AND ATTACHMENT COMPONENTS

General Requirements:

Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.

Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 4. Include consideration for vibration, equipment operation, and shock loads where applicable.

Do not use products for applications other than as permitted by NFPA 70 and product listing.

Steel Components: Use corrosion resistant materials suitable for the environment where installed.

Zinc-Plated Steel: Electroplated in accordance with ASTM B633.

Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

Conduit Straps: One-hole or two-hole type; steel or malleable iron.

Conduit Clamps: Bolted type unless otherwise indicated.

Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

Comply with MFMA-4.

Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

Anchors and Fasteners:

Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

Concrete: Use preset concrete inserts, expansion anchors or screw anchors.

Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

Hollow Masonry: Use toggle bolts.
Hollow Stud Walls: Use toggle bolts.
Steel: Use beam clamps, machine bolts or welded threaded studs.
Sheet Metal: Use sheet metal screws.
Wood: Use wood screws.
Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
Comply with MFMA-4.
Channel Material: Use galvanized steel.

Section 260533.13 - Conduit for Electrical Systems

CONDUIT APPLICATIONS

Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
Underground:
Under Slab on Grade: Use galvanized steel rigid metal conduit, rigid PVC conduit or reinforced thermosetting resin conduit (RTRC).
Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.
Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit, rigid PVC conduit or reinforced thermosetting resin conduit (RTRC).
Embedded Within Concrete:
Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, rigid PVC conduit or reinforced thermosetting resin conduit (RTRC).
Within Slab Above Ground (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit or rigid PVC conduit.
Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit or rigid PVC conduit.
Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT) or rigid PVC conduit.
Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).
Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).
Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).
Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or PVC-coated galvanized steel rigid metal conduit.

CONDUIT REQUIREMENTS

Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
Provide products listed, classified, and labeled as suitable for the purpose intended.
Minimum Conduit Size, Unless Otherwise Indicated:
Branch Circuits: 1/2 inch (16 mm) trade size.
Branch Circuit Homeruns: 1/2 inch (16 mm)) trade size.

Underground, Interior: 3/4 inch (21 mm) trade size.

Underground, Exterior: 3/4 inch (21 mm) trade size.

Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

FLEXIBLE METAL CONDUIT (FMC)

Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

Fittings:

Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

Fittings:

Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

ELECTRICAL METALLIC TUBING (EMT)

Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

Fittings:

Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

Material: Use steel or malleable iron.

Connectors and Couplings: Use compression (gland) or set-screw type.

Do not use indenter type connectors and couplings.

Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

Fittings:

Manufacturer: Same as manufacturer of conduit to be connected.

Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.

Fittings:

Manufacturer: Same as manufacturer of conduit to be connected.

Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).

Supports: Per manufacturer's recommendations.

Fittings: Same type and manufacturer as conduit to be connected.

ACCESSORIES

Section 260533.16 - Boxes for Electrical Systems

BOXES

General Requirements:

Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

Provide grounding terminals within boxes where equipment grounding conductors terminate.

Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:

Use sheet-steel boxes for dry locations unless otherwise indicated or required.

Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.

Use suitable concrete type boxes where flush-mounted in concrete.

Use suitable masonry type boxes where flush-mounted in masonry walls.

Use raised covers suitable for the type of wall construction and device configuration where required.

Use shallow boxes where required by the type of wall construction.

Nonmetallic boxes shall be permitted to be used within dry locations of multifamily dwellings of type III, IV, and V construction.

Fire rated boxes or listed fire rated wraps (putty pads) must be used in fire rated assemblies. Refer to architectural drawings for locations.

Boxes must maintain Architect's specified Sound Transmission Class (STC) for all assemblies. Acoustic rated wraps (putty pads) must be used where the box does not meet the STC.

Do not use "through-wall" boxes designed for access from both sides of wall.

Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.

Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.

Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.

Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.

Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):

Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.

Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):

Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

Boxes and Enclosures for Integrated Power, Data, and Audio/Video: Size and configuration as indicated or as required with partitions to separate services; field-connected gangable boxes may be used.

Floor Boxes:

Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.

Underground Boxes/Enclosures:

Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.

Size: As indicated on drawings.

Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches (300 mm).

Applications:

Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.

Section 260548 - Vibration and Seismic Controls for Electrical Systems

VIBRATION ISOLATION REQUIREMENTS

Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing electrical equipment and/or electrical connections to vibration-isolated equipment.

Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:

General Requirements:

Select vibration isolators to provide required static deflection.

Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.

Select seismic type vibration isolators to comply with seismic design requirements, including conditions of equipment seismic certification where applicable.

Equipment Isolation:

Transformers:

Floor-Mounted Transformers, Non-Seismic Applications: Use resilent material isolator pads, resilient material isolator mounts or open (unhoused) spring isolators.

Floor-Mounted Transformers, Seismic Applications: Use seismic type resilient material isolator mounts or seismic type restrained spring isolators.

Wall-Mounted Transformers, Non-Seismic Applications: Use resilient material isolator mounts.

Wall-Mounted Transformers, Seismic Applications: Use seismic type resilient material isolator mounts.

Engine Generators:

Seismic Applications: Use seismic type restrained spring isolators.

Conduit Isolation:

Use flexible conduit or cable for electrical connections to vibration-isolated equipment, including equipment installed under other sections or by others.

SEISMIC CONTROL REQUIREMENTS

Design and provide electrical component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location.

Consider wind loads for outdoor electrical components.

Seismic Restraints:

Provide seismic restraints for electrical components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.

Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:

ASHRAE (HVACA).

FEMA 413.

FEMA E-74.

SMACNA (SRM).

Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third party registered professional engineer acceptable to authorities having jurisdiction.

Seismic Attachments:

Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.

Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.

Do not use power-actuated fasteners.

Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.

Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.

Concrete Housekeeping Pads:

Increase size of pad as required to comply with anchor requirements.

Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.

Seismic Interactions:

Include provisions to prevent seismic impact between electrical components and other structural or nonstructural components.

Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.

Seismic Relative Displacement Provisions:

Use suitable fittings or flexible connections to accommodate:

Relative displacements at connections between components, including distributed systems (e.g. conduit, cable tray); do not exceed load limits for equipment utility connections.

Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.

Design displacements at seismic separations.

Anticipated drifts between floors.

Section 260553 - Identification for Electrical Systems

IDENTIFICATION REQUIREMENTS

Identification for Equipment:

Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

Switchboards:

Use identification nameplate to identify main overcurrent protective device.

Use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.

Panelboards:

Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.

Use typewritten circuit directory to identify load(s) served for panelboards with a door.

For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

Busway:

Provide identification at maximum intervals of 40 feet (12 m).

Use identification nameplate or identification label to identify load(s) served for each plug-in unit. Include location when not within sight of equipment.

Service Equipment:

Use identification nameplate to identify each service disconnecting means.

For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.

Emergency System Equipment:

Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.

Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

Use identification nameplate to identify equipment utilizing series ratings, where permitted, in accordance with NFPA 70.

Use identification nameplate to identify switchboards and panelboards utilizing a high leg delta system in accordance with NFPA 70.

Use identification nameplate or identification label to identify disconnect location for equipment with remote disconnecting means.

Use field-painted floor markings, floor marking tape or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.

Available Fault Current Documentation: Use identification nameplate to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.

Service equipment.

Industrial control panels.

Motor control centers.

Elevator control panels.

Industrial machinery.

Identification for Conductors and Cables:

Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

Identification for Raceways:

Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet (6.1 m).

Use identification labels, handwritten text using indelible marker or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor

penetrations, at roof penetrations and at equipment terminations when source is not within sight.

Use identification labels, handwritten text using indelible marker or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.

Use underground warning tape to identify underground raceways.

Identification for Boxes:

Use voltage markers or color coded boxes to identify systems other than normal power system.

Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

Identification for Devices:

Use identification label to identify fire alarm system devices.

Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.

Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.

Identification for Luminaires:

Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

IDENTIFICATION NAMEPLATES AND LABELS

Identification Nameplates:

Materials:

Indoor Clean, Dry Locations: Use plastic nameplates.

Outdoor Locations: Use plastic, stainless steel or aluminum nameplates suitable for exterior use.

Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.

Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.

Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.

Identification Labels:

Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.

Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

WIRE AND CABLE MARKERS

Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

UNDERGROUND WARNING TAPE

Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

Exception: Use foil-backed detectable type tape where required by serving utility or where directed by Owner.

Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).

Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.

FLOOR MARKING TAPE

Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlaminate, 3 inches (76 mm) wide, with alternating black and white stripes.

WARNING SIGNS AND LABELS

Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

Warning Signs:

Materials:

Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.

Outdoor Locations: Use factory pre-printed rigid aluminum signs.

Warning Labels:

Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.

Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.

Section 260923 - Lighting Control Devices

LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

Products for Switching of Electronic Ballasts/Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

AUTOMATIC LIGHTING CONTROL SYSTEMS

Manufacturers:

Acuity Brands Inc; www.acuitybrands.com/#sle.

WattStopper: www.wattstopper.com/#sle.

Lutron Electronics Company, Inc: www.lutron.com/#sle.

Osram Sylvania Inc.

Substitutions: See Section 016000 - Product Requirements.

Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

Capacity: system shall be capable of future expansion by at least 25 percent of installed capacity, including relays, control points, and programmability.

Programming: fully programmable system with serial bus and IP interface for programming and monitoring.

Functionality: system shall be capable of all functions indicated on drawings.

Emergency egress lighting: system shall be capable of emergency lighting control in compliance with UL 924, with capability to maintain proper separation from normal lighting in accordance with NFPA 70.

OCCUPANCY SENSORS

All Occupancy Sensors:

Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.

Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.

Wall Switch Occupancy Sensors:

All Wall Switch Occupancy Sensors:

Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.

Ceiling Mounted Occupancy Sensors:

All Ceiling Mounted Occupancy Sensors:

Description: Low profile occupancy sensors designed for ceiling installation.

Power Packs for Low Voltage Occupancy Sensors:

Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.

Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.

TIME SWITCHES

Digital Electronic Time Switches:

Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.

Program Capability:

24-Hour Time Switches: Single channel, with same schedule for each day of the week and skip-a-day feature to omit selected days.

7-Day Time Switches: Single channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days.

Astronomic Time Switches: Single channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days and field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.

Schedule Capacity: Not less than 16 programmable on/off operations.

IN-WALL TIME SWITCHES

Digital Electronic In-Wall Time Switches:

Description: Factory-assembled solid state programmable controller with LCD display, suitable for mounting in standard wall box, and listed and labeled as complying with UL 916 or UL 917.

Program Capability:

7-Day Time Switches: Capable of different schedule for each day of the week.

Astronomic Time Switches: Capable of different schedule for each day of the week and field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.

Schedule Capacity: Not less than 40 programmable on/off operations.

OUTDOOR PHOTO CONTROLS

Stem-Mounted Outdoor Photo Controls:

Description: Direct-wired photo control unit with threaded conduit mounting stem and field-adjustable swivel base, listed and labeled as complying with UL 773A.

Housing: Weatherproof, impact resistant polycarbonate.
Photo Sensor: Cadmium sulfide.

DAYLIGHTING CONTROLS

System Description: Control system consisting of photo sensors and compatible control modules and power packs, contactors, or relays as required for automatic control of load indicated according to available natural light; capable of integrating with occupancy sensors and manual override controls.

LIGHTING CONTACTORS

Description: Magnetic lighting contactors complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; noncombination type unless otherwise indicated; ratings, configurations and features as indicated on the drawings.

Section 262100 - Low-Voltage Electrical Service Entrance

ELECTRICAL SERVICE REQUIREMENTS

Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.
Electrical Service Characteristics: As indicated on drawings.
Utility Company: As indicated on drawings.
Division of Responsibility: As indicated on drawings.
Products Furnished by Contractor: Comply with Utility Company requirements.

Section 262200 - Low-Voltage Transformers

TRANSFORMERS - GENERAL REQUIREMENTS

Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.
Seismic Qualification: Provide transformers suitable for application under seismic design criteria in accordance with Section 260548 where required. Include certification of compliance with submittals.

GENERAL PURPOSE TRANSFORMERS

Description: Self-cooled, two winding transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.

Section 262413 - Switchboards

SWITCHBOARDS

Provide products listed, classified, and labeled as suitable for the purpose intended.
Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.
Service Entrance Switchboards:
Listed and labeled as suitable for use as service equipment according to UL 869A.
Seismic Qualification: Provide switchboards and associated components suitable for application under the seismic design criteria specified in Section 260548 where required. Include certification of compliance with submittals.
Short Circuit Current Rating:
Listed series ratings are acceptable only where specifically indicated.
Bussing: Sized in accordance with UL 891 temperature rise requirements.
Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
Phase and Neutral Bus Material: Aluminum or copper.
Ground Bus Material: Aluminum or copper.

Conductor Terminations: Suitable for use with the conductors to be installed.

Line Conductor Terminations:

Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Main and Neutral Lug Type: Mechanical.

Load Conductor Terminations:

Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Lug Type:

Provide mechanical lugs unless otherwise indicated.

Provide compression lugs where indicated.

Enclosures:

Outdoor Enclosures:

Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.

Arc Flash Energy-Reducing Maintenance Switching: For circuit breakers rated 1200 A or higher, provide a local accessory switch with status indicator light that permits selection of a maintenance mode with alternate electronic trip unit settings for reduced fault clearing time, or otherwise comply with the requirements of NEC 240.87.

OVERCURRENT PROTECTIVE DEVICES

Fusible Devices:

Fusible Switches:

Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA KS 1, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.

Circuit Breakers:

Molded Case Circuit Breakers:

Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.

Section 262416 - Panelboards

PANELBOARDS - GENERAL REQUIREMENTS

Provide products listed, classified, and labeled as suitable for the purpose intended.

Seismic Qualification: Provide panelboards and associated components suitable for application under the seismic design criteria specified in Section 260548 where required. Include certification of compliance with submittals.

Short Circuit Current Rating:

Listed series ratings are acceptable only where specifically indicated.

Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

Bussing: Sized in accordance with UL 67 temperature rise requirements.

Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

Boxes: Galvanized steel unless otherwise indicated.

Fronts:

Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 264300, list and label panelboards as a complete assembly including surge protective device.

POWER DISTRIBUTION PANELBOARDS

Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

Conductor Terminations:

Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Main and Neutral Lug Type: Mechanical.

Bussing:

Phase and Neutral Bus Material: Aluminum or copper.

Ground Bus Material: Aluminum or copper.

Circuit Breakers:

Provide bolt-on type.

Enclosures:

Provide surface-mounted enclosures unless otherwise indicated.

LIGHTING AND APPLIANCE PANELBOARDS

Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

Conductor Terminations:

Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Main and Neutral Lug Type: Mechanical.

Bussing:

Phase and Neutral Bus Material: Aluminum or copper.

Ground Bus Material: Aluminum or copper.

Circuit Breakers: Thermal magnetic bolt-on type.

Enclosures:

Provide surface-mounted or flush-mounted enclosures as indicated.

LOAD CENTERS

Description: Circuit breaker type load centers listed and labeled as complying with UL 67; ratings, configurations, and features as indicated on the drawings.

Bussing:

Bus Material: Aluminum or copper.

Circuit Breakers: Thermal magnetic plug-in type.

Enclosures:

Provide flush-mounted enclosures unless otherwise indicated.

OVERCURRENT PROTECTIVE DEVICES

Molded Case Circuit Breakers:

Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

Interrupting Capacity:

Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:

Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

Conductor Terminations:

Provide mechanical lugs unless otherwise indicated.

Provide compression lugs where indicated.

Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.

Do not use handle ties in lieu of multi-pole circuit breakers.

Section 262713 - Electricity Metering

EQUIPMENT FOR ELECTRICAL UTILITY METERING

Meter bases: provide meter socket bases as indicated, configuration to comply with all requirements of the serving electrical utility.

Current transformer cabinets and enclosures: comply with all requirements of the serving electrical utility.

Multi-metering equipment:

Gangable multiple meter sections, wall mounted unless indicated otherwise, located as indicated.

Formed and welded steel enclosure, baked enamel finish.

Factory assembled, tin-plated aluminum or copper bus bars.

200 amp rated meter sockets, comply with all requirements of the serving electrical utility.

EQUIPMENT FOR OWNER ELECTRICITY METERING

Provide products listed, classified, and labeled as suitable for the purpose intended.

Instrument Transformers:

Comply with IEEE C57.13, where applicable.

Section 262726 - Wiring Devices

WALL SWITCHES

Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way or four way as indicated on the drawings.

Exception: residential grade, 15A, 125V, wall switches are allowed within residential dwelling units where protected by a 15A breaker.

Locking Wall Switches: Commercial specification grade, 20 A, 120/277 V with lever type keyed switch actuator and maintained contacts; switches keyed alike; single pole single throw, double pole single throw, three way or four way as indicated on the drawings.

RECEPTACLES

Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.

NEMA configurations specified are according to NEMA WD 6.

Convenience Receptacles:

Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

Exception: residential grade, 15A, 125V, NEMA 5-15R receptacles are allowed in residential living units where protected by a 15A breaker.

Automatically Controlled Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; controlled receptacle marking on device face per NFPA 70; single or duplex as indicated on the drawings.

Weather Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

Tamper Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.

GFCI Receptacles:

GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.

USB Charging Devices:

USB Charging Devices - General Requirements: Listed as complying with UL 1310.

WALL PLATES

Wall Plates: Comply with UL 514D.

FLOOR BOX SERVICE FITTINGS

Description: Service fittings compatible with floor boxes provided under Section 260533.16 with components, adapters, and trims required for complete installation.

POKE-THROUGH ASSEMBLIES

Description: Assembly comprising floor service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination; fire rating listed to match fire rating of floor and suitable for floor thickness where installed.

Section 262813 - Fuses

FUSES

Provide products listed, classified, and labeled as suitable for the purpose intended.

Comply with UL 248-1.

Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

Class R Fuses: Comply with UL 248-12.

Class L Fuses: Comply with UL 248-10.

Section 262816.13 - Enclosed Circuit Breakers

ENCLOSED CIRCUIT BREAKERS

Description: Units consisting of molded case circuit breakers individually mounted in enclosures.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Seismic Qualification: Provide enclosed circuit breakers and associated components suitable for application under the seismic design criteria specified in Section 260548 where required. Include certification of compliance with submittals.

Short Circuit Current Rating:

Listed series ratings are only acceptable where specifically indicated.

Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.

Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

Provide externally operable handle with means for locking in the OFF position.

MOLDED CASE CIRCUIT BREAKERS

Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

Interrupting Capacity:

Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:

10,000 rms symmetrical amperes at 240 VAC or 208 VAC.

14,000 rms symmetrical amperes at 480 VAC.

Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.

Conductor Terminations:

Provide mechanical lugs unless otherwise indicated.

Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.

Section 262816.16 - Enclosed Switches

ENCLOSED SAFETY SWITCHES

Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy or general duty as indicated; ratings, configurations, and features as indicated on the drawings.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Seismic Qualification: Provide enclosed safety switches suitable for application under the seismic design criteria specified in Section 260548 where required. Include certification of compliance with submittals.

Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

Conductor Terminations: Suitable for use with the conductors to be installed.

Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

Heavy Duty Switches:

Comply with NEMA KS 1.

Conductor Terminations:

Provide mechanical lugs unless otherwise indicated.

Provide compression lugs where indicated.

Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

General Duty Switches:

Conductor Terminations:

Provide mechanical lugs.
Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

Section 264300 - Surge Protective Devices

SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mouonted SPDs.

List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.

Protected Modes:

Wye Systems: L-N, L-G, N-G, L-L.

Single Split Phase Systems: L-N, L-G, N-G, L-L.

UL 1449 Voltage Protection Ratings (VPRs):

208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.

240/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.

480Y/277V System Voltage: Not more than 1,500 V for L-N, L-G, and N-G modes and 2,000 V for L-L mode.

UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.

Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.

SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

Surge Protective Device:

Protection Circuits: Field-replaceable modular or non-modular.

Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.

UL 1449 Nominal Discharge Current (I-n): 20 kA.

UL 1449 Short Circuit Current Rating (SCCR): Not less than the maximum fault current at the installed location.

SURGE PROTECTIVE DEVICES FOR DISTRIBUTION LOCATIONS

Surge Protective Device:

Protection Circuits: Field-replaceable modular or non-modular.

Surge Current Rating: Not less than 80 kA per mode/160 kA per phase.

UL 1449 Nominal Discharge Current (I-n): 20 kA.

UL 1449 Short Circuit Current Rating (SCCR): Not less than the maximum fault current at the installed location.

SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

Surge Protective Device:

Protection Circuits: Field-replaceable modular or non-modular.

Surge Current Rating: Not less than 60 kA per mode/120 kA per phase.

UL 1449 Nominal Discharge Current (I-n): 20 kA.

UL 1449 Short Circuit Current Rating (SCCR): Not less than the maximum fault current at the installed location.

Section 265100 - Interior Lighting

LUMINAIRE TYPES

Furnish products as indicated in luminaire schedule included on the drawings.

LUMINAIRES

Provide products that comply with requirements of NFPA 70.

Provide products that are listed and labeled as complying with UL 1598, where applicable.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

Hazardous (Classified) Location Luminaires: Listed and labeled as complying with UL 844 for the classification of the installed location.

LED Luminaires:

Components: UL 8750 recognized or listed as applicable.

Tested in accordance with IES LM-79 and IES LM-80.

LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

All luminaires to be minimum 80 Color Rendering Index (CRI) unless indicated otherwise.

LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.

LED Tape - General Requirements:

Listed.

Designed for field cutting in accordance with listing.

Wet Location Applications: IEC 60529, IP 68 (waterproof) rated.

Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.

EMERGENCY LIGHTING UNITS

Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

EXIT SIGNS

Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

Section 265600 - Exterior Lighting

LUMINAIRE TYPES

Furnish products as indicated in luminaire schedule included on the drawings.

LUMINAIRES

Provide products that comply with requirements of NFPA 70.

Provide products that are listed and labeled as complying with UL 1598, where applicable.

Provide products listed, classified, and labeled as suitable for the purpose intended.

Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

LED Luminaires:

Components: UL 8750 recognized or listed as applicable.

Tested in accordance with IES LM-79 and IES LM-80.

LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.

LED Tape - General Requirements:

Listed.

Designed for field cutting in accordance with listing.

Wet Location Applications: IEC 60529, IP 68 (waterproof) rated.

POLES

All Poles:

Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.

Material: Steel, unless otherwise indicated.

Shape: Square straight, unless otherwise indicated.

