EAGLE POINT SCHOOL DISTRICT 9

TABLE ROCK ELEMENTARY SCHOOL PROJECT

BID DOCUMENTS

HMK COMPANY

arkitek:design&architecture

MARCH 29, 2023

PROJECT MANAGER:	Josh Whitaker, Project Manager HMK Company 46 N Front Street, Suite 201 Medford, Oregon 97501 Phone: 541.601.3638 Email: josh.whitaker@hmkco.org
DESIGN PROFESSIONAL:	Christopher Brown, Architect arkitek:design+architecture 426 A Street, Suite 101 Ashland, Oregon 97520 Phone: 541.591.9988 Email: arkitek@arkitek.us
SCHOOL DISTRICT:	Nick Hogan, Business Manager Eagle Point School District 9 11 N Royal Ave Eagle Point, Oregon 97524 Phone: 541.830.6559 Email: hogann@eaglepnt.k12.or.us
PROJECT:	Table Rock Elementary School
LOCATIONS:	2830 Maple Court White City, Oregon 97503

TABLE OF CONTENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0010 – Title Page
00 0110 – Table of Contents
00 1113 – Invitation to Bid
00 2113 – Instructions to Bidders
00 4100 – Bid Form
00 4339 – First Tier Sub Contractor Disclosure
00 5000 – Stipulated Sum Agreement
00 6000 – General Conditions
00 6113 – Payment Bond
00 6613 – Performance Bond
00 7343 – Prevailing Wage Rates
00 8000 – Supplementary Conditions

DIVISION 01 -- GENERAL REQUIREMENTS

01 1000 – Summary
01 2000 – Price and Payment Procedures
01 3000 – Administrative Requirements
01 3216 – Construction Progress Schedule
01 4000 – Quality Requirements
01 5000 – Temporary Facilities and Controls
01 5100 – Temporary Utilities
01 5713 – Temporary Erosion and Sediment Control
01 5721 – Indoor Air Quality Controls
01 6000 – Product Requirements
01 6023 – Substitution Request Form
01 6116 – Volatile Organic Compound (VOC) Content Restrictions
01 7000 – Execution and Closeout Requirements
01 7419 – Construction Waste Management and Disposal
01 7800 – Closeout Submittals
01 7900 – Demonstration and Training

DIVISION 23-33 – TECHNICAL SPECIFICATIONS PROVIDED BY arkitek:design&architecture

DIVISION 23 -- HVAC

23 0500 – Common Work Results for HVAC
23 0529 – Hangers and Supports for HVAC Piping, Ducts, and Equipment
23 0593 – Testing, Adjusting, and Balancing for HVAC
23 0700 – HVAC Insulation
23 1123 – Facility Natural Gas Piping
23 3113 – Low-Pressure Metal Ducts
23 3300 – Air Duct Accessories
23 5416 – Split-System Furnaces
23 8127 – Ductless Split Systems

DIVISION 26 – ELECTRICAL AND LIGHTING

26 0500 – Common Work Results for Electrical
26 0519 – Low-Voltage Electrical Power Conductors and Cables
26 0523 – Control-Voltage Electrical Power Cables

26 0526 – Grounding and Bonding for Electrical Systems
26 0529 – Hangers and Supports for Electrical Systems
26 0533.13 – Conduits for Electrical Systems
26 0533.16 – Boxes and Covers for Electrical Systems
26 0536 – Cable Trays for Electrical Systems
26 0543 – Underground Ducts and Raceways for Electrical Systems
26 0544 – Sleeves and Sleeve Seals for Electrical Raceways and Cabling
26 0548.16 – Seismic Controls for Electrical Systems
26 0553 – Identification for Electrical Systems
26 0575 – Electrical Connections to Equipment
26 2416 – Panelboards
26 2713 – Electricity Metering

DIVISION 27 – COMMUNICATIONS

27 0500 – Common Work Results for Communications
27 0528 – Pathways for Communications Systems
27 1100 – Communications Equipment Room Fittings
27 1323 – Communications Optical Fiber Backbone Cabling
27 1513 – Communications Copper Horizontal Cabling
27 5116 – Public Address Systems

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 0500 – Common Work Results for Electronic Safety and Security
28 3100 – Intrusion Detection
28 4621.11 – Addressable Fire-Alarm Systems

DIVISION 31 – EARTHWORK

31 1000 – Site Clearing
31 2200 – Grading
31 2316 – Trenching
31 2323 – Fill

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 1123 – Aggregate Base Courses
32 1313 – Concrete Paving