Mounting: Install on concrete foundation, height as indicated on the drawings, unless

EXHIBIT A.5 - WAGE RATE 4/8/2021

WALSH CONSTRUCTION

Hourly Rates

Classification	Hourly Rate 2021	Hourly Rate 2022	Hourly Rate 2023
Project Executive	$133	$137	$141
Senior Project Manager	$124	$128	$131
Project Manager	$116	$119	$123
Project Engineer	$77	$79	$81
Safety Manager	$108	$111	$115
Project Superintendent	$115	$118	$122
Asst Superintendent	$98	$101	$104
Project Scheduler	$108	$111	$115
Assistant Manager	$101	$105	$108
Estimator	$129	$133	$137
Project Admin	$70	$72	$74
General Administrative	$68	$70	$72

Craft Labor Classification	Hourly Rate 2021	Hourly Rate 2022	Hourly Rate 2023
Carpenter Foreman	$86.88	$89.48	$92.17
Carpenter Foreman OT	$120.94	$124.57	$128.31
Carpenter Foreman (shift differential)	$120.94	$124.57	$128.31
Carpenter Foreman DT	$154.97	$159.62	$164.41
Carpenter Journeyman	$84.04	$86.56	$89.16
Carpenter Journeyman OT	$116.68	$120.18	$123.78
Carpenter Journeyman (shift differential)	$116.68	$120.18	$123.78
Carpenter Journeyman DT	$149.30	$153.78	$158.39
Laborer Foreman	$70.04	$72.14	$74.31
Labor Foreman OT	$88.82	$91.48	$94.23
Labor Foreman (shift differential)	$88.82	$91.48	$94.23
Labor Foreman DT	$112.84	$116.22	$119.71
Laborer Journeyman	$68.25	$71.66	$73.81
Labor Journeyman OT	$85.76	$88.33	$90.98
Labor Journeyman (shift differential)	$85.76	$88.33	$90.98
Labor Journeyman DT	$108.76	$112.02	$115.38

EXHIBIT A.5 - EQUIPMENT RATES

Walsh Construction Equipment Yard

Contractors Equipment Co.-Oregon Rental Schedule and Rates - As of 1/01/2021			
Item / Description	**Daily**	**Weekly**	**Monthly**
AIR COMPRESSORS			
Compressor - Wheel barrow type	$22	$65	$195
Compressor - Pancake	$10	$30	$90
Compressor - 185 cfm tow-behind	$100	$300	$900
AIR TOOLS			
Chipping Gun (Pneumatic 30#)	$23	$69	$200
Pavement Breaker (Jackhammer) 60#	$26	$78	$230
Pavement Breaker (Jackhammer) 90#	$30	$90	$260
Rivet Buster	$30	$100	$250
BUILDING DRY-OUT			
220v Electric Heaters- Portable	$10	$20	$40
High-Velocity Floor Fans	$20	$60	$120
Portable Dehumidifiers- 12 gallon	$40	$120	$360
Portable Dehumidifiers- 25 gallon	$60	$180	$540
CONCRETE EQUIPMENT			
Ceiling Grinders	$33	$98	$294
60 # Electric Breaker	$50	$150	$450
Concrete Blanket-Basket	$13	$48	$147
Concrete Bucket - 2 yd	$40	$120	$360
Concrete Bucket - 3/4, 1, 1-1/2 yd	$30	$90	$270
Concrete Coring Tool - (Hand-held)	$52	$144	$412
Concrete Trailer - Foundation Crews	$200	$600	$1,200
Concrete Vibrators - Gas-powered backpack	$60	$180	$420
Concrete Vibrators	$30	$90	$270
Demo Saws	$45	$135	$375
Generators - 6500 watt	$40	$120	$360
Georgia Buggies	$85	$250	$750
Concrete Mixers	$25	$75	$200
Rebar Bender - Hydraulic	$50	$150	$450
Rebar Cutter - Electric	$40	$120	$350
Aluma Post-Shore Braces	N/A	$3	$3
PERI Panels		$.60 per sq. ft.	$2.00 per sq. ft.
Rotohammers (Large)	$30	$100	$300
Concrete Slab Grab Handrails	$1	$3	$7
CONTAINERS - STORAGE			
Storage Containers, 8' x 10', no electricity	$15	$45	$120
Storage Containers, 8' x 20', lights,alarm, heat & power service	$20	$60	$180
Storage Containers, 8' x 40', lights, alarm,heat & power service	$25	$75	$225
EXCAVATION EQUIPMENT			
JOHN DEERE Mini-Excavators	$300	$900	$2,700
CAT Skid Steer Loader	$129	$388	$1,155
CASE 580-SL Backhoes	$225	$775	$2,300
CASE Dozer - Crawler Tractor 850-G	$340	$1,080	$2,900
Dump Trucks	$250	$1,100	$3,400
Water Truck - 2000 Gallon (Hourly $150.00)	$265	$800	$2,400
Ho-pak for CASE Backhoe	$100	$380	$1,200
Hitachi ZX 75 Excavator	$400	$1,300	$3,500
KOMATSU Excavators, PC160 LC-7	$500	$1,500	$4,500
Dynapac CC 1200 Roller	$400	$1,200	$3,600
Trailer - Excavation Crew Trailer	$65	$210	$650
LARGE SAWS			
Table Saw	$24	$55	$168
Tablesaw Powermatic Finish	$26	$82	$232
MATERIAL HANDLING - Cranes, Forklifts, Lifts, Man Basket, Window Boxes			
Boom Lifts - 60' Straight Boom -500# capacity	$350	$1,000	$3,000
Boom Lift- 80' Articulated	$700	$1,800	$4,000
Crane - Potain HDT 80 - Self-Erector (including maint. agreement)	N/A	$3,500	$10,500
Crane - LIEBHERR 281 HC Tower Crane (including maint. agreement)	N/A	$4,600	$14,000
Crane - LIEBHERR 420 EC-H 16 Tower Crane (including maint. agreement)	N/A	$6,600	$20,000
Crane Pallet Forks	$50	$150	$450
Man/Material Hoist - Alimak FC 7100-12 (including maint. Agreement)	$1,000	$2,500	$8,000
Intercoms/Interlocks for Man/Material Hoist	$75	$215	$645
Forklifts- HYSTER Lift Truck, 5000# capacity, propane	$130	$400	$1,200
Forklifts- SKYJACK VR-1056 (56'-10k)	$400	$1,300	$3,800
Forklifts- INGERSOLL-RAND VR-843 (43'-8k)	$350	$1,100	$3,200
Forklifts- GEHL RS5-19 RT Forklift -19' lift height w/ 5000# capacity	$200	$600	$1,800

EXHIBIT A.5 - EQUIPMENT RATES

Walsh Construction Equipment Yard

2' Truss Boom attachment for RT Forklifts	$40	$120	$300
Genie Lifts, 650 lbs.	$35	$110	$270
Man-basket (personnel platform)	$21	$68	$205
Scissor Lift- SKYJACK 500# capacity- 19' platform height	$70	$210	$500
Window Basket - 5' x 10'	$21	$68	$205
PAINT EQUIPMENT			
Paint spray pump - 500 & 600 ULTRA & 447E TITAN	$33	$108	$330
Paint spray pumps - ULTRA 1500 & 1000 or SPEEDO 4500	$61	$183	$551
Adhesive spray pump	$200	$400	$800
Painters' Van	$36	$118	$361
PRESSURE WASHERS			
Pressure Washer - Cold Water - 2500 psi & 3500 psi	$52	$160	$485
RADIOS / COMMUNICATIONS			
Radios : 2-Way	$15	$45	$100
SIDING EQUIPMENT			
Aluma-Pole Pump Jacks- per set	$50	$100	$300
SAFETY/SECURITY EQUIPMENT			
Roof top anchor sytem - Flat roofs	$75	$200	$600
Yo-Yo (Controlled Descent Block)	$25	$75	$200
SCAFFOLDING			
Baker Scaffold - 1 section w/ plank & handrails	$15	$51	$150
SURVEY & PRECISION MEASURING EQUIPMENT			
Builder's Level	$34	$76	$230
Digital Transits	$40	$100	$310
Lasers - (RL-VH & Laser Theodolite)	$75	$210	$625
Lasers (LB-1, LB-2, LB-10)	$50	$150	$450
Pipe Laser	$100	$300	$900
3-Second Total Station	$175	$525	$1,550
Total Station	$150	$450	$1,350
TEMPORARY POWER			
Temporary Power Box (Spider Box)	$30	$90	$180
50' Baloney Cord	$15	$45	$120
Multiquip 56kw Generators	$100	$700	$1,500
200 Amp Service Panel	$10	$30	$90
TRASH BOXES & CHUTES			
Trash Box - Crane-Clamshell	$25	$75	$250
Trash Box - Crane - 4 yd self-dumping	$50	$150	$450
Trash Box - 5' x 10' front opening	$25	$75	$250
Trash Box- forklift: front tilt, self-dumping	$25	$75	$250
TRUCKS - Pickup & Delivery Trips Within a Distance of:	*50 Miles*	*100 Miles*	*200 Miles*
GMC 1-1/2 Ton Flatbed	$50	$100	$150
Dodge 5 Ton flatbed	$65	$135	$200
Dodge- Service Truck	$50	$100	$150
Volvo with 48' Equipment/Material Hauler		$90 Per Hour -	
Kenworth 24' Flatbed	$80	$160	$250
Storage Trailers			
Storage Trailers- 45' & 48'	$20	$70	$200
WELDERS & CUTTING TORCHES			
Cutting Torch w/ Tanks	$25	$75	$225
Welder	$29	$87	$234
MISCELLANEOUS - Banders, Drills, Framing Boxes, Pumps, etc.			
Bander w/ Cart	$15	$50	$150
Backpack Blower	$15	$45	$135
Magnetic Drill Press	$40	$120	$360
Sump Pumps - 2"	$30	$90	$270
Chain Saws	$10	$30	$100
Negative Air Machine- Medium	$40	$120	$230
Negative Air Machine- Large	$50	$150	$350
Picking Eye- for steel plates	$12	$36	$120
Large Steel Plates	$25	$75	$200
Tool Skips 4x4 (wood sides)	$8	$25	$77

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
1	**HACC Webster Road Rehab**	**308 days**	**Fri 4/9/21**	**Fri 6/24/22**
2	**Submittals**	**270 days**	**Fri 4/9/21**	**Tue 5/3/22**
3	**02 41 19 - Proposed Protection Measures**	**26 days**	**Tue 5/18/21**	**Thu 6/24/21**
9	**02 41 19 - Closeout - Inventory and Landfill Records**	**36 days**	**Fri 6/25/21**	**Mon 8/16/21**
15	**03 30 00 - CIP Mix Designs and Consumables**	**46 days**	**Wed 7/14/21**	**Fri 9/17/21**
21	**03 30 00 - CIP Rebar Shops**	**76 days**	**Tue 6/1/21**	**Fri 9/17/21**
27	**03 35 43 - Special Concrete Floor Finishes**	**66 days**	**Mon 9/20/21**	**Thu 12/23/21**
33	**05 50 00 - Metal Fabrications - Product Data and Welding Certs**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
39	**05 50 00 - Metal Fabrications - Site Steel Shops**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
45	**05 50 00 - Metal Fabrications - Bent Plate at Fireplace Hearth Shops**	**81 days**	**Mon 6/28/21**	**Thu 10/21/21**
51	**05 50 00 - Metal Fabrications - Samples**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
57	**05 50 00 - Metal Fabrications - Engineering**	**101 days**	**Fri 10/1/21**	**Fri 2/25/22**
63	**06 10 00 - Rough Carpentry - Product Data**	**71 days**	**Wed 6/16/21**	**Mon 9/27/21**
69	**06 16 00 - Sheathing - Product Data**	**71 days**	**Wed 6/16/21**	**Mon 9/27/21**
75	**06 18 00 - Glu-Lams - Product Data**	**71 days**	**Wed 6/16/21**	**Mon 9/27/21**
81	**06 18 00 - Glu-Lams - Shops**	**71 days**	**Wed 6/16/21**	**Mon 9/27/21**
87	**06 18 00 - Glu-Lams - Engineering**	**81 days**	**Wed 6/2/21**	**Mon 9/27/21**
93	**06 20 13 - Exterior Finish Carpentry - Cedar Product data**	**81 days**	**Wed 7/21/21**	**Fri 11/12/21**
99	**06 20 13 - Exterior Finish Carpentry - Cedar Samples**	**81 days**	**Wed 7/21/21**	**Fri 11/12/21**
105	**06 40 23 - Interior Arch. Woodwork - Unrated Door Frames and Trim - Product Data**	**101 days**	**Tue 8/24/21**	**Wed 1/19/22**
111	**06 40 23 - Interior Arch. Woodwork - Unrated Door Frames and Trim - Samples**	**101 days**	**Tue 8/24/21**	**Wed 1/19/22**
117	**06 40 23 - Interior Arch. Woodwork - Millwork - Product Data**	**71 days**	**Wed 10/6/21**	**Wed 1/19/22**
123	**06 40 23 - Interior Arch. Woodwork - Millwork - Samples**	**71 days**	**Wed 10/6/21**	**Wed 1/19/22**
129	**06 40 23 - Interior Arch. Woodwork - Wall Coverings - Plam PL-1 and PL-3 - Product Data**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
135	**06 40 23 - Interior Arch. Woodwork - Wall Coverings - Plam PL-1 and PL-3 - Samples**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
141	**06 40 23 - Interior Arch. Woodwork - Wall Coverings - Formica PL-2 and PL-4 - Product Data**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
147	**06 40 23 - Interior Arch. Woodwork - Wall Coverings - Formica PL-2 and PL-4 - Samples**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
153	**06 40 23 - Interior Arch. Woodwork - Closet and Storage Shelving - Product Data**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
159	**06 40 23 - Interior Arch. Woodwork - Closet and Storage Shelving - Samples**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
165	**06 40 23 - Interior Arch. Woodwork - Concealed Countertop Brackets - Product Data**	**71 days**	**Wed 9/29/21**	**Wed 1/12/22**
171	**07 21 00 - Thermal Insulation - Product Data**	**61 days**	**Mon 8/23/21**	**Wed 11/17/21**
177	**07 25 00 - Water Resistive Barrier - Product Data**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
183	**07 46 46 - Fiber Cement Siding - Product Data**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
189	**07 46 46 - Fiber Cement Siding - Samples**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
195	**07 54 23 - TPO Roofing - Product Data**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
201	**07 54 23 - TPO Roofing - Samples**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
207	**07 62 00 - Sheet Metal Flashing - Product Data**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**

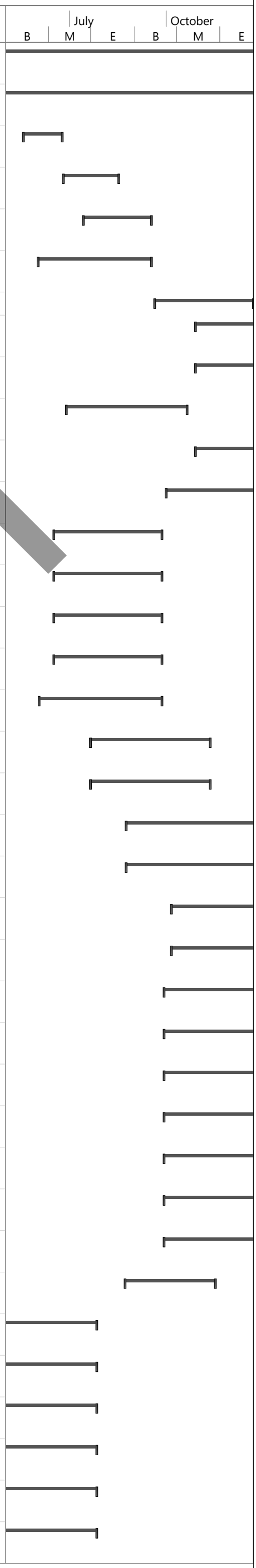

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
213	**07 62 00 - Sheet Metal Flashing - Shops**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
219	**07 62 00 - Sheet Metal Flashing - Samples**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
225	**07 84 13 - Firestopping - Product Data and Details**	**61 days**	**Thu 7/29/21**	**Mon 10/25/21**
231	**07 92 00 - Joint Sealants - Product Data / schedule**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
237	**07 92 00 - Joint Sealants - Samples / adhesion test**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
243	**08 11 13 - HM Frames and Doors - Product Data**	**71 days**	**Wed 6/23/21**	**Fri 10/1/21**
249	**08 11 13 - HM Frames and Doors - Shops**	**71 days**	**Wed 6/23/21**	**Fri 10/1/21**
255	**08 11 13 - HM Frames and Doors - Samples**	**71 days**	**Wed 6/23/21**	**Fri 10/1/21**
261	**08 14 16 - Wood Doors and Frames - Product Data**	**91 days**	**Wed 6/23/21**	**Fri 10/29/21**
267	**08 14 16 - Wood Doors and Frames - Shops**	**101 days**	**Wed 6/23/21**	**Fri 11/12/21**
273	**08 14 16 - Wood Doors and Frames - Samples**	**81 days**	**Wed 6/23/21**	**Fri 10/15/21**
279	**08 22 50 - Fiberglass Faced Doors and Frames - Product Data**	**81 days**	**Wed 6/23/21**	**Fri 10/15/21**
285	**08 22 50 - Fiberglass Faced Doors and Frames - Shops**	**81 days**	**Wed 6/23/21**	**Fri 10/15/21**
291	**08 31 13 - Access Doors and Frames - Product Data**	**61 days**	**Wed 9/1/21**	**Tue 11/30/21**
297	**08 53 13 - Vinyl Windows - Product Data**	**91 days**	**Wed 6/23/21**	**Fri 10/29/21**
303	**08 53 13 - Vinyl Windows - Shops**	**91 days**	**Wed 6/23/21**	**Fri 10/29/21**
309	**08 53 13 - Vinyl Windows - Samples**	**91 days**	**Wed 6/23/21**	**Fri 10/29/21**
315	**08 62 00 - Skylights - Product Data**	**91 days**	**Wed 6/2/21**	**Mon 10/11/21**
321	**08 62 00 - Skylights - Samples**	**91 days**	**Wed 6/2/21**	**Mon 10/11/21**
327	**08 71 00 - Door Hardware - Product Data**	**76 days**	**Fri 7/23/21**	**Tue 11/9/21**
333	**08 71 00 - Door Hardware - Shops**	**76 days**	**Fri 7/23/21**	**Tue 11/9/21**
339	**08 71 00 - Door Hardware - Samples**	**76 days**	**Fri 7/23/21**	**Tue 11/9/21**
345	**08 71 00 - Door Hardware - Keying Schedule**	**76 days**	**Fri 7/23/21**	**Tue 11/9/21**
351	**08 80 00 - Glazing - Product Data**	**71 days**	**Wed 10/6/21**	**Wed 1/19/22**
357	**08 80 00 - Glazing - Shops and Engineering?**	**71 days**	**Wed 10/6/21**	**Wed 1/19/22**
363	**08 83 00 - Mirrors - Product Data**	**71 days**	**Thu 10/21/21**	**Thu 2/3/22**
369	**08 83 00 - Mirrors - Shops**	**71 days**	**Thu 10/21/21**	**Thu 2/3/22**
375	**09 22 16 - Non-Structural Metal Framing - Product Data**	**61 days**	**Tue 8/31/21**	**Mon 11/29/21**
381	**09 29 00 - Gypsum Board - Product Data**	**61 days**	**Tue 8/31/21**	**Mon 11/29/21**
387	**09 29 00 - Gypsum Board - Samples**	**61 days**	**Tue 8/31/21**	**Mon 11/29/21**
393	**09 29 00 - Gypsum Board - Shops?**	**61 days**	**Tue 8/31/21**	**Mon 11/29/21**
399	**09 30 13 - Ceramic Tile - Product Data**	**71 days**	**Fri 11/12/21**	**Fri 2/25/22**
405	**09 30 13 - Ceramic Tile - Samples**	**71 days**	**Fri 11/12/21**	**Fri 2/25/22**
411	**09 51 13 - Acoustical Panel Ceilings - Product Data**	**66 days**	**Wed 10/6/21**	**Wed 1/12/22**
417	**09 51 13 - Acoustical Panel Ceilings - Samples**	**66 days**	**Wed 10/6/21**	**Wed 1/12/22**
423	**09 51 13 - Acoustical Panel Ceilings - Shops?**	**66 days**	**Wed 10/6/21**	**Wed 1/12/22**
429	**09 65 13 - Resilient Base and Accessories - Product Data**	**61 days**	**Mon 9/27/21**	**Thu 12/23/21**
435	**09 65 13 - Resilient Base and Accessories - Samples**	**61 days**	**Mon 9/27/21**	**Thu 12/23/21**

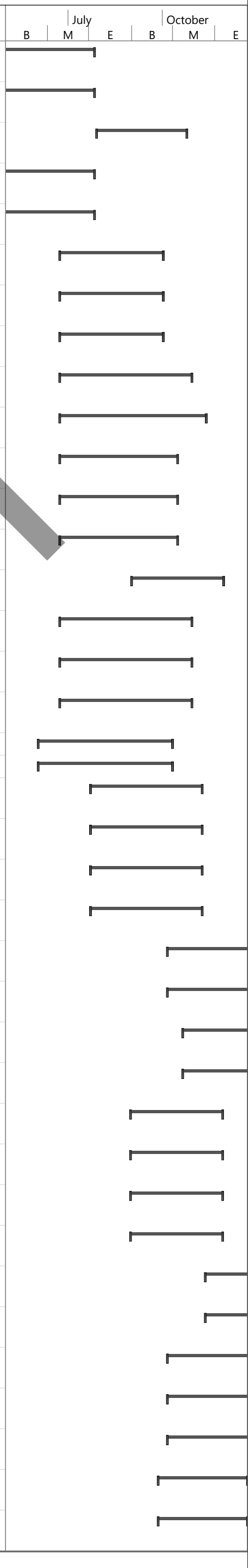

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
441	**09 65 16 - Resilient Sheet Flooring - Product Data**	**81 days**	**Fri 8/27/21**	**Thu 12/23/21**
447	**09 65 16 - Resilient Sheet Flooring - Samples**	**81 days**	**Fri 8/27/21**	**Thu 12/23/21**
453	**09 68 13 - Carpet Tile - Product Data**	**76 days**	**Fri 9/3/21**	**Thu 12/23/21**
459	**09 68 13 - Carpet Tile - Samples**	**76 days**	**Fri 9/3/21**	**Thu 12/23/21**
465	**09 91 13 - Exterior Paint - Product Data**	**61 days**	**Wed 9/15/21**	**Mon 12/13/21**
471	**09 91 13 - Exterior Paint - Drawdowns**	**61 days**	**Wed 9/15/21**	**Mon 12/13/21**
477	**09 91 23 - Interior Paint - Product Data**	**61 days**	**Wed 9/1/21**	**Tue 11/30/21**
483	**09 91 23 - Interior Paint - Drawdowns**	**61 days**	**Wed 9/1/21**	**Tue 11/30/21**
489	**10 14 23 - Signage - Product Data**	**61 days**	**Tue 1/25/22**	**Wed 4/20/22**
495	**10 14 23 - Signage - Shops**	**61 days**	**Tue 1/25/22**	**Wed 4/20/22**
501	**10 14 23 - Signage - Samples**	**61 days**	**Tue 1/25/22**	**Wed 4/20/22**
507	**10 26 00 - Wall Protection (Corner Guards) - Product Dat**	**61 days**	**Tue 1/25/22**	**Wed 4/20/22**
513	**10 26 00 - Wall Protection (Corner Guards) - Samples**	**61 days**	**Tue 1/25/22**	**Wed 4/20/22**
519	**10 28 00 - Toilet and Bath Accessories - Product Data**	**61 days**	**Thu 11/4/21**	**Thu 2/3/22**
525	**10 28 00 - Toilet and Bath Accessories - Samples**	**61 days**	**Thu 11/4/21**	**Thu 2/3/22**
531	**10 31 00 - Manufactured Gas Fireplaces - Product Data**	**61 days**	**Tue 11/23/21**	**Tue 2/22/22**
537	**10 31 00 - Manufactured Gas Fireplaces - Shops**	**61 days**	**Tue 11/23/21**	**Tue 2/22/22**
543	**10 31 00 - Manufactured Gas Fireplaces - Samples**	**61 days**	**Tue 11/23/21**	**Tue 2/22/22**
549	**10 44 16 - Fire Extinguishers - Product Data**	**61 days**	**Wed 6/30/21**	**Mon 9/27/21**
555	**10 55 00 - Postal Specialties - Product Data**	**81 days**	**Mon 6/28/21**	**Thu 10/21/21**
561	**10 55 00 - Postal Specialties - Shops**	**96 days**	**Mon 6/7/21**	**Thu 10/21/21**
568	**10 55 00 - Postal Specialties - Samples**	**81 days**	**Mon 6/28/21**	**Thu 10/21/21**
574	**10 75 16 - Ground Set Flagpoles - Product Data**	**81 days**	**Wed 12/1/21**	**Mon 3/28/22**
580	**10 75 16 - Ground Set Flagpoles - Shops**	**81 days**	**Wed 12/1/21**	**Mon 3/28/22**
586	**10 75 16 - Ground Set Flagpoles - Engineering**	**81 days**	**Wed 12/1/21**	**Mon 3/28/22**
592	**10 75 16 - Ground Set Flagpoles - Samples**	**81 days**	**Wed 12/1/21**	**Mon 3/28/22**
598	**11 31 00 - Residential Appliances - Product Data**	**61 days**	**Thu 11/11/21**	**Thu 2/10/22**
604	**12 24 13 - Window Shades - Product Data**	**61 days**	**Thu 11/4/21**	**Thu 2/3/22**
610	**12 24 13 - Window Shades - Shops**	**61 days**	**Thu 11/4/21**	**Thu 2/3/22**
616	**12 24 13 - Window Shades - Samples**	**61 days**	**Thu 11/4/21**	**Thu 2/3/22**
622	**12 35 30 - Residential Casework - Product Data**	**86 days**	**Wed 9/8/21**	**Wed 1/12/22**
628	**12 35 30 - Residential Casework - Shops**	**86 days**	**Wed 9/8/21**	**Wed 1/12/22**
634	**12 35 30 - Residential Casework - Samples**	**86 days**	**Wed 9/8/21**	**Wed 1/12/22**
640	**12 35 30 - Countertops - Product Data**	**66 days**	**Wed 10/13/21**	**Wed 1/19/22**
646	**12 35 30 - Countertops - Shops**	**66 days**	**Wed 10/13/21**	**Wed 1/19/22**
652	**12 35 30 - Countertops - Samples**	**66 days**	**Wed 10/13/21**	**Wed 1/19/22**
658	**12 93 00 - Site Structure - Product Data**	**61 days**	**Tue 1/11/22**	**Wed 4/6/22**

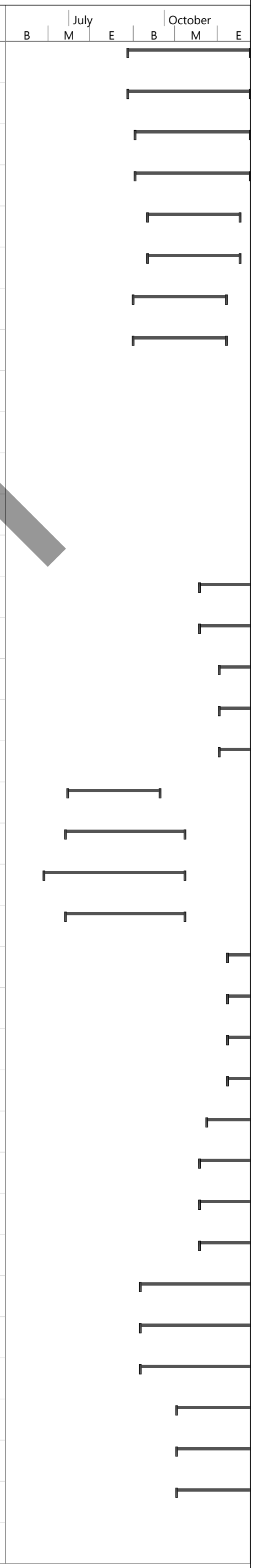

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
664	**12 93 00 - Site Structure - Shops**	**86 days**	**Fri 12/3/21**	**Wed 4/6/22**
670	**12 93 00 - Site Structure - Engineering**	**76 days**	**Fri 12/17/21**	**Wed 4/6/22**
676	**12 93 00 - Site Structure - Samples**	**61 days**	**Tue 1/11/22**	**Wed 4/6/22**
682	**12 93 13 - Bike Storage - Product Data**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
688	**12 93 13 - Bike Storage - Shops**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
694	**12 93 13 - Bike Storage - Samples**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
700	**21 13 13 - Wet Pipe Sprinkler Systems**	**61 days**	**Tue 7/27/21**	**Thu 10/21/21**
706	**22 00 00 - General Plumbing Provisions**	**46 days**	**Fri 6/4/21**	**Mon 8/9/21**
712	**22 05 00 - Common Work Results for Plumbing**	**46 days**	**Fri 6/25/21**	**Mon 8/30/21**
718	**22 05 10 - Plumbing Insulation**	**46 days**	**Fri 6/25/21**	**Mon 8/30/21**
724	**22 07 50 - System Identification**	**56 days**	**Fri 6/25/21**	**Tue 9/14/21**
730	**22 10 00 - Plumbing Piping and Pumps**	**56 days**	**Fri 6/25/21**	**Tue 9/14/21**
736	**22 30 00 - Plumbing Equipment**	**41 days**	**Fri 6/25/21**	**Mon 8/23/21**
742	**22 40 00 - Plumbing Fixtures**	**86 days**	**Thu 5/20/21**	**Tue 9/21/21**
748	**23 01 00 - Operations and Maintenance**	**66 days**	**Tue 7/20/21**	**Thu 10/21/21**
754	**23 05 00 - Common Work Results for HVAC**	**66 days**	**Tue 7/20/21**	**Thu 10/21/21**
760	**23 05 29 - Hangers and Supports for HVAC Piping and Equipment**	**66 days**	**Tue 7/20/21**	**Thu 10/21/21**
769	**23 05 53 - Mechanical Identification**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
775	**23 05 93 - Testing Adjusting and Balancing**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
781	**23 07 16 - Ductwork Insulation**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
787	**23 07 19 - HVAC Piping Insulation**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
793	**23 23 00 - Refrigerant Piping**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
799	**23 31 00 - HVAC Ducts and Casings**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
805	**23 33 00 - Air Duct Accessories**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
811	**23 34 00 - HVAC Fans**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
817	**23 37 00 - Air Outlets and Inlets**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
823	**23 41 00 - Particulate Air Filtration**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
829	**23 81 00 - Decentralized Unitary Air Conditioner Units**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
835	**23 81 26 - Split System Air Conditioners and Heat Pumps**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
841	**26 05 19 - Low-Voltage Electrical Power Conductors and Cables**	**66 days**	**Thu 7/22/21**	**Mon 10/25/21**
847	**26 05 26 - Grounding and Bonding**	**66 days**	**Thu 7/22/21**	**Mon 10/25/21**
853	**26 05 29 - Hangers and Supports for Electrical Systems**	**66 days**	**Thu 7/22/21**	**Mon 10/25/21**
859	**26 05 33 - Conduit for Electrical Systems**	**66 days**	**Thu 7/22/21**	**Mon 10/25/21**
865	**26 05 48 - Vibration and Seismic Controls for Electrical Systems**	**66 days**	**Thu 7/22/21**	**Mon 10/25/21**
871	**26 05 53 - Identification for Electrical Systems**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
877	**26 09 23 - Lighting Control Devices**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
883	**26 21 00 - Low-Voltage Electrical Service Entrance**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**

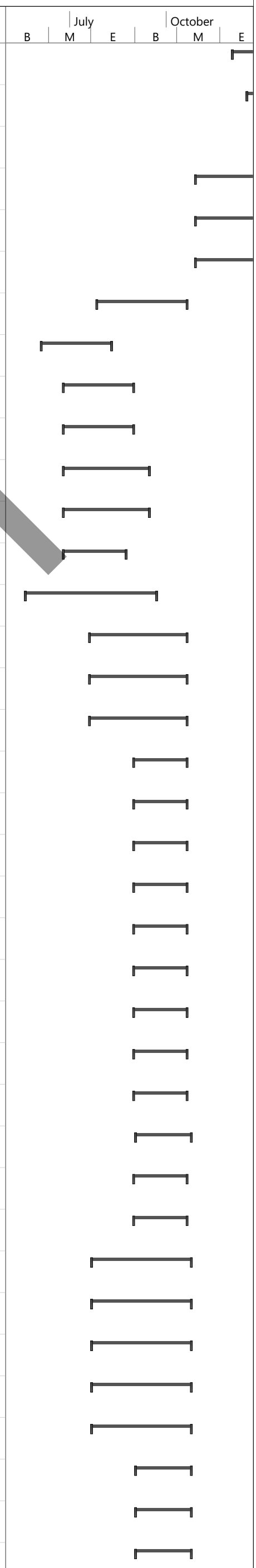

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
889	**26 22 00 - Low-Votage Electrical Transformers**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
895	**26 24 13 - Switchboards**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
901	**26 24 16 - Panelboards**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
907	**26 27 13 - Electricity Metering**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
913	**26 27 26 - Wiring Devices**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
919	**26 28 13 - Fuses**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
925	**26 28 16 - Enclosed Switches and Circuit Breakers**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
931	**26 43 00 - Surge Protecetion Devices**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
937	**26 51 00 - Interior Lighting**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
943	**26 56 00 - Exterior Lighting**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
949	**27 05 28 - Pathways for Communication Systems**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
955	**27 05 53 - Labeling for Communication Systems**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
961	**27 15 13 - Communications Copper Horizontal Cabling**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
967	**28 10 00 - Electronic Access Control & Intrusion Detectic**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
973	**28 23 00 - Video Surveillance**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
979	**28 31 11 - Digital Addressable Fire-Alarm System**	**36 days**	**Thu 9/2/21**	**Mon 10/25/21**
985	**29 09 00 - Building Automation System (BAS) Controls**	**36 days**	**Tue 8/31/21**	**Thu 10/21/21**
991	**31 10 00 - Site Clearing - Existing Conditions**	**18 days**	**Wed 5/26/21**	**Tue 6/22/21**
997	**31 20 00 - Earth Moving - Product Data**	**36 days**	**Fri 4/30/21**	**Tue 6/22/21**
1003	**32 12 16 - Asphalt Paving - Product Data**	**61 days**	**Mon 2/7/22**	**Tue 5/3/22**
1009	**32 12 16 - Asphalt Paving - Mix Designs**	**61 days**	**Mon 2/7/22**	**Tue 5/3/22**
1015	**32 13 13 - Concrete Paving - Mix Design**	**61 days**	**Fri 11/5/21**	**Fri 2/4/22**
1021	**32 31 29 - Exterior Wood - Product Data**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
1027	**32 31 29 - Exterior Wood - Samples**	**61 days**	**Thu 4/29/21**	**Tue 7/27/21**
1033	**32 33 00 - Site Furnishings - Product Data**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
1039	**32 33 00 - Site Furnishings - Shops**	**81 days**	**Fri 10/29/21**	**Fri 2/25/22**
1045	**32 84 00 - Irrigation - Product Data**	**61 days**	**Wed 11/17/21**	**Wed 2/16/22**
1051	**32 84 00 - Irrigation - Shops / Zone Plans**	**61 days**	**Wed 11/17/21**	**Wed 2/16/22**
1057	**32 91 13 - Soil Preparation - Product Data**	**61 days**	**Fri 12/3/21**	**Wed 3/2/22**
1063	**32 91 13 - Soil Preparation - Samples**	**61 days**	**Fri 12/3/21**	**Wed 3/2/22**
1069	**32 93 00 - Plants - Product Data**	**61 days**	**Tue 12/7/21**	**Fri 3/4/22**
1075	**32 93 00 - Plants - Samples**	**61 days**	**Tue 12/7/21**	**Fri 3/4/22**
1081	**33 11 00 - Water Distribution - Product Data**	**71 days**	**Fri 4/9/21**	**Wed 7/21/21**
1087	**33 11 00 - Water Distribution - Shops**	**71 days**	**Fri 4/9/21**	**Wed 7/21/21**
1093	**33 31 00 - Sanitary Sewerage - Product Data**	**61 days**	**Tue 6/15/21**	**Fri 9/10/21**
1099	**33 31 00 - Sanitary Sewerage - Shops**	**61 days**	**Tue 6/15/21**	**Fri 9/10/21**
1105	**33 41 00 - Storm Utility Drainage - Product Data**	**61 days**	**Mon 6/28/21**	**Thu 9/23/21**

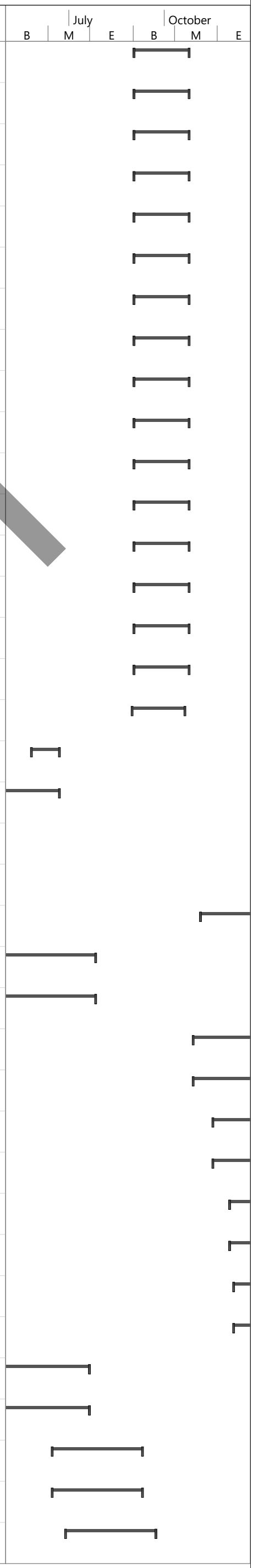

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
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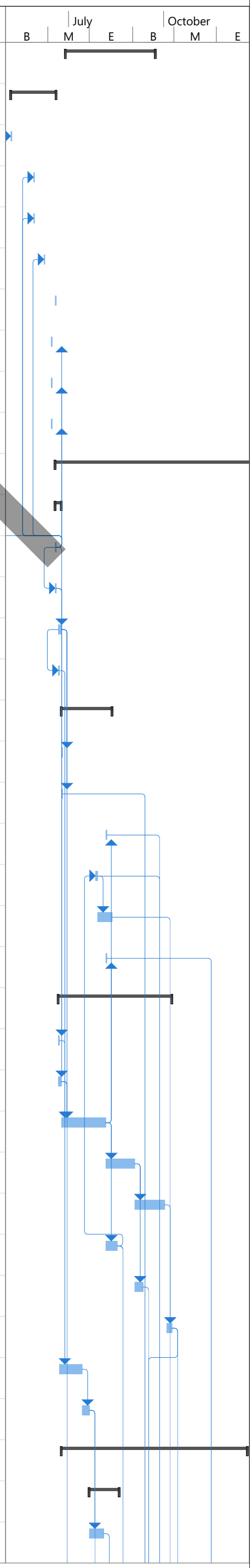
ID	Task Name	Duration	Start	Finish
1111	**33 46 00 - Subdrainage - Product Data**	**61 days**	**Mon 6/28/21**	**Thu 9/23/21**
1117	**Pre-NTP Meetings/Tasks**	**31 days**	**Thu 5/6/21**	**Fri 6/18/21**
1118	Meet with the City	1 day	Thu 5/6/21	Thu 5/6/21
1119	Video City SS Main	1 day	Fri 5/28/21	Fri 5/28/21
1120	Notify Trimet for bus stop relocate	1 day	Fri 5/28/21	Fri 5/28/21
1121	Abatement / Demo	1 day	Mon 6/7/21	Mon 6/7/21
1122	Waste Management Plan	1 day	Fri 6/18/21	Fri 6/18/21
1123	Locates	1 day	Mon 6/14/21	Mon 6/14/21
1124	Earthwork / Arborist / City Inspector	1 day	Mon 6/14/21	Mon 6/14/21
1125	Sign Waivers for Disposal Bins	1 day	Mon 6/14/21	Mon 6/14/21
1126	**Construction (259 Days)**	**259 days**	**Fri 6/18/21**	**Fri 6/24/22**
1127	**Construction Start-Up**	**4 days**	**Fri 6/18/21**	**Wed 6/23/21**
1128	***Notice to proceed***	***1 day***	***Fri 6/18/21***	***Fri 6/18/21***
1129	***Permit Issued***	***1 day***	***Fri 6/18/21***	***Fri 6/18/21***
1130	***Mobilization***	***3 days***	***Mon 6/21/21***	***Wed 6/23/21***
1131	Install Erosion Control	1 day	Mon 6/21/21	Mon 6/21/21
1132	**Pre-Con Meetings**	**34 days**	**Thu 6/24/21**	**Wed 8/11/21**
1133	Project Team Roles and Responsibilities	1 day	Thu 6/24/21	Thu 6/24/21
1134	Special Inspector	1 day	Thu 6/24/21	Thu 6/24/21
1135	Earth Advantage	1 day	Fri 8/6/21	Fri 8/6/21
1136	BEC Meeting	2 days	Tue 7/27/21	Wed 7/28/21
1137	Mockup	10 days	Thu 7/29/21	Wed 8/11/21
1138	Fire-proofing	1 day	Fri 8/6/21	Fri 8/6/21
1139	**Demolition**	**78 days**	**Mon 6/21/21**	**Fri 10/8/21**
1140	PGE disconnect service	1 day	Mon 6/21/21	Mon 6/21/21
1141	***NW Natural disconnect service***	***3 days***	***Mon 6/21/21***	***Wed 6/23/21***
1142	***Abatement and slab grind - West wing and Center***	***30 days***	***Thu 6/24/21***	***Thu 8/5/21***
1143	Abatement and slab grind - North Wing	20 days	Fri 8/6/21	Thu 9/2/21
1144	Abatement and slab grind - East Wing	20 days	Fri 9/3/21	Fri 10/1/21
1145	***Demo remaining finishes/walls/openings - West Win***	***7 days***	***Fri 8/6/21***	***Mon 8/16/21***
1146	Demo remaining finishes/walls/openings - North Wing	5 days	Fri 9/3/21	Fri 9/10/21
1147	Demo remaining finishes/walls/openings - East Wing	5 days	Mon 10/4/21	Fri 10/8/21
1148	Clear and grub site / working rock around perimiter of building	15 days	Tue 6/22/21	Tue 7/13/21
1149	Demo misc. site items and hardscapes (except AC)	5 days	Wed 7/14/21	Tue 7/20/21
1150	**Utilities**	**124 days**	**Thu 6/24/21**	**Mon 12/20/21**
1151	**Domestic Water**	**21 days**	**Wed 7/21/21**	**Wed 8/18/21**
1152	Demo old vault. Install new 3" DCVA Vault	10 days	Wed 7/21/21	Tue 8/3/21



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Walsh Construction
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Project: HACC Webster Road Rehab
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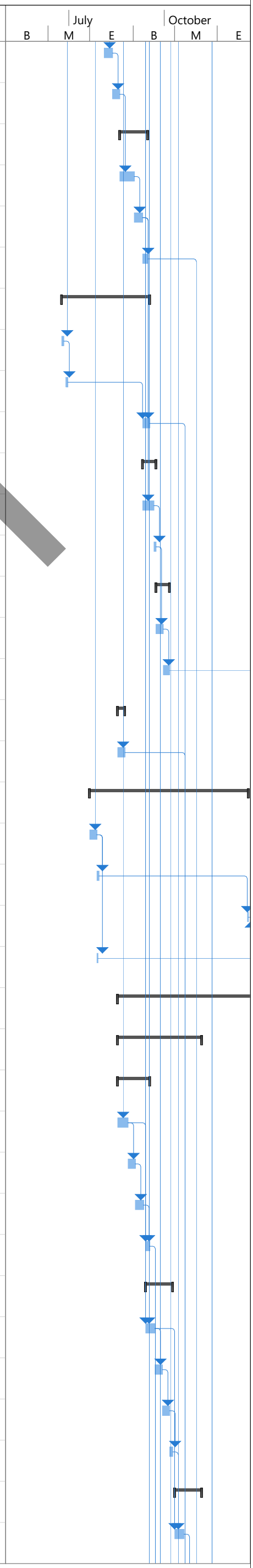
ID	Task Name	Duration	Start	Finish
1153	Dig/Install/Inspect/Backfill domestic to building POC	6 days	Wed 8/4/21	Wed 8/11/21
1154	Bug Test / Tie-In to City Meter	5 days	Thu 8/12/21	Wed 8/18/21
1155	**Fire Water Service**	**18 days**	**Thu 8/19/21**	**Tue 9/14/21**
1156	Demo old vault. Install new vault and assembly	10 days	Thu 8/19/21	Wed 9/1/21
1157	Dig/Install/Inspect/Backfill new FSW to building POC	5 days	Thu 9/2/21	Thu 9/9/21
1158	Bug Test / Tie-In to City Main	3 days	Fri 9/10/21	Tue 9/14/21
1159	**Natural Gas**	**59 days**	**Thu 6/24/21**	**Thu 9/16/21**
1160	Remove old meters/regs	2 days	Thu 6/24/21	Fri 6/25/21
1161	Disconnect and cap lines to be abandoned	2 days	Mon 6/28/21	Tue 6/29/21
1162	Install New meter/service	5 days	Fri 9/10/21	Thu 9/16/21
1163	**Sanitary Sewer (NE corner of Common Area)**	**9 days**	**Fri 9/10/21**	**Wed 9/22/21**
1164	Dig/Install/Inspect/Backfill new 6" SS to building PC	7 days	Fri 9/10/21	Mon 9/20/21
1165	Cap and abandon old 4" SS at main	2 days	Tue 9/21/21	Wed 9/22/21
1166	**Storm Sewer (East side of South parking lot)**	**9 days**	**Thu 9/23/21**	**Tue 10/5/21**
1167	Install new filtration system	5 days	Thu 9/23/21	Wed 9/29/21
1168	Install new catch basin	4 days	Thu 9/30/21	Tue 10/5/21
1169	**Low Volt**	**5 days**	**Tue 8/17/21**	**Mon 8/23/21**
1170	Verify Existing Service to building	5 days	Tue 8/17/21	Mon 8/23/21
1171	**Electrical**	**106 days**	**Wed 7/21/21**	**Mon 12/20/21**
1172	PGE remove old cap bank	5 days	Wed 7/21/21	Tue 7/27/21
1173	PGE set new cap bank	2 days	Wed 7/28/21	Thu 7/29/21
1174	PGE connect service	1 day	Mon 12/20/21	Mon 12/20/21
1175	PGE Demo Light Pole at Roundabout	1 day	Wed 7/28/21	Wed 7/28/21
1176	**Building Interior**	**193 days**	**Tue 8/17/21**	**Thu 5/19/22**
1177	**Underground (w/in building)**	**58 days**	**Tue 8/17/21**	**Fri 11/5/21**
1178	**West Wing and Center**	**22 days**	**Tue 8/17/21**	**Thu 9/16/21**
1179	***Saw Cut/demo for SS lines, Radon and shower p***	***8 days***	***Tue 8/17/21***	***Thu 8/26/21***
1180	***Trench for SS and Radon***	***5 days***	***Fri 8/27/21***	***Thu 9/2/21***
1181	***Install SS lines and Radon***	***5 days***	***Fri 9/3/21***	***Fri 9/10/21***
1182	***Inspect/backfill - EOR to inspect once rebar is in***	***4 days***	***Mon 9/13/21***	***Thu 9/16/21***
1183	**North Wing**	**20 days**	**Mon 9/13/21**	**Fri 10/8/21**
1184	Saw Cut/demo for SS lines, Radon and shower pa	7 days	Mon 9/13/21	Tue 9/21/21
1185	Trench for SS and Radon	5 days	Wed 9/22/21	Tue 9/28/21
1186	Install SS lines and Radon	5 days	Wed 9/29/21	Tue 10/5/21
1187	Inspect/backfill	3 days	Wed 10/6/21	Fri 10/8/21
1188	**East Wing**	**20 days**	**Mon 10/11/21**	**Fri 11/5/21**
1189	Saw Cut/demo for SS lines, Radon and shower pa	7 days	Mon 10/11/21	Tue 10/19/21