DIVISION 33 – Site Utilities

33 3113 – Site Sanitary Sewerage Gravity Piping
33 4211 – Stormwater Gravity Piping

ATTACHMENT 1 – TABLE ROCK ELEMENTARY MODULAR CLASSROOM DRAWINGS

ATTACHMENT 2 – TABLE ROCK ELEMENTARY COVERED OUTDOOR SPACE PERMIT SET

ATTACHMENT 3 – PREVAILING WAGE RATE

THE EAGLE POINT SCHOOL DISTRICT 9
TABLE ROCK ELEMENTARY SCHOOL PROJECT
Bids Due 2:00 PM, April 25, 2023

INVITATION FOR BIDS

NOTICE IS HEREBY GIVEN that sealed bids will be accepted at **the HMK Medford Office**, by Josh Whitaker, Project Manager, HMK Company, **at 46 N Front St, Suite 201, Medford, OR 97501** until **2:00 PM** Local Time, **April 25, 2023,** at which time and place bids will be closed. The bids will be publicly opened and read immediately after closing.

The work consists of: Site work, utility connections, sidewalks, construction of a covered pavilion, and finishes in factory-built building.

The following deadlines and restrictions are applicable to the project: Project start date **May 17, 2023**. Contract must meet a Substantial Completion date of **August 29, 2023.**

A MANDATORY Pre-Bid Meeting will be held at 10:00 AM local time on April 13, 2023, at Table Rock Elementary School at 2830 Maple Court, White City, Oregon 97503. Representatives of the Contractors will meet with the Owner and Project Manager for review of the project specifications and then visit the site for a walk of the facility.

All bids must be submitted on the proposal forms furnished to the bidders. Each bid proposal shall be submitted in a sealed envelope and plainly marked **"TABLE ROCK ELEMENTARY SCHOOL PROJECT"** and show the name and business address of the bidder. Each bid must be accompanied by an unconditional cashier's check, certified check or surety bond of the bidder in the amount of ten percent (10%). Unsuccessful bidders will have their security refunded to them when the contract has been awarded.

Bid documents may be obtained from HMK Company web site https://www.hmkco.org/bid-documents/.

Any objections to or comments upon the bid specifications must be submitted in writing to the attention of Josh Whitaker, Project Manager, HMK Company, 46 N Front Street, Suite 201, Medford, Oregon 97501. To be considered, such objections or comments must be received at least FIVE (5) working days before the bid closing date.

This contract is for a public work subject to ORS 279C.800 to 279C.870 (the Oregon Prevailing Wage Rate Law). **BOLI wage rates will be applicable to this project.** The wage rates are included in the bid documents which are available as noted above.

No bid for a construction contract shall be received or considered by the public contracting agency unless the bidder is licensed by the Construction Contractors Board of the State of Oregon as required by ORS 701.035 and 701.055. Each bid must identify whether the bidder is an Oregon resident bidder, as defined in ORS 279A.120.

Bidder's attention is directed to compliance with ORS 279C.370 regarding submission of the First-Tier Subcontractor Disclosure Form. If the contract amount exceeds $100,000.00, the First-Tier Subcontractor Disclosure Form will be required and may be submitted either with the bid or within **two (2)** hours after the bid closing time and date at the bid site address. Failure to provide the First-Tier Subcontractor Disclosure Form may result in bid rejection.

The District reserves the right to reject any or all bids, to waive formalities, and to postpone the award of the contract for thirty (30) days. All bids and all prices quoted in bids shall be firm for a period of sixty (60) days after the bid closing date.

Dated this 5th day of April 2023

Josh Whitaker
Project Manager, HMK Company
on behalf of Eagle Point School District 9

PART 1 – GENERAL

1.1 GENERAL

A. The Work contemplated under this contract with the Eagle Point School District 9, (also referred to as the Owner or the District), includes all labor, materials, transportation, equipment and services necessary for, and reasonably incidental to, the completion of all Work in connection with the project described in the bidding documents.

B. A brief summary of the Work to be completed for the District is as follows:

The project includes site work, utility connections, sidewalks, construction of a covered pavilion, and finishes in factory-built building.

1.2 EXAMINATION OF SITE AND CONDITIONS

A. Prior to submitting a bid, the bidder shall examine the facilities, and ascertain all of the physical conditions in relation thereto. The bidder shall also make a careful examination of the drawings, specifications and other contract documents and shall fully inform himself as to the quantity of materials and the sources of supply of the materials. Failure to make these precautions will not release the successful bidder from entering into a contract or excuse him from performing the Work in strict accordance with the terms of the contract.