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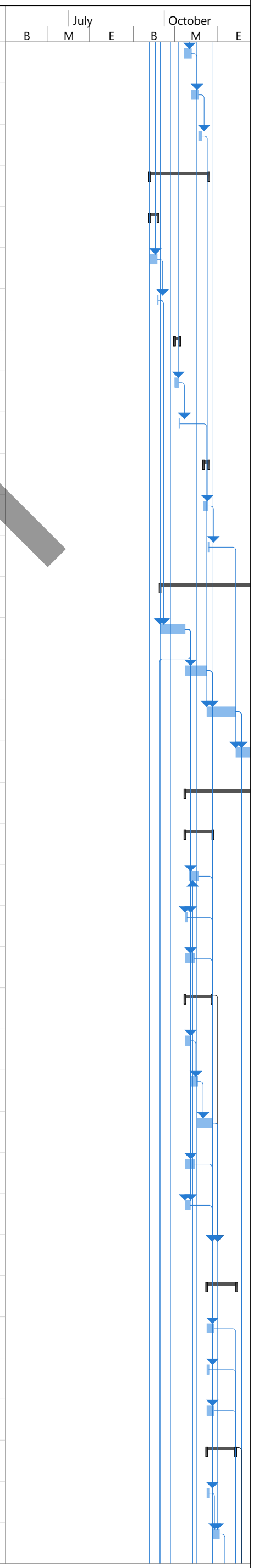
ID	Task Name	Duration	Start	Finish
1190	Trench for SS and Radon	5 days	Wed 10/20/21	Tue 10/26/21
1191	Install SS lines and Radon	5 days	Wed 10/27/21	Tue 11/2/21
1192	Inspect/backfill	3 days	Wed 11/3/21	Fri 11/5/21
1193	**Concrete**	**41 days**	**Fri 9/17/21**	**Fri 11/12/21**
1194	**West Wing and Center**	**6 days**	**Fri 9/17/21**	**Fri 9/24/21**
1195	***Vapor Barrier/Drill and epoxy dowels/rebar***	***5 days***	***Fri 9/17/21***	***Thu 9/23/21***
1196	***Pour back trenches and shower depressions***	***1 day***	***Fri 9/24/21***	***Fri 9/24/21***
1197	**North Wing**	**5 days**	**Mon 10/11/21**	**Fri 10/15/21**
1198	Vapor Barrier/Drill and epoxy dowels/rebar	4 days	Mon 10/11/21	Thu 10/14/21
1199	Pour back trenches and shower depressions	1 day	Fri 10/15/21	Fri 10/15/21
1200	**East Wing**	**5 days**	**Mon 11/8/21**	**Fri 11/12/21**
1201	Vapor Barrier/Drill and epoxy dowels/rebar	4 days	Mon 11/8/21	Thu 11/11/21
1202	Pour back trenches and shower depressions	1 day	Fri 11/12/21	Fri 11/12/21
1203	**Framing**	**69 days**	**Mon 9/27/21**	**Wed 1/5/22**
1204	***West Wing - Notify EOR of framing start***	***18 days***	***Mon 9/27/21***	***Wed 10/20/21***
1205	***Center***	***15 days***	***Thu 10/21/21***	***Wed 11/10/21***
1206	***North Wing***	***18 days***	***Thu 11/11/21***	***Wed 12/8/21***
1207	***East Wing***	***18 days***	***Thu 12/9/21***	***Wed 1/5/22***
1208	**Rough-In**	**70 days**	**Thu 10/21/21**	**Tue 2/1/22**
1209	**West Wing**	**19 days**	**Thu 10/21/21**	**Tue 11/16/21**
1210	Electrical	7 days	Mon 10/25/21	Tue 11/2/21
1211	Low Volt	2 days	Thu 10/21/21	Fri 10/22/21
1212	Fire Sprinkler	7 days	Thu 10/21/21	Fri 10/29/21
1213	**HVAC**	**18 days**	**Thu 10/21/21**	**Mon 11/15/21**
1214	Pre-Rock Corridors/Party Walls	3 days	Thu 10/21/21	Mon 10/25/21
1215	Install venting/units	5 days	Tue 10/26/21	Mon 11/1/21
1216	Install Line sets	10 days	Tue 11/2/21	Mon 11/15/21
1217	Plumbing	7 days	Thu 10/21/21	Fri 10/29/21
1218	Gas	3 days	Thu 10/21/21	Mon 10/25/21
1219	Cover	1 day	Tue 11/16/21	Tue 11/16/21
1220	**Center**	**19 days**	**Thu 11/11/21**	**Thu 12/9/21**
1221	Electrical	5 days	Thu 11/11/21	Wed 11/17/21
1222	Low Volt	2 days	Thu 11/11/21	Fri 11/12/21
1223	Fire Sprinkler	5 days	Thu 11/11/21	Wed 11/17/21
1224	**HVAC**	**18 days**	**Thu 11/11/21**	**Wed 12/8/21**
1225	Pre-Rock Corridors/Party Walls	2 days	Thu 11/11/21	Fri 11/12/21
1226	Install venting	5 days	Tue 11/16/21	Mon 11/22/21



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Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
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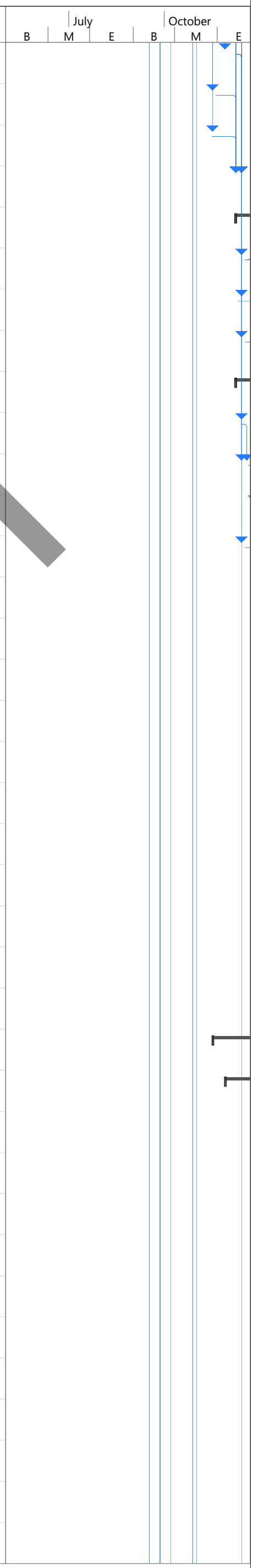
ID	Task Name	Duration	Start	Finish
1227	Install Line sets	10 days	Tue 11/23/21	Wed 12/8/21
1228	Plumbing	7 days	Thu 11/11/21	Fri 11/19/21
1229	Gas	3 days	Thu 11/11/21	Mon 11/15/21
1230	Cover	1 day	Thu 12/9/21	Thu 12/9/21
1231	**North Wing**	**19 days**	**Thu 12/9/21**	**Thu 1/6/22**
1232	Electrical	7 days	Thu 12/9/21	Fri 12/17/21
1233	Low Volt	2 days	Thu 12/9/21	Fri 12/10/21
1234	Fire Sprinkler	7 days	Thu 12/9/21	Fri 12/17/21
1235	**HVAC**	**18 days**	**Thu 12/9/21**	**Wed 1/5/22**
1236	Pre-Rock Corridors/Party Walls	3 days	Thu 12/9/21	Mon 12/13/21
1237	Install venting	5 days	Tue 12/14/21	Mon 12/20/21
1238	Install Line sets	10 days	Tue 12/21/21	Wed 1/5/22
1239	Plumbing	7 days	Thu 12/9/21	Fri 12/17/21
1240	Cover	1 day	Thu 1/6/22	Thu 1/6/22
1241	**East Wing**	**19 days**	**Thu 1/6/22**	**Tue 2/1/22**
1242	Electrical	7 days	Thu 1/6/22	Fri 1/14/22
1243	Low Volt	2 days	Thu 1/6/22	Fri 1/7/22
1244	Fire Sprinkler	7 days	Thu 1/6/22	Fri 1/14/22
1245	**HVAC**	**18 days**	**Thu 1/6/22**	**Mon 1/31/22**
1246	Pre-Rock Soffits	3 days	Thu 1/6/22	Mon 1/10/22
1247	Install venting	5 days	Tue 1/11/22	Mon 1/17/22
1248	Install Line sets	10 days	Tue 1/18/22	Mon 1/31/22
1249	Plumbing	7 days	Thu 1/6/22	Fri 1/14/22
1250	Cover	1 day	Tue 2/1/22	Tue 2/1/22
1251	**Insulation**	**57 days**	**Wed 11/17/21**	**Wed 2/9/22**
1268	**Drywall/Paint**	**69 days**	**Mon 11/29/21**	**Mon 3/7/22**
1296	**Interior Finishes**	**104 days**	**Thu 12/23/21**	**Thu 5/19/22**
1297	**West Wing**	**47 days**	**Thu 12/23/21**	**Tue 3/1/22**
1298	Install Flooring (Includes slab prep)	12 days	Thu 12/23/21	Tue 1/11/22
1299	Install Cabinets	5 days	Wed 1/12/22	Tue 1/18/22
1300	Install Countertops	10 days	Wed 1/19/22	Tue 2/1/22
1301	Install MEP Trims	5 days	Wed 2/2/22	Tue 2/8/22
1302	Install Doors/Trim	5 days	Wed 1/19/22	Tue 1/25/22
1303	Paint Doors/Trim	4 days	Wed 1/26/22	Mon 1/31/22
1304	Install Hardware	2 days	Tue 2/1/22	Wed 2/2/22
1305	Install Base	2 days	Tue 2/1/22	Wed 2/2/22
1306	Install Specialties	5 days	Thu 2/3/22	Wed 2/9/22



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Project: HACC Webster Road Rehab
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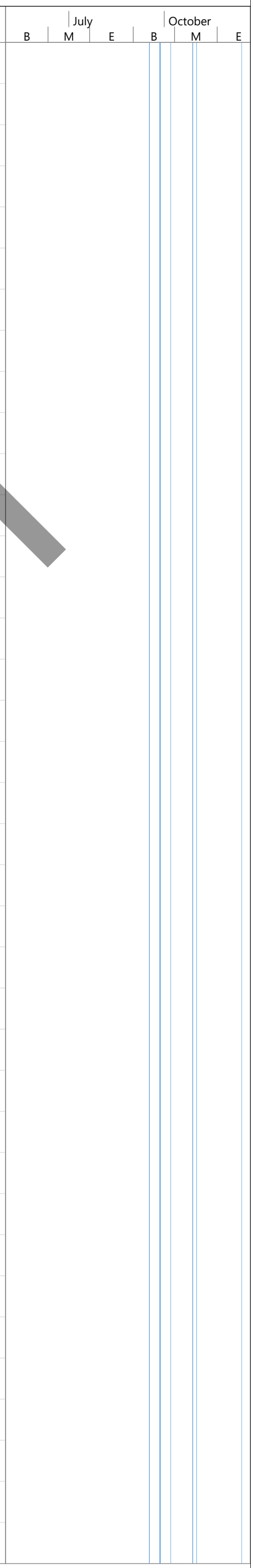
ID	Task Name	Duration	Start	Finish
1307	Appliances	1 day	Thu 2/10/22	Thu 2/10/22
1308	GC Punch	5 days	Fri 2/11/22	Thu 2/17/22
1309	Owner Punch	5 days	Fri 2/18/22	Thu 2/24/22
1310	Final Clean	3 days	Fri 2/25/22	Tue 3/1/22
1311	**Center Space / Corridors**	**92 days**	**Wed 1/12/22**	**Thu 5/19/22**
1312	Install ACT Grid	10 days	Wed 1/12/22	Tue 1/25/22
1313	Install MEPs into grid	12 days	Wed 1/26/22	Thu 2/10/22
1314	MEP Cover	2 days	Fri 2/11/22	Mon 2/14/22
1315	Install ACT Tiles	5 days	Tue 2/15/22	Mon 2/21/22
1316	Install Gas Fireplace	3 days	Tue 2/22/22	Thu 2/24/22
1317	Install Tile surround	5 days	Fri 2/25/22	Thu 3/3/22
1318	Install Flooring (Includes slab prep)	12 days	Fri 3/4/22	Mon 3/21/22
1319	Install Cabinets/Shelving	7 days	Tue 3/22/22	Wed 3/30/22
1320	Install countertops	10 days	Thu 3/31/22	Wed 4/13/22
1321	Install MEP Trims	7 days	Thu 4/14/22	Fri 4/22/22
1322	Install Doors/Trim	4 days	Thu 3/31/22	Tue 4/5/22
1323	Install Base	3 days	Wed 4/6/22	Fri 4/8/22
1324	Paint Doors/Trim	4 days	Mon 4/11/22	Thu 4/14/22
1325	Install Hardware	3 days	Fri 4/15/22	Tue 4/19/22
1326	Install Specialties	3 days	Wed 4/20/22	Fri 4/22/22
1327	Install Post Boxes	6 days	Mon 4/25/22	Mon 5/2/22
1328	GC Punch	5 days	Tue 5/3/22	Mon 5/9/22
1329	Owner Punch	5 days	Tue 5/10/22	Mon 5/16/22
1330	Final Clean	3 days	Tue 5/17/22	Thu 5/19/22
1331	**North Wing**	**46 days**	**Fri 2/11/22**	**Fri 4/15/22**
1332	Install Flooring (Includes slab prep)	12 days	Fri 2/11/22	Mon 2/28/22
1333	Install Cabinets	5 days	Tue 3/1/22	Mon 3/7/22
1334	Install countertops	10 days	Tue 3/8/22	Mon 3/21/22
1335	Install MEP Trims	5 days	Tue 3/22/22	Mon 3/28/22
1336	Install Doors/Trim	5 days	Tue 3/8/22	Mon 3/14/22
1337	Paint Doors/Trim	4 days	Tue 3/15/22	Fri 3/18/22
1338	Install Hardware	2 days	Mon 3/21/22	Tue 3/22/22
1339	Install Base	2 days	Mon 3/21/22	Tue 3/22/22
1340	Install Specialties	5 days	Wed 3/23/22	Tue 3/29/22
1341	Appliances	1 day	Wed 3/30/22	Wed 3/30/22
1342	GC Punch	5 days	Thu 3/31/22	Wed 4/6/22
1343	Owner Punch	5 days	Thu 4/7/22	Wed 4/13/22



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Project: HACC Webster Road Rehab
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ID	Task Name	Duration	Start	Finish
1344	Final Clean	2 days	Thu 4/14/22	Fri 4/15/22
1345	**East Wing**	**46 days**	**Tue 3/8/22**	**Tue 5/10/22**
1346	Install Flooring (Includes slab prep)	12 days	Tue 3/8/22	Wed 3/23/22
1347	Install Cabinets	5 days	Thu 3/24/22	Wed 3/30/22
1348	Install countertops	10 days	Thu 3/31/22	Wed 4/13/22
1349	Install MEP Trims	5 days	Thu 4/14/22	Wed 4/20/22
1350	Install Doors/Trim	5 days	Thu 3/31/22	Wed 4/6/22
1351	Paint Doors/Trim	4 days	Thu 4/7/22	Tue 4/12/22
1352	Install Hardware	2 days	Wed 4/13/22	Thu 4/14/22
1353	Install Base	2 days	Wed 4/13/22	Thu 4/14/22
1354	Install Specialties	5 days	Fri 4/15/22	Thu 4/21/22
1355	Appliances	1 day	Fri 4/22/22	Fri 4/22/22
1356	GC Punch	5 days	Mon 4/25/22	Fri 4/29/22
1357	Owner Punch	5 days	Mon 5/2/22	Fri 5/6/22
1358	Final Clean	2 days	Mon 5/9/22	Tue 5/10/22
1359	**Building Exterior**	**112 days**	**Mon 9/27/21**	**Mon 3/7/22**
1360	**Roof**	**98 days**	**Mon 9/27/21**	**Tue 2/15/22**
1361	Tear-Off Existing	4 days	Mon 9/27/21	Thu 9/30/21
1362	Replace Sheeting as Needed	4 days	Fri 10/1/21	Wed 10/6/21
1363	Install Curbs	2 days	Thu 10/7/21	Fri 10/8/21
1364	Install Skylights	2 days	Mon 10/11/21	Tue 10/12/21
1365	Vapor Barrier	8 days	Wed 10/13/21	Fri 10/22/21
1366	Insulation/Cover Board (After MEP Rough-Ins)	5 days	Wed 2/2/22	Tue 2/8/22
1367	Cap Sheet	5 days	Wed 2/9/22	Tue 2/15/22
1368	**Envelope**	**75 days**	**Thu 10/7/21**	**Tue 1/25/22**
1369	**West Wing and Center**	**26 days**	**Thu 10/7/21**	**Thu 11/11/21**
1370	WRB	6 days	Thu 10/7/21	Thu 10/14/21
1371	Windows	6 days	Mon 11/1/21	Mon 11/8/21
1372	Door Frames	3 days	Tue 11/9/21	Thu 11/11/21
1373	**North Wing**	**14 days**	**Thu 12/9/21**	**Wed 12/29/21**
1374	WRB	6 days	Thu 12/9/21	Thu 12/16/21
1375	Windows	5 days	Fri 12/17/21	Thu 12/23/21
1376	Door Frames	3 days	Mon 12/27/21	Wed 12/29/21
1377	**East Wing**	**14 days**	**Thu 1/6/22**	**Tue 1/25/22**
1378	***WRB***	***6 days***	***Thu 1/6/22***	***Thu 1/13/22***
1379	***Windows***	***5 days***	***Fri 1/14/22***	***Thu 1/20/22***
1380	***Door Frames***	***3 days***	***Fri 1/21/22***	***Tue 1/25/22***

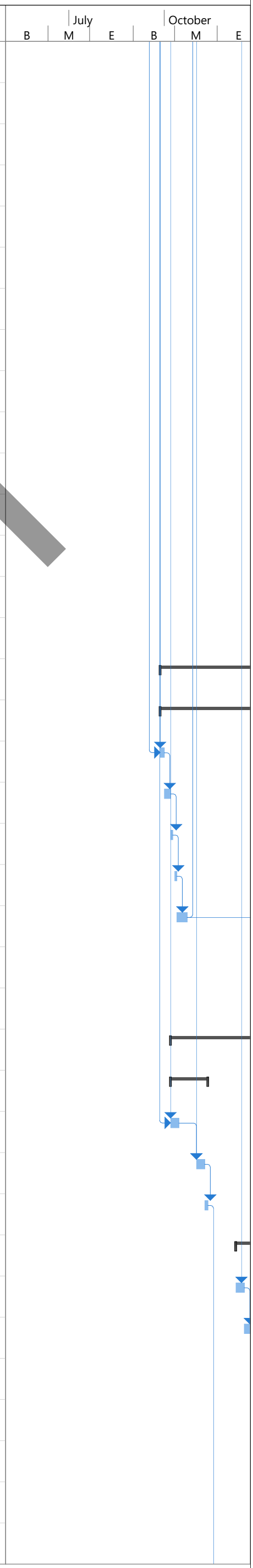


EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
1381	**Cladding**	**78 days**	**Fri 11/12/21**	**Mon 3/7/22**
1382	**West Wing and Center**	**29 days**	**Fri 11/12/21**	**Mon 12/27/21**
1383	Install Flashing/Furring/Insulation	6 days	Fri 11/12/21	Fri 11/19/21
1384	Install Siding	8 days	Mon 11/22/21	Fri 12/3/21
1385	Caulk Siding/Windows	5 days	Mon 12/6/21	Fri 12/10/21
1386	Paint	5 days	Mon 12/13/21	Fri 12/17/21
1387	MEP Trim	5 days	Mon 12/20/21	Mon 12/27/21
1388	**North Wing**	**29 days**	**Thu 12/30/21**	**Wed 2/9/22**
1389	Install Flashing/Furring/Insulation	6 days	Thu 12/30/21	Fri 1/7/22
1390	Install Siding	8 days	Mon 1/10/22	Wed 1/19/22
1391	Caulk Siding/Windows	5 days	Thu 1/20/22	Wed 1/26/22
1392	Paint	5 days	Thu 1/27/22	Wed 2/2/22
1393	MEP Trim	5 days	Thu 2/3/22	Wed 2/9/22
1394	**East Wing**	**29 days**	**Wed 1/26/22**	**Mon 3/7/22**
1395	***Install Flashing/Furring/Insulation***	***6 days***	***Wed 1/26/22***	***Wed 2/2/22***
1396	***Install Siding***	***8 days***	***Thu 2/3/22***	***Mon 2/14/22***
1397	***Caulk Siding/Windows***	***5 days***	***Tue 2/15/22***	***Mon 2/21/22***
1398	***Paint***	***5 days***	***Tue 2/22/22***	***Mon 2/28/22***
1399	***MEP Trim***	***5 days***	***Tue 3/1/22***	***Mon 3/7/22***
1400	**Site**	**114 days**	**Tue 12/28/21**	**Tue 6/7/22**
1401	**West Wing Area**	**54 days**	**Tue 12/28/21**	**Mon 3/14/22**
1402	Trench/Install/Inspect/Backfill SD for roof drains	6 days	Tue 12/28/21	Wed 1/5/22
1403	Excavate for Retaining wall	2 days	Thu 1/6/22	Fri 1/7/22
1404	F/T/P footings	5 days	Mon 1/10/22	Fri 1/14/22
1405	Install irrigation sleeves	1 day	Mon 1/17/22	Mon 1/17/22
1406	F/T/P Wall	7 days	Tue 1/18/22	Wed 1/26/22
1407	Install Perf drain/backfill wall	1 day	Thu 1/27/22	Thu 1/27/22
1408	Install perf at sidewalk	1 day	Fri 1/28/22	Fri 1/28/22
1409	Install electrical conduit at sidewalk	2 days	Mon 1/31/22	Tue 2/1/22
1410	Install Irrigation sleeves/pipe	2 days	Wed 2/2/22	Thu 2/3/22
1411	F/P Curb at Walks	3 days	Fri 2/4/22	Tue 2/8/22
1412	Grade Walks	2 days	Wed 2/9/22	Thu 2/10/22
1413	F/P Walks	3 days	Fri 2/11/22	Tue 2/15/22
1414	Install Irrigation	4 days	Wed 2/16/22	Mon 2/21/22
1415	Install site lights	3 days	Tue 2/22/22	Thu 2/24/22
1416	Install Handrails/Accessories	3 days	Fri 2/25/22	Tue 3/1/22
1417	Install topsoil	2 days	Wed 3/2/22	Thu 3/3/22

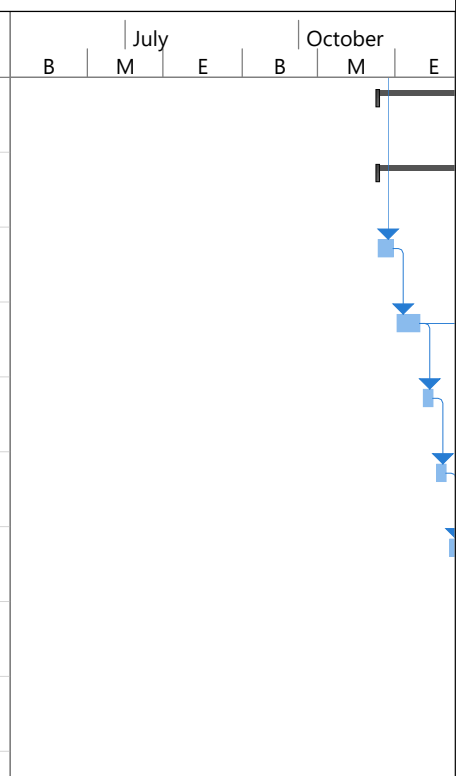


EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
1418	Install Plantings	6 days	Fri 3/4/22	Fri 3/11/22
1419	Install Bark	1 day	Mon 3/14/22	Mon 3/14/22
1420	**North Wing Area**	**52 days**	**Thu 2/10/22**	**Fri 4/22/22**
1421	Trench/Install/Inspect/Backfill SD for roof drains	6 days	Thu 2/10/22	Thu 2/17/22
1422	Excavate for Retaining wall	2 days	Fri 2/18/22	Mon 2/21/22
1423	F/T/P footings	5 days	Tue 2/22/22	Mon 2/28/22
1424	Install irrigation sleeves	1 day	Tue 3/1/22	Tue 3/1/22
1425	F/T/P Wall	7 days	Wed 3/2/22	Thu 3/10/22
1426	Install Perf drain/backfill wall	1 day	Fri 3/11/22	Fri 3/11/22
1427	Install perf at sidewalk	1 day	Mon 3/14/22	Mon 3/14/22
1428	Install electrical conduit at sidewalk	2 days	Tue 3/15/22	Wed 3/16/22
1429	Install Irrigation sleeves/pipe	2 days	Thu 3/17/22	Fri 3/18/22
1430	F/P Curb at Walks	3 days	Mon 3/21/22	Wed 3/23/22
1431	Grade Walks	1 day	Thu 3/24/22	Thu 3/24/22
1432	F/P Walks	3 days	Fri 3/25/22	Tue 3/29/22
1433	Install Irrigation	4 days	Wed 3/30/22	Mon 4/4/22
1434	Install site lights	3 days	Tue 4/5/22	Thu 4/7/22
1435	Install Handrails/Accessories	2 days	Fri 4/8/22	Mon 4/11/22
1436	Install topsoil	2 days	Tue 4/12/22	Wed 4/13/22
1437	Install Plantings	6 days	Thu 4/14/22	Thu 4/21/22
1438	Install Bark	1 day	Fri 4/22/22	Fri 4/22/22
1439	**East Wing Area**	**50 days**	**Tue 3/8/22**	**Mon 5/16/22**
1440	***Trench/Install/Inspect/Backfill SD for roof drains***	***6 days***	***Tue 3/8/22***	***Tue 3/15/22***
1441	***Excavate for Retaining wall***	***3 days***	***Wed 3/16/22***	***Fri 3/18/22***
1442	***F/T/P footings***	***5 days***	***Mon 3/21/22***	***Fri 3/25/22***
1443	Install Flag Pole Base	3 days	Mon 3/28/22	Wed 3/30/22
1444	Install Flag Pole	2 days	Thu 3/31/22	Fri 4/1/22
1445	***Install irrigation sleeves***	***1 day***	***Mon 3/28/22***	***Mon 3/28/22***
1446	***F/T/P Wall***	***5 days***	***Tue 3/29/22***	***Mon 4/4/22***
1447	***Install Perf drain/backfill wall***	***1 day***	***Tue 4/5/22***	***Tue 4/5/22***
1448	***Install Shelter Footings***	***3 days***	***Wed 4/6/22***	***Fri 4/8/22***
1449	Install perf at sidewalk	1 day	Wed 4/6/22	Wed 4/6/22
1450	***Install electrical conduit at sidewalk***	***2 days***	***Mon 4/11/22***	***Tue 4/12/22***
1451	Install Irrigation sleeves/pipe	2 days	Mon 4/11/22	Tue 4/12/22
1452	Grade Walks	3 days	Wed 4/13/22	Fri 4/15/22
1453	F/P Walks	3 days	Mon 4/18/22	Wed 4/20/22
1454	Install Shelter	3 days	Thu 4/21/22	Mon 4/25/22

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

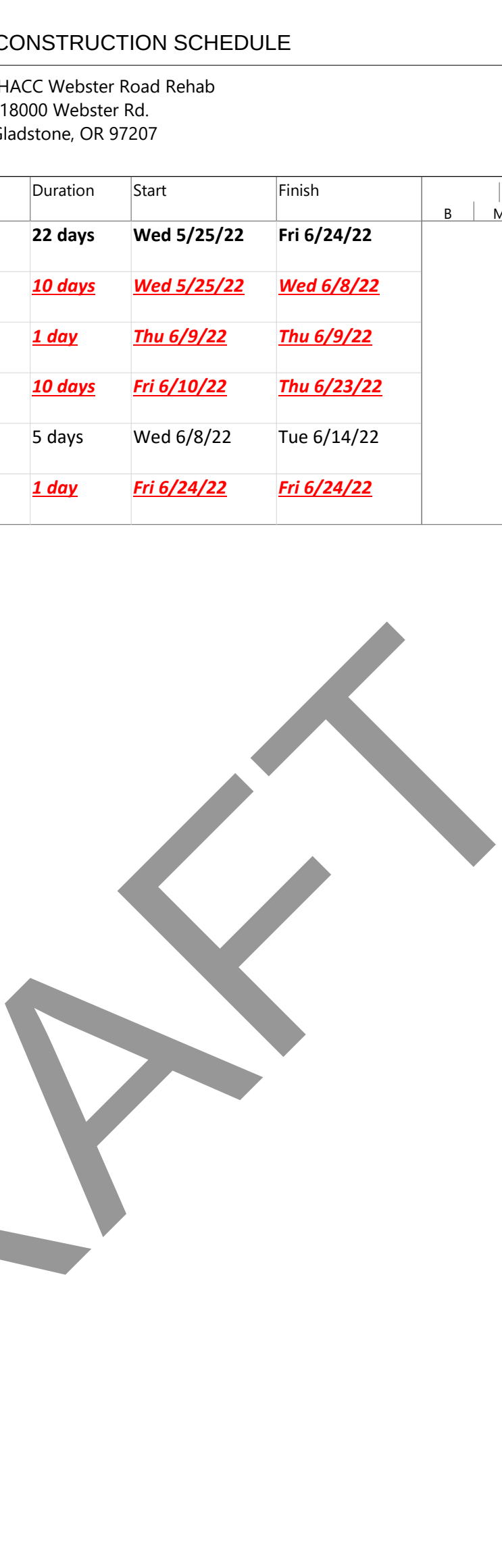
ID	Task Name	Duration	Start	Finish
1455	Install Irrigation	2 days	Tue 4/26/22	Wed 4/27/22
1456	Install site lights	4 days	Thu 4/28/22	Tue 5/3/22
1457	Install Handrails/Accessories	2 days	Wed 5/4/22	Thu 5/5/22
1458	Install topsoil	2 days	Fri 5/6/22	Mon 5/9/22
1459	Install Plantings	1 day	Tue 5/10/22	Tue 5/10/22
1460	Install Bark	4 days	Wed 5/11/22	Mon 5/16/22
1461	**Parking Lots/ROW**	**30 days**	**Mon 4/11/22**	**Fri 5/20/22**
1462	***F/P Curbs North Lot***	***4 days***	***Wed 4/13/22***	***Mon 4/18/22***
1463	***F/P Curbs South Lot***	***4 days***	***Tue 4/19/22***	***Fri 4/22/22***
1464	Demo ROW Sidewalk	3 days	Mon 4/11/22	Wed 4/13/22
1465	Install Fire Hydrant	6 days	Thu 4/14/22	Thu 4/21/22
1466	***F/P Apron North Entry***	***3 days***	***Mon 4/25/22***	***Wed 4/27/22***
1467	***F/P Apron South Entry***	***3 days***	***Thu 4/28/22***	***Mon 5/2/22***
1468	***F/P ROW Sidewalk***	***6 days***	***Tue 5/3/22***	***Tue 5/10/22***
1469	Grade/Fine Grade both Lots	2 days	Tue 5/3/22	Wed 5/4/22
1470	Pave Both Lots	1 day	Thu 5/5/22	Thu 5/5/22
1471	Install Striping	1 day	Fri 5/6/22	Fri 5/6/22
1472	Install Wheel Stops	1 day	Fri 5/6/22	Fri 5/6/22
1473	Install Signage	1 day	Mon 5/9/22	Mon 5/9/22
1474	***Install Topsoil***	***3 days***	***Wed 5/11/22***	***Fri 5/13/22***
1475	***Install Plantings***	***4 days***	***Mon 5/16/22***	***Thu 5/19/22***
1476	***Install Bark***	***1 day***	***Fri 5/20/22***	***Fri 5/20/22***
1477	**Exterior Punch**	**11 days**	**Mon 5/23/22**	**Tue 6/7/22**
1478	GC Punch	4 days	Mon 5/23/22	Thu 5/26/22
1479	Owner Punch	5 days	Fri 5/27/22	Fri 6/3/22
1480	Clean	2 days	Mon 6/6/22	Tue 6/7/22
1481	**Project Closeout**	**35 days**	**Fri 5/6/22**	**Fri 6/24/22**
1482	**Final Letters**	**16 days**	**Fri 5/6/22**	**Fri 5/27/22**
1483	Special Inspection Final letter	2 days	Fri 5/6/22	Mon 5/9/22
1484	EOR final letter	2 days	Fri 5/6/22	Mon 5/9/22
1485	Video City SS Main	1 day	Fri 5/27/22	Fri 5/27/22
1486	**MEP / Finals**	**11 days**	**Tue 5/10/22**	**Tue 5/24/22**
1487	Final Electrical/LV/Fire Alarm Inspections	5 days	Tue 5/10/22	Mon 5/16/22
1488	Final Plumbing Inspection	5 days	Tue 5/10/22	Mon 5/16/22
1489	Final Mechanical Inspection	5 days	Tue 5/10/22	Mon 5/16/22
1490	Fire Marshal (FSP) Final inspection	5 days	Tue 5/10/22	Mon 5/16/22
1491	***Site Final***	***2 days***	***Mon 5/23/22***	***Tue 5/24/22***

EXHIBIT A.6 - CONSTRUCTION SCHEDULE

Walsh Construction
Date: Wed 4/28/21

Project: HACC Webster Road Rehab
18000 Webster Rd.
Gladstone, OR 97207

ID	Task Name	Duration	Start	Finish
1492	**Completion**	**22 days**	**Wed 5/25/22**	**Fri 6/24/22**
1493	***Schedule Contingency***	***10 days***	***Wed 5/25/22***	***Wed 6/8/22***
1494	***Substantial Completion / TCO (6.9.22)***	***1 day***	***Thu 6/9/22***	***Thu 6/9/22***
1495	***C of O***	***10 days***	***Fri 6/10/22***	***Thu 6/23/22***
1496	Complete All Owner Punchlists	5 days	Wed 6/8/22	Tue 6/14/22
1497	***Final Completion (6.24.22)***	***1 day***	***Fri 6/24/22***	***Fri 6/24/22***



CONTRACTOR'S CONSENT AND CERTIFICATE

The undersigned ("Contractor") has entered into that certain [title or description of contract] (the "Agreement") dated _____, 20__, with _____, a _____ limited partnership ("Owner"), for the construction of certain improvements (the "Improvements") to be located on the land (the "Land") more particularly described on Exhibit A attached hereto and made a part hereof. Contractor acknowledges that U.S. Bancorp Community Development Corporation, a Minnesota corporation, is the limited partner of Owner ("Limited Partner") under a certain Amended and Restated Agreement of Limited Partnership made as of even date herewith by and between, _____a _____, as general partner ("General Partner") and Limited Partner (the "Partnership Agreement"). Contractor further certifies to and agrees for the benefit of Limited Partner as follows:

1. The Agreement is in full force and effect, Contractor is not in default under the Agreement, and to Contractor's knowledge, Owner is not in default under the Agreement.

2. All permits required for the current stage of construction of the Improvements have been issued except: none (if none, so state), and all insurance coverage that Contractor is required to carry under the Agreement has been obtained.

3. There are and will be no side agreements or arrangements between Contractor and Owner, Contractor and General Partner or Contractor and Limited Partner (or any affiliates of any of the foregoing) and no fees will be paid to Contractor other than the fees set forth in the Agreement.

4. If Owner defaults in making any payment or in performing any other obligation under the Agreement, or if the Agreement is terminated for any reason, Contractor will give Limited Partner written notice of the default or termination. Prior to exercising any remedy available to Contractor under the Agreement as a result of such a default or termination, Contractor will afford to Limited Partner a period of thirty (30) days, beyond the expiration of any cure period available to the Owner, within which to cure the default or other cause for termination (it being acknowledged by Contractor that Limited Partner shall have no obligation to cure any default by Owner) and upon such a cure (or in Contractor's sole discretion, even if such cure has not been completed) the Agreement shall be reinstated on the same terms and conditions. Any notice of default or termination will be delivered by personal delivery or by a nationally recognized overnight courier service or will be mailed by certified mail, return receipt requested, to the following address:

U.S. Bancorp Community Development Corporation
USB Project No. [ ]
1307 Washington Avenue, Suite 300
St. Louis, MO 63103
Attention: Director of LIHTC Asset Management

5. In the event that Limited Partner or any other party ("Successor") becomes the general partner of Owner, unless otherwise notified by Successor, Contractor will continue to perform its obligations under the Agreement, provided that any past due amounts owed to Contractor under the Agreement are paid and further provided that Contractor is thereafter compensated for its services as provided in the Agreement.

6. Contractor acknowledges that Limited Partner will rely on this Consent and Certificate in making its capital contribution to Owner that is contemplated by the Partnership Agreement.

7. Contractor acknowledges that Limited Partner may assign its interest in the Partnership and this Consent and Certificate shall inure to the benefit of Limited Partner's successors and assigns.

[SIGNATURE PAGE FOLLOWS]

Contractor has executed and delivered this Consent and Certificate on the ____ day of _____, 20__.

Contractor:

_____

By:_____
Name:_____
Title:_____

EXHIBIT A

LEGAL DESCRIPTION OF THE LAND

EXHIBIT A.8 - COST MATRIX

DIRECT COST/ GENERAL CONDITIONS WORK COST MATRIX

	Description	Construction costs/Paid by Owner		Contractor's O/H Part of CM/GC's Fee	Misc. Costs Paid by Owner
		Direct Cost of the Work	General Conditions Work Costs		
Costs Related to CM Staffing & Job Office					
1	Project Superintendent		X		
2	Area Superintendents		X		
3	Project Executive (for project specific time only)		X*		
4	Senior Project Manager (for project specific time only)		X		
5	Project Manager		X		
6	Project Engineers		X		
7	Field Engineers = install, adjust, and/or trouble-shoot equipment		X		
8	Project Admin = on-site office manager, payroll, clerical services		X*		
9	Scheduler (for project specific time only)		X		
10	MEP Coordinator (for project specific time only)		X*		
11	LEED Coordinator (for project specific time only)		X*		
12	Safety Coordinator (for project specific time only)		X		
13	Detailer	X			
14	Accounting/Data Processing			X	
15	Payroll Accountant			X	
16	Surveying	X			
17	Benefits - included in hourly rates		X		
18	Vacation Time - included in hourly rates		X		
19	Travel, Hotel, Meals, etc. (in accordance with Agreement for product verification only)		X		
20	Sick Leave - included in hourly rates		X		
21	Bonuses			X	
22	Jobsite Office material costs and expendables		X		
23	Warranty			X	
24	Corrective/Non-conforming repair			X	
25	Corrective work not due to contractor default			X	
26	PM auto rental		X*		
27	PM auto fuel for on-site job-related errands only - not travel from home		X		
28	Project Superintendent truck rental		X		
29	Project Superintendent truck fuel for on-site job-related errands only - not travel from home		X		
30	Office Trailer Rental		X		
31	Office Furniture/Equipment		X*		
32	Blueprints for sub bidding - Allowance		X*		
33	Blueprints for day-to-day job operations		X		
34	Postage/FedEx		X		
35	Project Photos		X*		
36	Phones/Computers & other Electronic Devices, assoicated services charges			X	
37	General Contractor Bond	X			
38	Subcontractor Bonds	X*			

*May be subject to negotiation

EXHIBIT A.8 - COST MATRIX

		Construction costs/Paid by Owner				
	Description	Direct Cost of the Work	General Conditions Work Costs	Contractor's O/H Part of CM/GC's Fee	Misc. Costs Paid by Owner	
39	Insurance GL, Auto (in accordance with contract only)			X		
40	Insurance All Risk	X				
41	Soils report				X	
42	Testing and Inspections				X	
43	Facility training	X				
44	Building Permits/Fees				X	
45	Development Permits/fees				X	
46	Estimating	X				
47	Corporate accounting			X		
48	Corporate safety officer			X		
49	Main office administration			X		
50	Corporate IT director			X		
51	Legal			X		
52	Main office payroll costs			X		
53	Main office fringe/bonus costs			X		
54	Construction Wages for trade labor	X*				
55	Labor Burden for trade labor, including Workers Comp premiums	X*				
56	Subcontracts	X				
57	Material & Equipment related to craft labor & site logistics	X				
58	Rental-Contractor Owned equip (less than $2000 will be purchased)	X*				
59	Small Tools (less than $2000 will be purchased)		X*			
60	Job truck rental/operation		X			
61	Job truck fuel		X			
62	Water truck		X			
63	Dewatering		X			
64	Equipment rental -third party	X				
65	Storage Trailer rental		X			
66	Temporary Toilets		X			
67	Project Signage		X			
68	Temporary Fencing		X			
69	Barricades		X			
70	Temporary Enclosures		X			
71	Temporary Stairs		X			
72	Opening Protection	X				
73	Safety railing and nets		X			
74	Drinking water (NOT coffee) and supplies (cups)		X			
75	Safety equipment for CMGC personnel. Generic only - not logo materials. Subs provide own in COW.	X	X			
76	First Aid supplies for CMGC personnel. Subs provide own in COW.	X	X			
77	Security		X*			
78	Weather protection		X			
79	Mobilization/Demobilization		X			
80	Craft Parking			X		
81	Craft Shuttles			X		
82	Telephone and Data line Installation		X			
83	Temp utilities hookup		X			
84	Temp utility bills				X	

*May be subject to negotiation

EXHIBIT A.8 - COST MATRIX

		Construction costs/Paid by Owner				
	Description	**Direct Cost of the Work**	**General Conditions Work Costs**	**Contractor's O/H Part of CM/GC's Fee**	**Misc. Costs Paid by Owner**	
85	Periodic Cleanup	X				
86	Final cleanup	X				
87	Dump permits/fees	X				
88	Trash removal/Hauling	X				
89	Flagging/Traffic control	X				
90	Dust Control	X				
91	Trash chute	X				
92	Trade permits				X	
93	Manlift Materials and Rental	X				
94	Manlift Erect/Dismantle	X				
95	Manlift operator	X				
96	Crane rental	X				
97	Crane operator & bellman	X				
98	Crane Erect/Dismantle/Jump	X				
99	Crane Service agreement costs	X				
100	Temp elevator operator	X				
101	Temp elevator agreement	X				
102	Forklift rental	X				
103	Forklift operator	X				
104	Equipment Fuel	X				

*May be subject to negotiation

SECTION 02 82 13 ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 SCOPE

A. This section covers the removal and repair of materials that contain, or are presumed to contain, greater than one percent asbestos.

B. The abatement contractor shall provide all labor, materials, equipment, services, permits, and insurance required to complete asbestos abatement procedures as indicated in these Specifications. The abatement contractor shall perform all selective demolition as needed to access and abate asbestos-containing materials.

C. The General Contractor and its subcontractors shall familiarize themselves with the material types, locations and quantities of asbestos-containing building materials at the site.

D. Refer to the Asbestos-Containing Building Materials Survey Report, PBS Engineering and Environmental, December 2018 for information on asbestos-containing materials within the building. The table below summarizes the asbestos-containing building materials identified at the site.

E. Table 1. Asbestos-Containing Materials

Asbestos-Containing Building Materials
Sheet Floor Covering
Textured Ceiling Material
Hard Fittings on Fiberglass
Joint Compound
Sink Undercoating
Exterior Stucco

F. The asbestos-containing building materials listed above and in the associated survey do not necessarily represent materials requiring abatement to facilitate the planned facility renovations. Rather, they are the materials that were identified within, or immediately adjacent to, the work items and work areas. While many of these materials may require abatement, some may be able to safely remain during the project. ACM should be managed in place unless abatement is warranted.

G. Although the work under the renovation project may not impact all of these asbestos-containing building materials, it is important to communicate the hazards to all individuals involved in the project in order to meet Oregon OSHA Hazard Communication requirements and avoid accidental damage to ACM during construction.

1.2 DEFINITIONS

A. Abatement: Procedures to control fiber release from asbestos-containing building materials, which include encapsulation, enclosure, removal, repair, and related activities.

B. Aggressive Sampling: Air sampling method that assures that asbestos fibers remain airborne during sampling. All surfaces inside the work area will be agitated by the liberal use of compressed air, leaf blowers, or similar. Fans will then be run throughout the sampling period to keep all suspended fibers airborne.

C. AHERA: Asbestos Hazard Emergency Response Act, 40 CFR Part 763.

D. Air Lock: A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least three feet apart.

E. Air Monitoring: The process of measuring the asbestos fiber content of a specific volume of air in a stated period of time.

F. Amended Water: Water containing a surfactant additive.

G. Asbestos-containing Material (ACM): Any material containing more than one percent asbestos as defined under NESHAPS CFR 40, Part 61, OAR Chapter 340, Division 248, OR-OSHA 437, 1926.1101, and OSHA 29 CFR Part 1926.1101.

H. Authorized Visitor: The owner or designated representative, or a representative of any regulatory or other agency having jurisdiction over the project, and having required training, medical, fit test, etc.

I. Certified Industrial Hygienist (CIH): An industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

J. Construction, Manager/General Contractor (CMGC): A construction delivery method in which the construction manager acts as the general contractor with schedule and cost risk. The CMGC provides design phase assistance in evaluating costs, schedule, and implications of systems and materials during design.

K. Class I Asbestos Work: Activities involving the removal of TSI and surfacing ACM and PACM.

L. Class II Asbestos Work: Activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and mastics.

M. Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storing workers' street clothes and clean protective equipment.

N. Critical Barrier: Solid barrier constructed from minimum of 2- by 4-inch studs, 16-inch o.c.; 0.5-inch plywood or drywall sealed airtight and covered on both sides (where applicable) with two layers of 6-mil plastic.

O. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing three overlapping sheets of plastic over an existing or temporarily-framed doorway, securing each along the top of the doorway in a pleated fashion and securing one vertical side of each sheet on alternating sides of consecutive sheets. Two curtained doorways spaced a minimum of three feet apart to form an air lock.

P. Disposal: Procedures necessary to transport and deposit the asbestos-contaminated material in an approved waste disposal site in compliance with the Environmental Protection Agency (EPA) and other applicable regulations.

Q. Enclosure: Procedures necessary to completely seal all asbestos-containing material behind airtight, impermeable, permanent barriers, including PVC jackets.

R. Encapsulant (Sealant): A liquid material that can be applied to asbestos-containing material and that controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant), or by penetrating the material and binding its components together (penetrating encapsulant).

S. Environmental Consultant: Environmental consultant specializing in asbestos abatement—PBS Engineering and Environmental Inc., 4412 SW Corbett Avenue, Portland, Oregon, 97239, 503.248.1939.

T. Equipment Room: A contaminated area or room, which is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.

U. Fitting: With regard to pipe insulation, a fitting is any elbow, offset, reducer, tee, etc.

V. Fixed Object: Fixtures that are attached to the building or too heavy or bulky to remove from the work area.

W. Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing at the top and sides, and a receptacle in the bottom to hold asbestos waste. The glovebag is installed to surround the material to be removed and contain all fibers released during the process. Glovebags are used to remove insulation from small sections of pipe and fittings.

X. HEPA Filter: A high efficiency particulate air (absolute) filter capable of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns in length.

Y. HEPA Vacuum Equipment: High efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters of 99.97 percent efficiency for retaining fibers of 0.3 microns in length or larger shall be installed for filtering discharge air.

Z. Independent Testing Laboratory: A laboratory financially independent from and hired by the owner, architect, or contractor that is either AIHA-accredited for asbestos with demonstrated proficiency via the AIHA PAT program, or has analysts proficient in the AIHA AAR program for air sample analysis.

AA. Industrial Hygienist: An employee of the Independent Testing Laboratory who is experienced and trained in asbestos sampling and analysis as specified.

BB. Insulating Cement: Cementitious material applied to pipe reducers, manifolds, etc.

CC. Isolated Work Area: A totally contained area of the facility where abatement activities are performed.

DD. Movable Object: Furnishings not attached to the building structure that can be removed from the work area.

EE. Negative-air Glovebag: A manufactured device consisting of a transparent plastic bag with inward projecting sleeves, an internal tool pouch, provisions for fastening and sealing it at the top and sides, and a receptacle in the bottom to hold asbestos waste. The glovebag is installed to surround the material to be removed and contain all fibers released through the process, with provisions for allowing continuous airflow through the bag while maintaining negative pressure inside.

FF. Owner Representative: Designated by the Owner, and/or designated employee(s) of the Owner Representative.

GG. PACM: Presumed asbestos-containing materials.

HH. Pressure Differential Fan System: An air-purifying fan system located inside or outside the isolated work area that draws air out of the work area through a HEPA filter, keeping static air pressure in the work area lower than in adjacent areas, and preventing escape of contaminated air from work area to adjacent areas.

II. Public Area: Any area outside the isolated work area. When work area isolation measures are removed, the work area becomes a public area.

JJ. Removal: All operations where ACM and/or PACM are taken out or stripped from structures or substrates, and include demolition activities.

KK. Shower Room: A room between the clean room and the equipment room in the worker decontamination enclosure system that is equipped with soap, shampoo, and hot and cold running water controllable at the faucet, and suitably arranged for complete showering during decontamination. The shower room must be separated from the clean room and equipment room by air locks.

LL. Special Fitting: With regard to pipe insulation, a special fitting is any valve, union, strainer, thermometer, flange, etc.

MM. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

NN. Tack Coat: A coat of penetrating encapsulant applied to all surfaces from which asbestos-containing materials have been removed.

OO. Thermal System Insulation (TSI): ACM applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

PP. Vacuum Loader Removal: Wetting and pneumatic conveying of loose material through a vacuum hose to a sealed collection tank specially equipped to prevent escape of fibers.

QQ. Wet Cleaning: The process of eliminating asbestos from building surfaces and objects by using cloths, mops, or other cleaning tools that have been dampened with water.

RR. Worker Decontamination Enclosure System: A showering facility for workers, typically consisting of a clean room, a shower room, and an equipment room. Each of these rooms is separated from the others by air locks. The equipment room is separated from the work area by a curtained doorway. The clean room is separated from the public area by a curtained doorway.

SS. Worksite Entry Logbook: A logbook kept in the clean room that must be signed by everyone entering or leaving the work area. All pages of the logbook must be the same as the sample page bound into these Specifications.

1.3 DOCUMENTS INCORPORATED BY REFERENCE

A. The current issue of each document shall govern. Where conflict among requirements or with these Specifications exists, the most stringent requirements shall apply.

1. US Environmental Protection Agency National Emissions Standards for Hazardous Air Pollutants (NESHAPS). (Code of Federal Regulations Title 40, Part 61, Subparts A and M.)

2. US Environmental Protection Agency Office of Toxic Substances Guidance Document, "Guidance for Controlling Friable Asbestos-Containing Materials in Buildings." EPA Report Number 560/5-85-024 ("Purple Book").

3. US Department of Labor Occupational Safety and Health Administration (OSHA):

    a. Title 29 Code of Federal Regulations Section 1910.1001—General Industry Standard for Asbestos.

    b. Title 29 Code of Federal Regulations Section 1910.134—General Industry Standard for Respiratory Protection.

c. Title 29 Code of Federal Regulations Section 1910 et al.—Occupational Exposure to Asbestos; Final Rule.

d. Title 29 Code of Federal Regulations 1926.1101—Construction Standard for Asbestos.

e. Title 29 Code of Federal Regulations Section 1910.1020—Access to Employee Exposure and Medical Records.

f. Title 29 Code of Federal Regulations Section 1910.1200—Hazard Communication.

4. National Institute for Occupational Safety and Health (NIOSH), 42 CFR, Part 84, Respiratory Protective Devices.
5. American National Standards Institute (ANSI) NY; ANSI Standard Z 88.2-1980 "American National Standards Practice for Respiratory Protection," latest edition.
6. Oregon Administrative Rules Chapter 340, Division 248, Department of Environmental Quality; Chapter 340, Division 33, Licensing and Certification Requirements.
7. Oregon Administrative Rules Chapter 437, Divisions 2 and 3.
8. Oregon Revised Statutes (ORS), Chapters 279C, Certified Asbestos Contractors and Prevailing Wage; 656, Workers Compensation; and 701, Construction Contractors and Contracts.
9. All related electrical work shall be performed in accordance with the National Electrical Code.
10. All local ordinances, regulations, or rules pertaining to asbestos, including its storage, transportation, and disposal.

1.4 SUBMITTALS AND NOTICES

A. Contractors shall submit three bound indexed copies of each submittal package as indicated below.

B. Contractors shall submit to the architect and environmental consultant the following information prior to beginning work on the project:

1. CONTRACTOR'S LICENSE. Submit proof that the asbestos abatement contractor is currently and for the duration of the project licensed in the state of Oregon to perform asbestos abatement, per ORS Chapter 701, and OAR Chapter 340, Division 248.
2. ASBESTOS SUPERVISOR. Submit the name and resume of the assigned on-site foreman. At minimum, the foreman shall have successfully completed the Department of Environmental Quality (DEQ) asbestos supervisor course as approved by the State of Oregon. Other criteria such as references and similar projects will also be reviewed. At the architect or environmental consultant’s request, the contractor shall arrange an oral interview with the assigned on-site foreman. The owner, architect, and the environmental consultant reserve the right to reject the foreman from the work at any time during the project. The contractor shall then assign another on-site foreman for the owner, architect, and environmental consultant’s approval as described above.
3. INSURANCE CERTIFICATE. Submit a copy of the certificate of asbestos-specific liability insurance policy.
4. WORKER CERTIFICATION. Submit written proof indicating that all employees impacting asbestos-containing materials are Oregon state certified asbestos workers. Proof shall include photocopies of certificates and a signature from the contractor's principal indicating that all employees assigned to this project have completed such a program.

5. RESPIRATOR PROGRAM. Submit written proof indicating respirator program complies with all parts of OSHA Asbestos Regulations CFR Title 29, Part 1910.134 and 1926.1101, OR-OSHA Chapter 437, 1910.134 and 1926.1101.
6. MEDICAL PROGRAM. Submit written proof medical exam program complies with OSHA Asbestos Regulations CFR Title 29, Section 1926.1101 and OR-OSHA Chapter 437, 1926.1101.
7. EMERGENCY PLANS. Submit a written emergency control and cleanup plan to be followed by the contractor in the event of an accidental breach in containment, power failure, and accidental disturbance of ACMs in non-isolated areas.
8. NOTIFICATION. Submit copy of written notification to DEQ of the proposed asbestos work not fewer than 10 days before work commences on this project.
9. DISPOSAL PLAN. Submit written proof that all required permits and arrangements regarding the transportation and disposal of asbestos-containing or contaminated materials, supplies, etc. have been obtained. The disposal site must be approved by the EPA and/or DEQ and other responsible agencies.
10. WORK PLAN. Submit a written "work plan" satisfactory to the architect and environmental consultant describing the schedule for asbestos abatement, decontamination procedures, and plans for construction and location of decontamination enclosure systems, pressure differential exhaust fans, etc. in compliance with these Specifications and applicable regulations, including calculations for determining required number of negative-air filtration units. The plan shall schedule the systematic flow of work throughout the facility per Specifications on a day-by- day basis, outlining room-by-room, or area-by-area procedures and planned alternative control measures. The contractor shall keep close coordination of his work with the architect and environmental consultant.
11. AIR MONITORING. Submit information pertaining to the proposed Air Monitoring Program for this project, if appropriate. This information shall include the name(s) of the certified industrial hygienist appointed, the name of the on-site industrial hygiene technician working under his supervision, types of equipment, and sampling schedule, sampling procedures, calibration recordkeeping, and testing laboratory proposed.
12. PRODUCT INFORMATION. Submit complete product information for any materials and products for which the contractor requests approval for use on this job (other than those specified).
13. EMERGENCY PHONE NUMBER. Submit a local phone number at which the contractor or on-site foreman can be reached on a 24-hour basis during the course of the work.

C. Contractor shall not begin work until submittals are reviewed and accepted by architect and the environmental consultant. Allow a ten-day review period.

D. During the work, the contractor shall submit the following to the architect and environmental consultant, on a periodic basis as agreed to by the architect, environmental consultant, and contractor:

1. Waste shipment and disposal documentation.
2. Air monitoring data.
3. Notification updates.

E. Contractor shall submit to the environmental consultant, in writing, all information required above regarding any new asbestos workers hired by, or subcontracted to, the contractor before these new asbestos abatement workers begin work.

F. Prior to removal of decontamination systems and isolation barriers, the contractor shall obtain specific written permission from the environmental consultant.

G. Prior to making final application for payment the contractor shall:

1. Complete all work under this contract.
2. Submit to the environmental consultant all required submittals, including all waste shipment records completely filled out and signed.
3. Submit to the owner all payroll reports for work on this contract and other information as described elsewhere in the Specifications, if appropriate, under the contract.
4. Submit to the environmental consultant "as-abated" drawings along with a signed affidavit stating that all asbestos-containing materials have been removed as indicated on the drawings.

H. See other sections of these Specifications, and EPA, OSHA, and other standards referenced therein, for further information and requirements not included above.

1.5 BUILDING PROTECTION

A. Building Security and Protection

1. The contractor shall post adequate warning signs at all potential entrances to work areas as required by EPA and OSHA.
2. The contractor shall protect all existing fixed equipment, building finishes that are to remain, and existing systems and functions from damage during the abatement process. Extra precautions are to be taken in protecting existing electrical panels, light fixtures, etc. Any damage to existing building, services, and/or equipment shall be remedied by the contractor at their expense.
3. Contractor shall clean external surfaces of contaminated containers and equipment thoroughly by wet sponging and HEPA vacuum.
4. Contractor shall maintain access and use of existing fire lanes.

1.6 PERSONAL PROTECTION

A. Training

1. Prior to commencement of work, contractor shall ensure all workers have been trained as specified.
2. The contractor shall provide and post, in the clean room(s) and the equipment room(s), the decontamination, respirator, and work procedures to be followed by the workers.

B. Personnel Personal Protective Equipment for Asbestos Removal

1. Work clothes shall consist of disposable full-body coveralls and head and foot covers ("Tyvek" or approved), boots, or sneakers. Eye, hearing, fall protection, and hard hats should be available as appropriate.
2. At minimum, respiratory protection shall be approved by National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA); US Department of Labor; US Department of Health, Education, and Welfare; Centers for Disease Control; and as listed below. Respiratory protection shall provide workers with a maximum calculated fiber level inside the mask of 0.01 f/cc.

a. Glovebag or modified glovebag: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.

b. Demolition of walls and ceilings that may impact friable asbestos-containing material: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

c. Pre-abatement work in close proximity to friable asbestos-containing materials: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

d. Abatement in isolated areas: full-face mask, powered air-purifying respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 100.

e. HEPA vacuuming and wet cleaning of surfaces: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

f. Vinyl asbestos floor tile removal: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

g. Handling of double-bagged asbestos-contaminated waste: half-face mask, negative-pressure respirator with disposable HEPA filter cartridges (magenta/purple color code). Protection factor: 10.

3. Additional respiratory protection shall be as required by CFR 29 1910.134 and 1926.1101, OR-OSHA Chapter 437, 1910.134 and 1926.1101.

4. As part of the Contractor's Respiratory Protection Program, all workers shall be provided with a selection of brands and sizes of respirators to choose from. At a minimum, all workers shall be qualitatively fit-tested at the time of respirator selection per OR-OSHA Worker's Compensation Department Rule 22-069 (4)(e)(5)(i), and semiannually thereafter.

5. Contractor shall supply replacement filter cartridges, as required. Cartridges that have become wet or clogged shall be replaced immediately.

C. Worker Decontamination Enclosure System

1. The contractor shall construct a personnel decontamination facility immediately outside of the isolated work area consisting of three chambers and two air locks as follows:

a. The equipment room shall consist of an air lock to the shower room, and a curtained doorway to the work area.

b. The shower room shall have two air locks, one to the equipment room and one to the clean room. All showers shall have hot and cold water controllable at the taps and installed in this room. The contractor shall supply and maintain soap, shampoo, and towels at all times in the shower area. Shower wastewater shall be filtered to remove all fibers larger than five microns, or as required by local regulations, before disposal in the municipal sewer system, or shall be collected and disposed of as asbestos-contaminated material. Permits shall be obtained and all water discharge regulations complied with, as required by local municipalities. Water filters shall be disposed of as asbestos-contaminated material.

c. The clean room shall consist of an air lock to the shower room and a curtained doorway to the adjacent building area. The clean room shall contain a first aid kit, a place to sit

down, the Worksite Entry Logbook, and storage for workers' and visitors' clothing and shoes. Work, respirator, and decontamination procedures; regulations; and prevailing wage rates shall be conspicuously posted. There shall be a supply of clean, protective clothing, and respirators and cartridges in the clean room at all times.

d. A monometer measuring pressure differential within and outside the containment shall be installed and remain operable on any containment from the start of abatement work until work is complete, and satisfactory clearance results are obtained. Air pressure within the containment shall remain at or below -0.02 inches of water (compared to ambient air pressure) throughout.

2. Contractor shall not begin asbestos abatement work unless this system is functional, in good repair, and has been found acceptable for specification compliance by the environmental consultant.

D. Personnel Protection Procedures in Isolated Work Areas

1. Each worker shall, upon entering the jobsite, remove street clothes in the clean change room, put on and fit-test their respirator, put on clean protective clothing, and sign in on the Worksite Entry Logbook before entering the equipment room or the work area.

2. Workers shall, each time they leave the work area, remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove and dispose of disposable work clothes; remove and store shoes, boots, and other equipment except respirators; still wearing the respirator, proceed to the showers and clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash themselves; remove filters, dispose of filters in the container provided for that purpose, and wash and rinse the inside of the respirator.

3. Following showering and drying off, each worker shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work or before eating, smoking, or drinking. Before reentering the work area from the clean change room, each worker shall put on his respirator with clean filters, dress in clean protective clothing, and sign in on the Worksite Entry Logbook.

4. Contaminated work footwear and other equipment shall be stored in the equipment room when not in use in the work area. Upon completion of asbestos abatement, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out, using soap and water, before removing from work area.

5. Workers shall not eat, drink, or chew gum at the worksite except in the established clean room. Smoking or using other tobacco products is prohibited.

6. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material and until final cleanup is completed.

E. Access to Isolated Work Area by Others

1. Except for emergency personnel, the contractor shall limit access to the work area to authorized visitors.

2. The contractor shall provide protective clothing, respirators, and equipment for all authorized visitors, as specified above.

3. All authorized visitors shall be subject to the personnel protection provisions specified above, and shall sign in and out on the Worksite Entry Logbook.

F. Personal Protection during Work in Non-Isolated Work Areas:

1. Work clothes per Section 1.06 B.
2. Respiratory protection per Section 1.06 B.
3. Worker protection procedures will differ from Section 1.06 D, in that two layers of coveralls shall be worn after removal of street clothes. Worker decontamination through a Worker decontamination enclosure is required. The first layer of coveralls must be removed when exiting the glovebag work area. The worker shall immediately proceed to the worker decontamination unit. The remaining requirements of Section 1.06 D still apply.
4. Contractor shall submit to the architect and environmental consultant for approval an emergency control and cleanup plan to be followed in the event of asbestos contamination during glovebag use. Contractor shall ensure all workers are thoroughly familiar with approved plan.
5. Contractor shall promptly remove all bags as they are used to the bag-holding and decontamination enclosure system.

G. Emergency Precautions

1. The contractor shall establish emergency and fire exits from the work area. Contractor shall ensure these exits are well marked and remain unobstructed.
2. The contractor shall be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for decontamination.
3. Contractor shall notify the local fire department of the asbestos abatement project prior to beginning work area preparation.

1.7 SAFETY

With regard to the work of this contract, the safety of the contractor's employees, the owner's employees, and the public is the sole responsibility of the contractor.

1.8 LIABILITY

The contractor is an independent contractor and not an employee of the owner, architect, or the environmental consultant. The owner, architect, and environmental consultant shall have no liability to the contractor, or any third persons, for contractor's failure to faithfully perform and follow the provisions of these Specifications and the requirements of the governing agencies. Notwithstanding the failure of the owner, architect, or the environmental consultant to discover a violation by the contractor of any of the provisions of these Specifications, or to require the contractor to fully perform and follow any of them, shall not constitute a waiver of any of the requirements of these Specifications, which shall remain fully binding upon the contractor.

1.9 DELIVERY

Contractor shall deliver all materials to the worksite in the original packages, containers or bundles bearing the name of the manufacturer and the brand name.

1.10 STORAGE

Contractor shall store all materials subject to damage off the ground, away from wet or damp surfaces, away from heat sources, and under cover sufficient to prevent damage, contamination, or fire.

1.11 PROTECTION

Damaged or deteriorating materials shall not be used and shall be removed from the premises by the contractor. Materials that become contaminated with asbestos shall be disposed of in accordance with the applicable regulations by the contractor.

1.12 SUBCONTRACTORS

Any subcontractors employed by the contractor shall be bound to all the work and safety standards specified elsewhere in this Specification. Subcontractor's personnel shall be fully trained and supervised by the contractor during performance of this work.

1.13 AIR MONITORING BY ABATEMENT CONTRACTOR

A. An Independent Testing Laboratory shall be retained by the Abatement Contractor. All air-monitoring analysis shall be performed by an Industrial Hygienist. The Industrial Hygienist must be experienced and trained in asbestos sampling and analysis. At a minimum, documentation of prior asbestos sampling and analysis experience, plus satisfactory completion of the NIOSH 582 course or equivalent formal asbestos education, will be required. The laboratory must meet the requirements specified in Section 02 82 13. Air sample collection may be performed by an Industrial Hygienist or the Abatement Contractor's foreman at the Abatement Contractor's option.

B. Documentation shall be kept for each filter sample procured as to worker sampled, work area location, date, and time taken, volume of air drawn through filter, pump identification number and calibration. Documentation shall indicate in what areas tests were taken and shall clearly indicate the specified maximum allowable fiber levels for each area tested. Submit chain-of-custody records along with all samples.

C. The samples shall be collected on 25 millimeter (mm) filters and analyzed within 12 hours using the membrane filter method at 400-500x magnification with phase contrast illumination - NIOSH Analytical Method No. 7400 - for laboratory and field analysis. The analyst shall sign and submit permanent records of all samples analyzed directly to the Environmental Consultant. The Independent Testing Laboratory shall seal the unused portion of all filters in airtight containers so that individual samples can be reanalyzed at a later date if necessary. The containers shall be clearly labeled with project name and sample number and shall become property of the Owner at work completion at the Owner's request.

D. The Abatement Contractor's testing laboratory shall submit sample analysis results to the Environmental Consultant verbally within 18 hours from the time of collection and written within two weeks including chain-of-custody and equipment calibration records.

E. Abatement Contractor's Sampling During Abatement:

1. Air monitoring shall be performed to provide samples during the period of asbestos abatement in each work area. Begin sampling when asbestos removal commences. Samples are to be taken where Class I or II work is being conducted during each 8-hour work shift until abatement is complete in that work area or until a negative exposure assessment is established per 29 CFR 1926.1101.

2. The Abatement Contractor shall determine which worker(s) in each work area is probably experiencing the most severe exposure. This is the "Most Contaminated Worker(s)". Eight (8)-hour TWA and 30-minute excursion samples shall be collected on this worker(s). This worker shall wear a personal sampling pump and the sample shall be drawn from the breathing zone of this worker. All other samples are area samples.

3. The number of air samples collected shall be determined by the Abatement Contractor, and may be altered during the project based on work activity and results.

4. The maximum allowable fiber levels shall be as determined by the Environmental Consultant based on the respiratory protection being utilized.

F. Abatement Contractor shall notify the Department of Environmental Quality of air monitoring clearance results as supplied by Environmental Consultant. Notification shall be within 30 days after monitoring procedures were performed in accordance to OAR 340-32-465.

1.14 AIR MONITORING BY OWNER

A. The Owner will retain an experienced Industrial Hygienist/Environmental Consultant to collect and analyze asbestos air samples. Documentation of sample results will be forwarded to the Abatement Contractor as appropriate to regulatory requirements.

B. Samples analyzed by phase contrast microscopy (PCM) will use NIOSH Analytical Method No. 7400. Samples analyzed by transmission electron microscopy (TEM) will use either the AHERA methodology, 40 CFR Part 763, or Yamate Level Two.

C. Owner's Air Sampling During and After Abatement:

1. Air Sampling Table is to be used as a guide. The Owner's Industrial Hygienist/Environmental Consultant may modify criteria. Modifications to the Maximum Allowable Fiber Count shall be made in writing by the Owner.

Type of Sample	Average Samples per 8-hour Work Shift	Sample Volume--L (Liters [L])	Approximate Flow Rate	Maximum Allowable Fiber Count (f/cc)
HEPA Fan Exhaust	0 or selected units	400-2000 L	2 to 10 LPM	0.01 f/cc
Outside of Work Area	0-5	400-2000 L	2 to 10 LPM	0.01 f/cc or <pre-abatement
Clearance PCM	1-5/work area	800-3000 L	2 to 10 LPM	0.01 f/cc
Clearance TEM	1-5/work area	1200-1800 L	2 to 10 LPM	<70 s/mm^2 average

LPM = liters per minute
f/cc = fibers per cubic centimeter
s/mm^2 = structures per millimeters squared

2. Air sampling for post-abatement work in isolated work areas will use the aggressive sampling method. Use of aggressive sampling in other areas shall be as directed by the Environmental Consultant. Aggressive sampling shall be conducted to assure that fibers remain airborne during sample collection.
3. Analysis of all clearance samples shall be via PCM.
4. The Abatement Contractor shall allow 48 hours for the collection and analysis of final PCM air clearance samples. In addition, the Abatement Contractor must provide at least 24 hours advance notice to the Environmental Consultant for final visual Inspection and clearance air monitoring.
5. The Owner reserves the right to monitor Abatement Contractor's performance via air samples on abatement workers and in the work area in addition to the Abatement Contractor's air monitoring.

1.15 QUALITY ASSURANCE

A. If, at any time during the work, analysis of an air sample taken by the Abatement Contractor, Owner, or Owner's representative, indicates a fiber count in excess of the allowable maximums specified, the Industrial Hygienist who analyzed the air sample shall immediately notify:
   1. The Abatement Contractor's Foreman
   2. The Environmental Consultant: PBS Engineering and Environmental Inc.
   3. Other workers, employees, occupants, etc. in affected area(s).

B. Immediately upon being notified of fiber count exceeding the specified maximum allowable levels, the Abatement Contractor shall perform the following steps in the order presented, at no additional cost to the Owner:
   1. Stop abatement work.
   2. Identify source of high fiber counts.
   3. Immediately correct any containment breaches, pressure differential changes or other potential cause, and other concerns with the Environmental Consultant, and the Owner, if the Owner is available. The Environmental Consultant will determine the affected area and affected adjacent areas considered to be contaminated. The Environmental Consultant will determine the actions to be taken by the Abatement Contractor at no additional cost to the Owner.
      a. Clean the affected area and the affected adjacent areas. Cleaning shall use wet methods and HEPA vacuuming.
      b. Resample air until fiber counts are determined to be below one half of the specified maximum levels.
      c. Secure and repair containment barriers, repair or add equipment.
      d. Modify work procedures, and make other changes determined to be the possible cause of high fiber counts.
   4. Carefully resume work under close air monitoring.

5. The Abatement Contractor shall be responsible for costs of any testing, cleanup, repair, down time loss, etc. that is a result of the Abatement Contractor's negligence, poor maintenance of isolated areas or improper procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plastic Sheet: Plastic sheet shall be flame-retardant polyethylene material sized in lengths and widths to minimize the frequency of joints. The minimum thickness shall be 6-mil.

B. Plastic Bags: Plastic bags shall be 6-mil polyethylene printed with warning labels per OSHA and EPA regulations.

C. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic; attaching plastic sheet to finished or unfinished surfaces of dissimilar materials; and adhering under dry and wet conditions, including use of amended water. Minimum of 2-inch-wide tape must be used.

D. Disposal Containers: Disposal containers shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposal at an approved site. The containers shall be labeled in accordance with OSHA and EPA regulations. Containers must be both airtight and watertight, and have hard top, bottom, and sides.

E. Warning Labels and Signs: Warning labels and signs shall be posted as required by OR-OSHA, ODOT, and DEQ regulations.

F. Amended Water: Clean potable water containing a surfactant additive. The surfactant additive shall be 50 percent polyoxyethylene ether and 50 percent polyethylene ester, or equivalent, and shall be mixed with water at a concentration of one ounce surfactant to five gallons of water, or as recommended by the manufacturer in the case of an equivalent.

G. Encapsulants (Sealants): Encapsulants shall be of the bridging or penetrating variety and shall be listed as "satisfactory" by the EPA. Encapsulants shall provide a suitable substrate bonding agent for application of new material where appropriate. Penetrating Encapsulant: No. 207 Special Sealer #33775-27A as manufactured by Makus-Cincinnatus, Inc.; "Asbestop 30B-2" as manufactured by Asbesco Corp.; "Cable Coating 22-P" as manufactured by American Coatings Corp., or approved. Bridging Encapsulant: Decadex Firecheck, manufacturer's standard color "Magnolia," as manufactured by Pentagon Plastics, Inc.; "Cable Coating 2-B," manufacturer's standard color gray, as manufactured by American Coatings Corp.; or approved.

H. Rewettable Lagging Cloth: Twelve ounce glass fabric lagging cloth saturated with dried lagging adhesive. "Dip-Lag" as manufactured by Claremont Co. or approved.

I. Enclosure: Protective plastic jacketing systems, framed gypsum board enclosures, suspended ceilings or other materials as specified elsewhere.

J. Other Materials: Provide all other materials such as lumber, nails, and hardware, which may be required to construct and dismantle the decontamination area, and the barriers that isolate the work area, and as required to complete the work, as specified.

2.2 TOOLS AND EQUIPMENT

A. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

B. Air-Purifying Equipment: Air-purifying equipment shall consist of high-efficiency particulate air (HEPA) filtration systems. No air movement system or air equipment shall discharge asbestos fibers outside the work area. Each unit shall be capable of variable volume from a minimum of 500 cubic feet per minute (CFM) to at least 1700 CFM under load and shall have at least two stages of pre-filtration ahead of the HEPA final filter. Each unit shall be overload protected, and equipped with an elapsed time indicator (hour meter), static pressure gauge with low flow alarm, and heat and smoke sensors that visually and audibly warn workers and shut unit fan down within 30 seconds. The units shall be: Micro-Trap Portable Air Filtration System manufactured by Asbestos Control Technology, Inc., "HOG 2000" Negative-air Protection System manufactured by Control Resource Systems, or approved.

C. Pressure Differential Monitoring Equipment: A combination sensing, alarm, and recording device shall be in operation at all times during use of the HEPA air-purifying equipment. The unit shall be a "Neg-A-Master," manufactured by Control Resource Systems, Inc., or approved.

D. Water-purifying Equipment: Water-purifying equipment shall be capable of removing all fibers longer than five microns, or as required by local regulations, from water used in abatement work and decontamination showers. Control Resource Systems, Inc. "AQUA-HOG" or approved.

E. Airless Sprayer: An airless sprayer, suitable for application of penetrating encapsulant material, shall be used.

F. Vacuum Equipment: All vacuum equipment used in the work area shall be High-efficiency Particulate Air (HEPA) equipment, and suitable for wet/dry usage.

G. Scaffolding: Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations. All special scaffolding shall have drawings and calculations stamped and signed by a civil or structural engineer registered in the state of Oregon.

H. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. Equipment shall have a hard top, bottom, and sides. If equipment is rented, notify rental agency in advance, in writing, of intended use of equipment.

I. Electrical: Electrical tools, equipment, and lighting shall meet all applicable codes and regulations. Ground fault protection as required by OSHA, shall be in effect at all times. Contractor shall take all additional precautions and measures necessary to ensure a safe working environment during wet removal.

J. Glovebags: Bags shall be clean poly bags seamless at the bottom, with pre-printed asbestos warning labels, 6-mil PVC with attached TYVEK arms, and latex gloves. Bags shall be Profo' Bag manufactured by Asbestos Control Technology, Inc., or Asbest'O'Saf/SAC by Control Resource Systems, Inc., or approved.

K. Remote Filter Housing: Stainless steel housing shall have pre-filters and HEPA filter sealed to cabinet flanges by Century Equipment "Advance Guard II" or approved equal.

L. Other Tools and Equipment: Other suitable tools shall be provided for the removal, enclosure, encapsulation, patching, and disposal activities including, but not limited to, hand-held scrapers, wire brushes, sponges, and rounded-edge shovels.

PART 3 EXECUTION

3.1 FULL ISOLATION WORK AREA PREPARATION

A. Contractor shall perform the following isolation procedures in the order in which they are presented. Any alternative control measures considered for Class I/II work shall be performed in accordance with 29 CFR 1926.1101.

1. Shut down, remove filters, and isolate HVAC systems to prevent contamination and fiber dispersal. Coordinate with building users and CMGC prior to shutdown.
2. Coordinate all electrical, safety, and other service connections, requirements and equipment with the CMGC. Use a journeyman electrician at a minimum. It is the contractor's responsibility to verify operation of systems that will be shut off during abatement. If any system is found to be defective or not operating satisfactorily, the contractor shall notify the CMGC or environmental consultant in writing prior to shutoff.
3. Install critical barriers as follows: seal off all openings including, but not limited to, doorways, windows, and other penetrations of the work area with solid critical barriers except openings left for HEPA air-purification system, which shall be properly HEPA-filtered. Where doors exist, sealing may be done by closing door, sealing with tape on both sides, and then covering both sides with two layers of plastic sheeting.
4. Pre-clean movable objects, such as furniture and equipment to be removed (and carpeting), within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and remove such objects from work areas to a temporary location, or consolidate such objects away from removal work and enclose with critical barriers.
5. Pre-clean fixed objects within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate, and enclose with critical barriers. Equipment that must continue operating shall be enclosed and ventilated to avoid damage.
6. Set up the worker decontamination enclosure system (decon). Once this system is installed and abatement commences, it shall be used in the specified manner for the ingress and egress of all personnel and equipment, except in emergency situations. All personnel shall sign the Worksite Entry Logbook each time they pass in or out of the decontamination enclosure.
7. Install HEPA air-purifying equipment pressure differential fan system so as to ensure lower static pressure in the isolated work area than in surrounding areas, a flow of air through all parts of the isolated work area towards the air-purifying equipment, and minimum air contamination levels at abatement worker breathing zones. Discharge from air-purifying equipment shall be ducted outside the building. Use one or more units of capacity as recommended by the manufacturer for the volume of the isolated work area, but in no case shall airflow be less than six air changes every 60 minutes with a minimum pressure differential of 0.02 inches wg between the work area and the decon clean room.
8. Cover floor and wall surfaces with plastic sheeting sealed with tape. Cover floors first so that plastic extends at least 12 inches up on walls, then cover walls with plastic sheeting to overlap floor plastic by a minimum of 24 inches, thus overlapping the horizontal floor material by a minimum of 12 inches. Install additional layer of plastic sheeting on floor and walls in similar manner. Contractor may use mechanical fastening techniques, such as tack strips, as necessary to secure wall plastic sheeting. Contractor shall repair any damage resulting from mechanical fasteners.

9. Maintain emergency and fire exits from the work areas, or establish alternative exits satisfactory to the local building or fire department officials. Ensure that all exits remain unobstructed and well marked.

10. Adequate portable fire extinguishing equipment shall be maintained within work area as defined by OSHA and/or local fire department officials.

B. No asbestos abatement work shall occur unless the work area isolation has been found acceptable for Specification compliance by the environmental consultant.

C. Isolated work area enclosure system maintenance. The contractor shall be responsible for daily documentation of the following:

1. Prior to the first use, and at the beginning of each shift during abatement work, containments shall be given a complete visual inspection by the contractor's shift foreman and industrial hygienist. Inspection shall include the HEPA air-purification system and associated filters. A smoke tube test by the shift foreman shall then be made of the worker decontamination enclosure system and other critical areas to verify that the isolated area is under negative air pressure. Work shall not begin until all defects have been repaired.

2. Periodic inspections shall be made, as required, during each shift to assure continued proper functioning of the containment and HEPA system.

3.2 NON-ISOLATED WORK AREA PREPARATION

A. Contractor shall perform the following procedures in the order in which they are presented and describe procedures for glovebag work and other work in non-isolated work areas. Any alternative control measures considered for Class II work shall be performed in accordance with 29 CFR 1926.1101.

1. Shut down heating, ventilation, and air conditioning (HVAC) systems. Coordinate with building users and the CMGC prior to shutdown.

2. Restrict access to work area and post warning signs. Do not perform glovebag work or any abatement work in an occupied area.

3. Completely pre-clean entire work area using HEPA vacuum equipment or wet cleaning methods.

4. Set up the worker decontamination enclosure system. Once this system is installed and abatement commences, it shall be used in the specified manner for the ingress and egress of all personnel, except in emergency situations. All personnel shall sign the Worksite Entry Logbook each time they pass in or out of the decontamination enclosure.

5. At the direction of the environmental consultant, install HEPA exhaust fan in work area. Duct fan intake to immediate area of work in such a manner that any fibers released will be drawn away from the worker and into intake duct.

6. Cover floor and other surfaces below work area with 6-mil plastic sheeting. Seal openings and install curtained doorways and air locks as directed by the environmental consultant.

7. Have emergency cleanup equipment and supplies, including HEPA vacuum, amended water, disposal bags, mop, buckets, towels, and sponges on hand prior to start of abatement work.

B. No asbestos abatement work shall occur unless the work area has been found acceptable for Specification compliance by the environmental consultant or industrial hygiene technician.

3.3 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN FULL ISOLATION WORK AREAS

A. Contractor shall isolate work area as specified.

B. Remove all asbestos-containing vinyl floor tile as Class 1 friable asbestos removal.

1. Contractor shall spray the asbestos material with amended water. A fine spray of this solution shall be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos shall be sufficiently saturated to prevent emission of airborne fibers in excess of specified fiber levels.

2. Contractor shall remove asbestos material while damp and pack it in sealable containers. Containers shall be moved to bag load out facility or equipment room in the worker decontamination system.

3. Contractor shall collect all water used in the removal and cleaning process and dispose of as contaminated waste or filter to remove all fibers more than five microns in length before disposal in the municipal sewer system, or as required by local regulations. Water filters shall be disposed of as asbestos-contaminated material.

C. All wooden subfloor associated with asbestos-containing mastic shall be wholly removed and disposed of as asbestos waste in accordance with section 3.9, Disposal.

D. Contractor shall maintain a safe and uncluttered work area, worker decontamination system, and bag load out facility on a daily basis.

3.4 REMOVAL OF ASBESTOS-CONTAINING MATERIALS IN NON-ISOLATED AREAS

A. Contractor shall apply spray coat of amended water to material to be removed; material shall be kept damp during entire removal process.

B. Glovebag work shall be as follows. All removal using the glovebag method shall be performed strictly according to regulations, manufacturer's printed instructions, and as demonstrated by the manufacturer's representative or as further specified in this section. Workers are not to smoke or wear hand or wrist jewelry while using glovebags.

1. Contractor shall install port for hose of HEPA vacuum to create reduced pressure inside glovebag. Installing of fresh air intake and/or bridging to prevent collapse of bag are acceptable. Reduced pressure shall be maintained throughout entire abatement procedure.

2. During the removal phase, contractor shall use amended water to reduce potential for airborne fibers.

3. Contractor shall seal flap if used and, using a HEPA vacuum, remove all contaminated air in the upper chamber.

4. Contractor shall promptly double-bag the glovebag after removal is complete, place it into a sealed container, and remove to the bag holding enclosure.

C. Exterior door and window caulking shall be removed using the following methods:

1. Caulking shall be removed in a non-friable state. Caulking that is determined to be friable or which is rendered friable during the abatement process shall be removed using either containment or glovebag methods.

2. The contractor shall utilize wet methods during removal and packaging for disposal.

3. The contractor may utilize a heat gun if at any time the caulking has the potential to become friable during removal.
4. The contractor shall have HEPA vacuums available and shall use them during removal.
5. The use of abrasive or mechanical methods to remove the caulking is prohibited.
6. Burning or blistering of the caulk with excessive heat by the heat gun is prohibited.
7. All asbestos-containing caulk and building components with residual asbestos caulk shall be disposed of as asbestos-containing waste as specified below.

3.5 CLEANUP IN FULL ISOLATION WORK AREAS

A. At the conclusion of removal in the isolated work area, conduct cleanup in the sequence described below. Windows, doors, HVAC vents, etc. shall remain sealed and HEPA-filtered pressure differential fan systems shall remain in service.

1. REMOVE MATERIAL AND EQUIPMENT. Contractor shall remove visible accumulations of material and debris (including filters removed from HVAC equipment and HEPA air-purification equipment). Contractor shall include all sealed containers and equipment used in the work area in the cleanup, and remove them from work area after decontamination of outer surfaces.
2. FIRST CLEAN. Contractor shall clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA-filtered vacuum equipment.
3. WAIT 24 HOURS. After the first cleaning of the work area, wait 24 hours to allow for settlement of dust. During this settling period, no entry to the work area shall be allowed.
4. SECOND CLEAN. Wet-clean or clean with HEPA-filtered vacuum equipment all surfaces in the work area. After completion of the second cleaning operation, perform a complete visual inspection of the work area to ensure that the work area is free of visible debris.
5. VISUAL INSPECTION. Prior to application of post-removal encapsulant, contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to desired inspection time.
6. REMOVE PLASTIC SHEETING. After visual observation by the consultant, contractor shall apply a coat of approved encapsulant to all surfaces in the work area where asbestos has been removed and to disposable plastic sheeting as a post-removal encapsulant. Encapsulant application shall follow all applicable manufacturer's recommendations and shall provide a compatible bonding agent for application of new material.
7. FINAL CLEAN. After the encapsulation is complete, the contractor shall remove all noncritical plastic and clean all floors, walls, fixtures, and other surfaces within the work area with only critical barriers in place using wet methods or HEPA-filtered vacuum equipment. Plastic sheeting over carpets may remain in place.
8. CONTACT ENVIRONMENTAL CONSULTANT. Contact the environmental consultant for a visual observation of the work area. The work area shall be free of visible debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to

desired inspection time. Consultant shall conduct final air monitoring as specified after work area has been allowed sufficient time to dry.

9. TEARDOWN. When the final observation by the environmental consultant and air sampling test results are satisfactory, the contractor shall then remove the decontamination systems and remaining barriers.

10. DISPOSAL. Contractor shall properly dispose of all waste materials. All polyethylene material, tape, cleaning material, and contaminated clothing shall be double-bagged, sealed, and labeled as described above for asbestos waste material.

3.6 CLEANUP IN NON-ISOLATED WORK AREAS

A. FIRST CLEAN. Contractor shall remove visible accumulations of asbestos material and debris. All surfaces shall be cleaned within the affected work area. Cleaning shall be with amended water and/or HEPA-filtered vacuum equipment. In a large open area, the affected work area shall include the immediate work area and an area that encompasses at least 6 feet in all directions or as defined by the environmental consultant. In small work areas, the affected work area shall include the entire room.

B. AFFECTED AREA. The affected work area may be further defined in the scope of work by the environmental consultant. During the work, high fiber levels, as indicated by air monitoring results, may increase the area to be cleaned. The increase in the affected area due to high fiber levels or other indications of fiber dispersal will be defined by the environmental consultant, and the contractor shall bear all costs of additional cleaning.

C. VISUAL INSPECTION. After completion of the cleaning operation, the environmental consultant shall perform a visual observation of the affected work area to ensure that the affected work area is free of visible dust and debris. Observation by the consultant does not alleviate the contractor of responsibility to provide work in compliance with Specifications. Contractor shall contact environmental consultant at least 24 hours prior to desired inspection time.

D. ENCAPSULANT. After visual observation by the environmental consultant, contractor shall spray-apply encapsulant to the material substrate, all temporary plastic sheeting, and other temporary protective materials.

E. CLEARANCE SAMPLING. Post-abatement air sampling shall be at the discretion of the Environmental Consultant and will be determined by the ongoing sample results.

F. TEARDOWN. When the final observation by the environmental consultant and air sampling test results (if required) are satisfactory, the temporary plastic sheeting and other temporary protective materials shall be removed by the contractor.

G. DISPOSAL. Contractor shall properly dispose of all waste materials, all polyethylene material, tape, and cleaning material, and contaminated clothing shall be double-bagged, sealed, and labeled as described for asbestos waste material.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

A. When cleanup is complete, contractor shall:

1. Relocate objects moved to temporary locations in the course of the work to their former positions. Coordinate with the CMGC.

2. Clean, repair and/or repaint all surfaces soiled, discolored, or damaged by removal of tape, adhesive, or other work of this contract to match existing surfaces. The contractor shall bear all costs associated with damage incurred during the abatement, which includes, but is not limited to, perimeter plaster walls, wall murals, windows, and mullions
3. If the contractor uses caulking to seal cracks in concrete floor, the caulking must be removed to architect's satisfaction at completion of project.
4. Return mechanical, electrical, and other systems shut down by the contractor to complete and functional operation.
5. Re-secure objects removed in the course of work in their former positions, including air dampers in plenums, and adjust for proper operation.
6. Clean, repair and/or repaint all surfaces soiled, discolored, or damaged by removal of tape, adhesive, or other work of this contract to match adjacent surfaces.

3.8 DISPOSAL

A. Contractor shall affix warning labels having waterproof print and permanent adhesive to the lid and sides of all containers. Warning labels shall be conspicuous and legible, and contain the following words:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
AVOID BREATHING AIRBORNE ASBESTOS FIBERS

B. The contractor shall determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. The contractor must comply with these regulations and all US Department of Transportation, DEQ, and EPA requirements. Double-bagged material in containers shall be delivered to the pre-designated disposal site for burial. Labels and all necessary signs shall be in accordance with DEQ and OSHA standards.

C. Contractor shall remove decontaminated containers from the site as soon as possible. Notify disposal site in advance of delivery of material to assure immediate burial of containers.

D. If the bags are broken or damaged, or the container is contaminated, the contractor shall clean and decontaminate the entire container for reuse.

E. Contractor shall submit three copies of written proof of disposal at approved disposal site to the environmental consultant prior to completion of the abatement work specified in this section. Use copies of the DEQ Waste Shipment Record ASN-4, completely filled out and signed, and accompanied by tickets and/or receipts from disposal site.

END OF SECTION

Exhibit A.10 - Equity Objectives

Project: Webster Rd - Based on Estimate #2 **Date: 4/8/2021**

Division	Scope	Buy up Opportunity	Current % Confirmed	Figured Select Bid %	Possible %	Buy Up %
1	GC's					
1	Cleaning		0.3%	0.0%	0.0%	0.0%
2	Abatement & Demo		5.5%	0.0%	0.0%	0.0%
2	Earthwork			0.0%	0.0%	0.0%
2	Landscaping		1.6%	0.0%	0.0%	0.0%
2	Striping			0.0%	0.1%	0.0%
2	Paving			0.0%	0.4%	0.0%
2	Site Concrete			0.0%	1.7%	0.0%
3	CIP Concrete			0.0%	0.0%	0.0%
4	Brick			0.0%	0.0%	0.0%
5	Steel			0.0%	0.0%	0.0%
6	Siding		2.1%	0.0%	0.0%	0.0%
7	WRB/Window Install		0.6%	0.0%	0.0%	0.0%
7	Waterproofing			0.0%	0.0%	0.0%
7	Insulation		0.4%	0.0%	0.0%	0.0%
7	Sheet Metal			0.0%	0.0%	0.0%
7	Roofing			0.0%	0.0%	0.0%
8	Doors and Hardware		1.5%	0.0%	0.0%	0.0%
9	Drywall		3.0%	0.0%	0.0%	0.0%
9	Flooring, Tile & Plam		1.4%	0.0%	0.0%	0.0%
9	Painting		1.2%	0.0%	0.0%	0.0%
10	Accessories		0.8%	0.0%	0.0%	0.0%
10	Signage		0.1%	0.0%	0.0%	0.0%
10	Metal Shelving			0.0%	0.0%	0.0%
12	Cabinets			0.0%	0.0%	0.0%
12	Window Coverings			0.2%	0.0%	0.0%
15	Fire Protection			0.0%	0.0%	0.0%
15	Plumbing	$ -	1.6%	0.0%	0.0%	0.0%
15	HVAC	$ -	1.5%	0.0%	0.0%	0.0%
15	Louvers			0.0%	0.0%	0.0%
16	Electrical / LV			0.0%	0.0%	0.0%

Totals	**21.59%**	**0.23%**	**2.18%**	**0.00%**
Total - Current + Select	21.8%			
Total - Current + Select + Possible	24.0%			
Total - All	24.0%			

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Contracting Plan– VERSION 3
Webster Road

Oct 20, 2020

Table of Contents

1.) CONTRACTING PLAN

The Walsh Construction Co./OR Contracting Plan consists of the procurement methods that will be implemented to meet Housing Authority of Clackamas County's goals for Target Business participation and workforce participation.

The Webster Road project contains some scopes that can't be targeted businesses. Knowing that we do not have all 16 divisions of work to obtain target business participation we will craft the best plan to maximize the participation while providing the most competitive pricing.

Based on the rehabilitation nature of this project and the scopes included within the project work, it will be a challenge to reach the participation goals. The MEP Design Build nature of this project adds additional challenges to ensure that the project has subcontractors that can not only perform the design-build but also ensuring at least one or two of them is a qualified targeted firm.

Update 10/20/20 – Buy-up options to include an DMWESB Plumber and/or Mechanical subcontractor has been rejected and we are starting design with all non-DMWESB MEPS. Please note it will be very unlikely to reach aspirational goal of 30

The goals are:

- DMWESB Targeted Business Participation – 20% Baseline Goal / 30% Aspirational Goal

  Understanding that this project will be challenged to maximize the participation of Target Businesses, Walsh Construction Ca./OR has created this Contracting Plan to guide the project team toward Housing Authority of Clackamos County's 20% participation baseline goal while pushing for the higher goal of 30%. Update 10/20/20 – Please note it will be very unlikely to reach aspirational goal of 30% without buying up Plumbing or Mechanical scopes.

- Section 3 business participation

Four methods of procurement will be used and are described as follows:

I. Public Bidding

Walsh Construction Co./OR will use a public bid process to procure the majority of the work.
In our effort to reinforce our commitment to maximize target business participation and to ensure a diversified workforce, we will use a bid rating system in the public bidding. Bids will be evaluated on a formula as follows:

		MAX POINTS
1	Bid Price	95 points
2	DBE/MBE/WBE/ESB	5 points
	a Registered DBE/MBE/WBE/ESB OR	
	b Registered DBE/MBE/WBE/ESB 2nd tier subs or suppliers	
3	Registered Section 3 Business	Up to 10% off Bid Price Factored in Item 1 Above

Proposals will be scored as follows:

1.) Price

Low Proposer will be awarded 90 points. Points for higher bids will be reduced by the percentage that the higher bid is above the low bid. If the low bid is $100 and the higher bid is $105, the score for the higher bid would be reduced by 5%, the percentage that the higher bid exceeds the low bid, or 4.5 points for a final point allocation of 85.5 points.

2.) DBE/MBE/WBE/ESB

a. If a Proposer is a registered DBE/MBE/WBE/ESB, the Proposer gets 5 points

b. If a proposer is not an DBE/MBE/WBE/ESB*, to the extent that suppliers or second tier subcontractors are registered DBE/MBE/WBE/ESB firms, up to five (5) points may be awarded. Proposers are to list their DBE/MBE/WBE/ESB second tier subcontractors and suppliers on the bid form. The percent of dollar second tier subcontract and supplier amounts to the total first tier subcontract amount will be multiplied by five to determine the final point allocation.

*Note: If DBE/MBE/WBE/ESB Status is "Yes", then no points are awarded for second tier DBE/MBE/WBE/ESB participation.

3.) Section 3

If a Proposer is a registered Section 3 business, their responsible and responsive bid total will have a percentage or maximum lump sum deducted from a bidder's overall bid amount as listed below.

a. When the lowest responsive bid is less than $100,000 = 10% or $9,000 maximum
b. When the lowest responsive bid is $100,000 but less than $200,000 = 9% or $16,000 maximum
c. When the lowest responsive bid is $200,000 but less than $300,000 = 8% or $21,000 maximum
d. When the lowest responsive bid is $300,000 but less than $400,000 = 7% or $24,000 maximum
e. When the lowest responsive bid is $400,000 but less than $500,000 = 6% or $25,000 maximum
f. When the lowest responsive bid is $500,000 but less than $1 million = 5% or $40,000 maximum
g. When the lowest responsive bid is $1 million but less than $2 million = 4% or $60,000 maximum
h. When the lowest responsive bid is $2 million but less than $4 million = 3% or $80,000 maximum
i. When the lowest responsive bid is $4 million but less than $7 million = 2% or $105,000 maximum
j. When the lowest responsive bid is $7 million or more = 1.5% with no dollar limit

These percentage reductions will be reduced from the overall Bid total as submitted on the Bid Form.

Selection

Walsh Construction Co./OR will award the bid to the company with the most points and who is responsible and responsive to the bid documents. If the apparent high point scoring subcontractor is deemed non-responsive, Walsh will move to the next highest point total bidder to consult and verify scope. This process will continue until the work is awarded.

II. Negotiated With Qualified Subcontractors

Based on the 20% targeted business participation requirements of the project and the higher goal of 30%, Walsh Construction Co./OR does not feel the low bid process will produce the required percentage of subcontractors and suppliers. Therefore, the project will need to target qualified subcontractors for major portions of the work scope. For this type of procurement Walsh Construction Co./OR / will again work with Housing Authority of Clackamas County to investigate and target pools of the most qualified subcontractors to perform the work at a competitive price. On Webster Road we feel negotiating the following scopes is appropriate.

- Vinyl Windows (Supply) – VPI (Sole Sourced)
- Skylights (Sole Sourced)
- Tile*
- Site Furnishings (Sole Sourced)

Already Selected as of 10/20/20

- Abatement – PMG^
- Fire Sprinkler – Crown Fire
- Plumbing – Tapani Plumbing~, 2nd tier^
- HVAC – American Heating~, 2nd tier^
- Electrical – Advanced Electric
- Low Voltage – Point Monitor

^DMWESB Specific Subcontractor
*Section 3 Specific Subcontractor
~Rejected buy-up for DMWESB firm.

Walsh Construction Co./OR also proposes to team up subcontractors and suppliers outside of the target groups with members of the targeted groups to both ensure the work can be completed, as well as grow the targeted businesses to be able to perform larger contracts in the future.

Walsh Construction Co./OR does not envision using this procedure for any other scopes at this time, however Walsh Construction Co./OR reserves the option to revise that opinion in future should it prove advantageous to the project goals.

III. Select Bid / Work Packages

When there exist scopes of work that have a deep pool of subcontractors that are all registered target businesses, we will want to use the Select Bid method of procurement. This will be a competitive process, with 3-5 qualified subcontractors using the project documents, obtaining pricing and commitment to using a diversified workforce. The point system described in the public bidding section above will be the basis for awarding the work. The list below are scopes that are advantageous to select bid on Webster Road:

- Asbestos Abatement
- Final Clean
- Striping
- Landscaping
- Painting
- Specialty Supply
- Signage
- Window Treatments
- Plumbing
- Mechanical

IV. Self-Perform

The last method for contracting work under this contract is self-performing certain portions of the work. Self perform work allows us to perform scopes of work that are more difficult to obtain competitive bids, allows us to perform the work in a more controlled safety environment, maintain the project schedule, and ensure a quality project.

Walsh Construction Co./OR is requesting to self-perform the following on Webster Road:

- Misc. Rough Carpentry
- Misc. Finish Carpentry
- Cast in Place Concrete

Summary

These procurement methods make up our Contracting Plan. Once we complete our Estimate we will provide a large spreadsheet that incorporates the current project budget and scope of work so that we can plan, monitor and track all of the goals listed above.

The Contracting Plan will continue to be updated throughout the project and will detail specifics as to how individual procurements are accomplished.

2.) PROCUREMENT

Procurement of Work / Bid Releases

Bid Release 1 –	Abatement and Design-Build MEP (Fire Suppression / Mechanical / Plumbing / Electrical & Low Voltage)
Negotiated –	Vinyl Windows (Supply), Skylights (Supply), Tile, Specialty Supply, Site Furnishings
Bid Release 2 –	Select and Low Bid Release

1. **Bid Release 1 – Early Bids**

Bid period – Pricing Set Drawings/Specifications	July 29, 2020 to Aug 26, 2020
Re-bid period (Plumbing & Mechanical)	Sept 9, 2020 to Oct 12, 2020
Approximate Intent to Award Announced	August 28, 2020
Re-bid Intent to Award Announced	Oct 20, 2020
Approximate work period	November 2020 thru Final Completion

Requests for Early Bids - WCC proposes to solicit Early Bids from the subcontractors for the following trades:

- Abatement & Demolition^ – Select Bid to DMWESB Firms Only
- Fire Suppression Design-Build – Low Bid per Scoring
- Plumbing Design-Build^ – Select Bid to DMWESB Firms Only
  - Re-bid to non-DMWESB Firms in Sept/Oct 2020. Awarded to non-certified firm. Rejected buy-up option for Plumbing certified firm was rejected
- Mechanical Design-Build^ – Select Bid to DMWESB Firms Only
  - Re-bid to non-DMWESB Firms in Sept/Oct 2020. Awarded to non-certified firm. Buy-up option for Mechanical certified firm was rejected
- Electrical and Low Voltage Design-Build – Low Bid per Scoring

We feel it prudent to bid these scopes early to ensure that we have the subcontractors on board early in order to better control the following items:

- Start MEP designs in time for submission for permit
- Ability to start abatement work prior to final bidding & GMP being completed
- Maximize DMWESB
- Ensuring we lock in subcontractors for the scheduled work
- Subcontractor feedback during final phase of design
- Constructability issues
- VE efforts
- Controlling change orders
- Controlling schedule

We would negotiate the scope and their contract. Our goal would be to select subcontractors that are either a Target Business (DMWESB or Section 3) and are qualified to do this type of work (Scopes with a ^ (DMWESB) or * (Section 3) above) or would provide the project a benefit by having on board earlier in the process due to complex nature of project.

2. Negotiated Scopes

Present Negotiated Bid Scopes to HACC — Aug 21, 2020

Approximate work period — April 2021 through completion

Webster Road Negotiated Bid Scopes:

- Vinyl Windows (Supply) – VPI – Sole Sourced
- Skylights (Supply) – Sole Sourced
- Tile*
- Site Furnishings (Sole Sourced)

We feel it prudent to negotiate the scopes listed above prior to the bid phase in order to better control the following items:

- Maximize DMWESB & Section 3
- Controlling change orders
- Controlling schedule
- Ensuring sole-sourced specified suppliers are on-board
- Locking in sub/suppliers early

We would negotiate the scope and their contract. Our goal would be to select subcontractors that are either a Target Business (DMWESB or Section 3) and are qualified to do this type of work (Scopes with a ^ (DMWESB) or * (Section 3) above) or would provide the project a benefit by having on board earlier in the process due to complex nature of project.

3. Bid Release 2 – Select and Low Bid Scopes

Bid Period – Bid Set Drawings/Specifications — Jan 6, 2021 to Feb 10, 2021

Approximate Intent to Award Announced — Feb 24, 2021

Approximate work period — April 2021 thru Completion

Select Bid Scopes

- ~~Asbestos Abatement – Previously Bid~~
- Final Clean (moved to Low Bid per 10/20/20 OAC discussion)
- Striping
- Landscaping (moved to Low Bid per 10/20/20 OAC discussion)
- Painting

- Specialty supply
- Signage
- Window Treatments
- ~~Plumbing – Previously Bid~~
- ~~Mechanical – Previously Bid~~

All of the scopes of work in these packages can be select bid to a grouping of target businesses only. Walsh Construction Co./OR will prepare an independent estimate for the work. The Walsh Construction Co./OR estimate will be used as a baseline to evaluate the select bid pricing.

If the estimates received from the select bidders do not fall within a reasonable range of the Walsh Construction Co./OR estimate or industry standard the bids will be thrown out. If this occurs Walsh Construction Co./OR will re-bid the work.

<u>Low Bid Scopes</u>

- Asphalt Paving
- Earthwork & Site Utilities
- WRB, Window Install & Siding
- Insulation
- Roofing
- Waterproofing
- Joint Sealants
- Wood & Metal Doors/Frames and Hardware (Supply)
- Flooring
- Casework
- Countertops
- Appliances
- Site Concrete – per OAC 10/20/20
- Drywall – per OAC 10/20/20

***As discussed at 10/20/20 OAC that while moving Site Concrete and Drywall to Low Bid Scopes may result in better bid results and participation, it does not guarantee that we can count on DMWESB participation for these scopes. Due to this the project could be at risk of not hitting the 20% goal.

<u>Self-Performed Scopes</u>

- Misc. Rough Carpentry
- Misc. Finish Carpentry
- Cast-In-Place Concrete

This page will be updated and tracked through the design, bidding and award phase.

3.) LONG LEAD ITEMS

Due to the timing of the Webster Road project we don't believe it will be necessary to procure any items prior to the start of construction but reserve our right to notify Housing Authority of Clackamas County if this changes based on design or subcontractor feedback.

The only materials that may need to be purchased early are:

- Vinyl Windows
- Skylights
- MEP Equipment

We will prepare whatever documentation is required to get prior approvals from Housing Authority of Clackamas County to pre-order these materials, if in fact we need to order this early.

4.) TARGET BUSINESS PARTICIPATION PLAN

Contracting Plan for Economic Participation

The Webster Road project will be challenged to maximize the participation of Target Businesses. The rehabilitation nature of the project will make it challenging to engage the full Target Business community.
With this in mind, we plan to increase focus on using Target Businesses as sub-tier subcontractors and suppliers.

In order to ensure maximum participation of qualified Target Businesses we propose the following:

- We will continually update our comprehensive bidders list and solicit input from various groups/individuals for additional Target Businesses we can contact directly. Our contacts include:
  - Walsh Construction Co./OR DMWESB list
  - ODOT State Certified DMWESB list
  - Oregon Association of Minority Entrepreneurs (OAME)
  - HUB Zone and SBA 8 (a) firms from the Small Business Administration
  - Section 3 Businesses
  - Portland Development Commission
  - Sheltered Market Program

- Oregon Tradeswomen
- Portland Youth Builders
- Input from community/business groups

- In addition, we will:
  - Advertise subcontracting work and potential Target Business opportunities in local minority newspapers including The Observer, the DJC, and the Asian Reporter.
  - Contact Target Businesses that perform the appropriate type of work, by fax, phone, email and mail, informing them of the bid opportunities and requesting their attendance at outreach and pre-bid meetings scheduled by Walsh Construction Co./OR.
  - Work with organizations such as the Oregon Tradeswomen, OAME, PBDG, community advisory committees, community associations and minority chambers to increase awareness of bidding opportunities and to incorporate our involvement into the community.

Focused Outreach and Technical Assistance

- Walsh Construction Co./OR plans to pursue the following additional approaches to increase Target Business outreach. Walsh Construction Co./OR will:
  - Break out bid packages into reasonable scopes to maximize Target Business participation, then identify qualified Target Businesses and engage them to determine their capability to successfully perform the identified scope of work.
  - Investigate opportunities to assist the Target Businesses with lines of credit and loan applications if necessary.
  - Continue our user friendly bid climate, where plans will be readily available in all Plan Centers. A Walsh Construction Co./OR representative will be available during the bid process to answer any questions and provide bidder support, and we will adjust bid packages accordingly.

Walsh Construction Co./OR does not require all subcontractors to be bonded, thus saving the owner money and making it easier for smaller firms to participate.

Bid Evaluation Process

In an effort to reinforce our commitment to Target Business participation and a diversified workforce, we will utilize the bid rating system explained in Section I. Public Bidding above.

Walsh Construction Co./OR will award the bid to the company with the most points per the bid rating system and who is responsible and responsive to the bid documents. All bids are subject to demonstrated capability to perform the work. Low bidders may be asked to provide financial statements and references.

Once bids are received, Walsh Construction Co./OR will review for completeness, accuracy and comprehension of the intended work. Walsh Construction Co./OR will follow up with all competitive Target Business bids to clarify any questions and make tentative awards and discuss specific details with selected firms.

Walsh Construction Co./OR will make the final selections and inform Housing Authority of Clackamas County of any potential add-up opportunities. Finally, we will offer contracts to all selected firms.

If Target Business proposals are not utilized in the identified areas of work, the reasons for this decision will be documented and submitted to Housing Authority of Clackamas County. Our goal is to identify reasons that Target Businesses decide to bid or not to bid so we can implement any necessary changes for subsequent bid opportunities.

Preconstruction/Construction

Walsh Construction Co./OR will maintain accurate records of all first and second tier subcontractors entered into with Target Businesses and records of materials purchased from suppliers that are Target Businesses. These reports will be provided to Housing Authority of Clackamas County, along with documentation to demonstrate efforts to maximize Target Business participation.

Technical Assistance

Walsh Construction Co./OR will continue to provide technical assistance to Target Businesses in the areas of insurance, bonding, workforce training, safety plans, certified payroll, bidding, estimating and other accounting related issues. Our support will include:

- Assure that a process is in place for resolution of issues and Target Businesses are familiar with that process.
- Set up individual Target Business meetings with Project Manager to establish relationship and review bid and scope of work.
- Meet with participants to identify any issues and promote a cohesive workflow.
- Assist Target Businesses with identification of other firms to support anticipated second tier subcontract work.
- Hold regular subcontractor meetings to assess needs and allow the Target Business to gain valuable information on team building and team learning.
- Consider Target Businesses for more work if prior work scope is completed successfully.
- Provide a performance review with constructive feedback at the completion of work.

I have read and accept the Walsh Contracting Plan outlined above including all bidding procedures, procurement strategies, and plan for long lead items.

Jill Smith

Name

Jill Smith

Signature

Executive Director

Title

11/04/2020

Date

JS SIG - Contracting Plan Webster 2020-10-20 - For Signature (002) 11.04.2020

Final Audit Report 2020-11-05

Created:	2020-11-04
By:	Bayley Knutson (bknutson@clackamas.us)
Status:	Signed
Transaction ID:	CBJCHBCAABAAq6vtRcqh321J6NbotDa2G7qxeD6lw1Ks

"JS SIG - Contracting Plan Webster 2020-10-20 - For Signature (002) 11.04.2020" History

Document created by Bayley Knutson (bknutson@clackamas.us)
2020-11-04 - 4:13:48 PM GMT- IP address: 98.246.18.38

Document emailed to Jill Smith (jsmith6@clackamas.us) for signature
2020-11-04 - 4:16:29 PM GMT

Email viewed by Jill Smith (jsmith6@clackamas.us)
2020-11-05 - 1:08:37 AM GMT- IP address: 67.189.124.6

Document e-signed by Jill Smith (jsmith6@clackamas.us)
Signature Date: 2020-11-05 - 1:10:52 AM GMT - Time Source: server- IP address: 67.189.124.6

Agreement completed.
2020-11-05 - 1:10:52 AM GMT

Exhibit A.11 - Sample Draw

APPLICATION AND CERTIFICATE FOR PAYMENT

Invoice #:

To Owner: Housing Authority of Clackamas County
13930 Gain Street
Oregon City, OR 97045

Project: Webster Road Housing Renovation
18000 Webster Road
Gladstone, OR 97027

Application No. :

Period To:

Distribution to :
- ☐ Owner
- ☐ Architect
- ☐ Contractor
- ☐

From Contractor: WALSH CONSTRUCTION CO/OR
2905 SW FIRST AVENUE
PORTLAND, OR 97201

Via Architect: Carleton Hart Architecture
830 SW 10th Avenue, Suite 200
Portland, OR 97205

Project Nos:

Contract For: Rehabilitation

Contract Date: 9/1/2020

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet is attached.

1. Original Contract Sum		$10,296,321.00
2. Net Change By Change Order		$0.00
3. Contract Sum To Date		$10,296,321.00
4. Total Completed and Stored To Date		$0.00
5. Retainage:		
a. 0.00% of Completed Work	$0.00	
b. 0.00% of Stored Material	$0.00	
Total Retainage		$0.00
6. Total Earned Less Retainage		$0.00
7. Less Previous Certificates For Payments		$0.00
8. Current Payment Due		$0.00
9. Balance To Finish, Plus Retainage		$0.00

CHANGE ORDER SUMMARY	Additions	Deductions
Total changes approved in previous months by Owner	$0.00	$0.00
Total Approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
Net Changes By Change Order	**$0.00**	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information, and belief, the work covered by this Application for Payment has been completed in accordance with the Contract Documents. That all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: WALSH CONSTRUCTION CO/OR

By:_____ Date: _____

State of: County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information, and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By:_____ Date:_____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment, and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CONTINUATION SHEET

Application and Certification for Payment, containing
Contractor's signed certification is attached.
In tabulations below, amounts are stated to the nearest dollar.
Use Column I on Contracts where variable retainage for line items may apply.

Application No. :
Application Date :
To:
Architect's Project No.:

Invoice # :

Contract : 112111- Webster Road Housing Renovation

A	B	C	D	E	F	G		H	I
Item No.	Description of Work	Scheduled Value	Work Completed		Materials Presently Stored	Total Completed and Stored To Date	% (G / C)	Balance To Finish (C-G)	Retainage
			From Previous Application (D+E)	This Period In Place	(Not in D or E)	(D+E+F)			
Bill Group:	**Construction**								
101.00	General Requirements	695,084.00	0.00	0.00	0.00	0.00	0%	695,084.00	0.00
102.00	Final Cleaning	30,766.00	0.00	0.00	0.00	0.00	0%	30,766.00	0.00
103.00	Site Preparation & Demolition	576,461.00	0.00	0.00	0.00	0.00	0%	576,461.00	0.00
104.00	Abatement	492,171.00	0.00	0.00	0.00	0.00	0%	492,171.00	0.00
105.00	Excavation	419,369.00	0.00	0.00	0.00	0.00	0%	419,369.00	0.00
106.00	Retaining Walls	76,974.00	0.00	0.00	0.00	0.00	0%	76,974.00	0.00
107.00	Roads & Walks	224,789.00	0.00	0.00	0.00	0.00	0%	224,789.00	0.00
108.00	Water Distribution	41,216.00	0.00	0.00	0.00	0.00	0%	41,216.00	0.00
109.00	Drainage Systems	212,687.00	0.00	0.00	0.00	0.00	0%	212,687.00	0.00
110.00	Site Improvements	110,471.00	0.00	0.00	0.00	0.00	0%	110,471.00	0.00
111.00	Landscaping / Irrigation	168,633.00	0.00	0.00	0.00	0.00	0%	168,633.00	0.00
112.00	Reinforcement	83,944.00	0.00	0.00	0.00	0.00	0%	83,944.00	0.00
113.00	Cast-in-Place Concrete	85,898.00	0.00	0.00	0.00	0.00	0%	85,898.00	0.00
114.00	Housekeeping Pads	3,000.00	0.00	0.00	0.00	0.00	0%	3,000.00	0.00
115.00	Structural Steel	10,512.00	0.00	0.00	0.00	0.00	0%	10,512.00	0.00
116.00	Metal Fabrications	45,133.00	0.00	0.00	0.00	0.00	0%	45,133.00	0.00
117.00	Rough Carpentry	556,883.00	0.00	0.00	0.00	0.00	0%	556,883.00	0.00
118.00	Finish Carpentry	178,593.00	0.00	0.00	0.00	0.00	0%	178,593.00	0.00
119.00	Siding & Trim	234,771.00	0.00	0.00	0.00	0.00	0%	234,771.00	0.00
120.00	Waterproofing	177,920.00	0.00	0.00	0.00	0.00	0%	177,920.00	0.00
121.00	Insulation	74,406.00	0.00	0.00	0.00	0.00	0%	74,406.00	0.00
122.00	Fireproofing	3,627.00	0.00	0.00	0.00	0.00	0%	3,627.00	0.00
123.00	Membrane Roofing	363,774.00	0.00	0.00	0.00	0.00	0%	363,774.00	0.00
124.00	Flashing & Sheet Metal	59,274.00	0.00	0.00	0.00	0.00	0%	59,274.00	0.00
125.00	Skylights	12,202.00	0.00	0.00	0.00	0.00	0%	12,202.00	0.00
126.00	Joint Sealants	22,620.00	0.00	0.00	0.00	0.00	0%	22,620.00	0.00
127.00	Hollow Metal Frames and Doors	25,894.00	0.00	0.00	0.00	0.00	0%	25,894.00	0.00
128.00	Wood Doors	46,073.00	0.00	0.00	0.00	0.00	0%	46,073.00	0.00
129.00	Special Doors	1,572.00	0.00	0.00	0.00	0.00	0%	1,572.00	0.00
130.00	Windows	97,064.00	0.00	0.00	0.00	0.00	0%	97,064.00	0.00

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Application No. :
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Contract : 112111- Webster Road Housing Renovation

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			From Previous Application (D+E)	This Period In Place	(Not in D or E)	(D+E+F)			
131.00	Hardware	118,271.00	0.00	0.00	0.00	0.00	0%	118,271.00	0.00
132.00	Glass & Glazing	24,030.00	0.00	0.00	0.00	0.00	0%	24,030.00	0.00
133.00	Gypsum Drywall	498,044.00	0.00	0.00	0.00	0.00	0%	498,044.00	0.00
134.00	Tile	6,020.00	0.00	0.00	0.00	0.00	0%	6,020.00	0.00
135.00	Acoustical	42,910.00	0.00	0.00	0.00	0.00	0%	42,910.00	0.00
136.00	Resilient Flooring	189,217.00	0.00	0.00	0.00	0.00	0%	189,217.00	0.00
137.00	Carpet	28,571.00	0.00	0.00	0.00	0.00	0%	28,571.00	0.00
138.00	Special Flooring	20,273.00	0.00	0.00	0.00	0.00	0%	20,273.00	0.00
139.00	Painting	133,128.00	0.00	0.00	0.00	0.00	0%	133,128.00	0.00
140.00	Display Boards - Allowance	5,000.00	0.00	0.00	0.00	0.00	0%	5,000.00	0.00
141.00	Corner Guards	5,275.00	0.00	0.00	0.00	0.00	0%	5,275.00	0.00
142.00	Fireplaces	6,470.00	0.00	0.00	0.00	0.00	0%	6,470.00	0.00
143.00	Flagpoles	10,384.00	0.00	0.00	0.00	0.00	0%	10,384.00	0.00
144.00	Identifying Devices	9,765.00	0.00	0.00	0.00	0.00	0%	9,765.00	0.00
145.00	Fire Protective Devices	2,075.00	0.00	0.00	0.00	0.00	0%	2,075.00	0.00
146.00	Postal Specialties	6,205.00	0.00	0.00	0.00	0.00	0%	6,205.00	0.00
147.00	Toilet & Bath Accessories	15,415.00	0.00	0.00	0.00	0.00	0%	15,415.00	0.00
148.00	Closet Specialties	9,898.00	0.00	0.00	0.00	0.00	0%	9,898.00	0.00
149.00	Bike Racks	1,566.00	0.00	0.00	0.00	0.00	0%	1,566.00	0.00
150.00	Food Service Equipment	8,500.00	0.00	0.00	0.00	0.00	0%	8,500.00	0.00
151.00	Residential Appliances	34,715.00	0.00	0.00	0.00	0.00	0%	34,715.00	0.00
152.00	Cabinets & Countertops	211,606.00	0.00	0.00	0.00	0.00	0%	211,606.00	0.00
153.00	Window Treatment	23,991.00	0.00	0.00	0.00	0.00	0%	23,991.00	0.00
154.00	Entrance Mats	4,357.00	0.00	0.00	0.00	0.00	0%	4,357.00	0.00
155.00	Pre-Engineered Structures	25,692.00	0.00	0.00	0.00	0.00	0%	25,692.00	0.00
156.00	Radon System	35,900.00	0.00	0.00	0.00	0.00	0%	35,900.00	0.00
157.00	Fire Protection	102,737.00	0.00	0.00	0.00	0.00	0%	102,737.00	0.00
158.00	Plumbing	690,374.00	0.00	0.00	0.00	0.00	0%	690,374.00	0.00
159.00	HVAC	858,197.00	0.00	0.00	0.00	0.00	0%	858,197.00	0.00
160.00	Underground Distribution	20,650.00	0.00	0.00	0.00	0.00	0%	20,650.00	0.00
161.00	Service & Building Wiring	594,723.00	0.00	0.00	0.00	0.00	0%	594,723.00	0.00
162.00	Light Fixtures	166,994.00	0.00	0.00	0.00	0.00	0%	166,994.00	0.00
163.00	Systems	190,875.00	0.00	0.00	0.00	0.00	0%	190,875.00	0.00
164.00	Temporary Electrical - By Owner	5,000.00	0.00	0.00	0.00	0.00	0%	5,000.00	0.00

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			From Previous Application (D+E)	This Period In Place	(Not in D or E)	(D+E+F)			
165.00	Subcontractor Bonding	20,000.00	0.00	0.00	0.00	0.00	0%	20,000.00	0.00
166.00	Parking Rental at Church	37,500.00	0.00	0.00	0.00	0.00	0%	37,500.00	0.00
167.00	Settlement found below SOG - Sub Slab Repair - Allowance	15,000.00	0.00	0.00	0.00	0.00	0%	15,000.00	0.00
168.00	MEPF Design	80,968.00	0.00	0.00	0.00	0.00	0%	80,968.00	0.00
169.00	Preconstruction (per RFP response & early work)	45,356.00	0.00	0.00	0.00	0.00	0%	45,356.00	0.00
170.00	Safety Plan	13,990.00	0.00	0.00	0.00	0.00	0%	13,990.00	0.00
171.00	Contingency - 2% Contractor's Construction	186,536.00	0.00	0.00	0.00	0.00	0%	186,536.00	0.00
172.00	Overhead & Profit	361,422.00	0.00	0.00	0.00	0.00	0%	361,422.00	0.00
173.00	Liability Insurance	195,988.00	0.00	0.00	0.00	0.00	0%	195,988.00	0.00
174.00	Gross Receipts Tax	37,998.00	0.00	0.00	0.00	0.00	0%	37,998.00	0.00
175.00	Performance Bond	62,954.00	0.00	0.00	0.00	0.00	0%	62,954.00	0.00
	Construction Totals	**10,296,321.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0%**	**10,296,321.00**	**0.00**