B. The Owner will not be responsible for any loss or any unanticipated costs that may be suffered by the successful bidder as a result of such bidder's failure to fully inform himself in advance with regard to all conditions pertaining to the Work and the character of the Work required. No statement made by any officer, agent or employee of the Owner in relation to the physical conditions pertaining to the site of the Work will be binding on the Owner.

1.3 INTERPRETATION OF CONTRACT DOCUMENTS

A. If any person contemplating submitting a bid for the proposed contract finds discrepancies in, or omission from, or is in doubt as to the true meaning of any part of the drawings, specifications or form of contract documents, he may submit to the Architect a written request for an interpretation thereof to be received in the office of the Architect no later than **7 calendar days before bid, before 2:00 PM** local time. The person submitting the request will be responsible for its delivery prior to the time of closing.

B. Any official interpretation of the drawings, specifications, and conditions of the contract or forms of contract documents will be made only by subsequent addenda issued by the Project Manager. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.

1.4 SPECIFIED PRODUCTS AND SUBSTITUTIONS

A. Bids must be based upon the use of items and manufacturers named in the specifications, or, approved equals issued by addenda during the bidding period. Approval of equals or substitutions must not be assumed.

B. If a prospective bidder or supplier seeks approval of a particular manufacturer’s material or product other than the material, product and / or manufacturer designated in the specifications, he may submit a written request for such substitute material, product and / or manufacturer. Substitution requests are to be submitted using the Substitution Request Form included in this project manual. Substitution requests must be received in the office of the architect no later than **7 days before bid, before 2:00 PM** local time. The person requesting the substitution will be responsible for delivery of the substitution request form prior to the time of closing. **Emailed Substitution**

Request Forms will be accepted by Chris Brown, Architect, arkitek@arkitek.us**.**

C. Approval of substitution requests will be made only by addenda issued by the Project Manager during the bidding period. The Owner will not be responsible for any other approval of a particular manufacturer's materials.

1.5 PRE-BID MEETING

A. A **MANDATORY** Pre-Bid Meeting will be held at **10:00 AM on April 13, 2023** at Table Rock Elementary School, **2830 Maple Court, White City, Oregon 97503** Representatives of the Contractors will meet with the Owner and Project Manager at the site for review of the project specifications and site walk of the facility.

B. Contractors intending to submit proposals for this project must attend this pre-bid meeting. No other meeting will be held.

1.6 GENERAL STATUTORY PROVISIONS CONCERNING PUBLIC CONTRACTS

A. In accordance with the provisions of Oregon Revised Statues (ORS) 279C.530, it is agreed that the Contractor shall make prompt payment, as due, to all person supplying to the contractor labor or materials for the prosecution of the Work provided for herein, pay all contributions or amounts due the State Industrial Accident Fund from the Contractor incurred in the performance of the contract herein, not permit any lien or claims to be file or prosecuted against the District on account of any labor or material furnished, and to pay the State Tax Commission all sums withheld from employees pursuant to ORS 316.169, ORS 316.189 and ORS 316.167.

B. Pursuant to ORS 279C.515, it is agreed that if the Contractor fails, neglects or refuses to make prompt payment on any claim for labor or services furnished to the Contractor by any persons in connection with this agreement as such claim becomes due, the proper officer of officers representing the District may pay such claim to the person furnishing the labor or service and charge the amount of the payment against the Contractor. The payment of a claim in the manner authorized in this paragraph shall not relieve the Contractor or his surety from obligation with respect to any unpaid claims.

C. Pursuant to ORS 279C.520, it is a condition of this agreement that no person shall be employed by the Contractor for more than eight (8) hours in any one (1) day, or forty hours in any one (1) week, except in cases of necessity, emergency or where the public policy absolutely requires it, and in such cases, the person shall be paid at least time and a half pay for all overtime in excess of eight (8) hours in any one (1) day and for Work performed on Saturdays and legal holidays.

D. Pursuant to ORS 279C.525 the Contractor shall comply with the provisions of all federal, state and local statues, ordinances and regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the project.

E. Pursuant to ORS 279C.530, it is an express condition of this agreement that the Contractor shall, promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, or all sums which the Contractor may or shall have deducted from their wages of his employees for such services pursuant to the terms of ORS 279B.230, and any contract entered into pursuant thereto, or collected or deducted from the wages of its employees pursuant to any law, contract or agreement for the purposes of providing or paying for such service.

F. The hourly rate of wage to be paid by the Contractor (and incorporated in his subcontracts) shall not be less than provided in ORS 279C.800 to ORS 279C.870, and as hereinafter included in

Section 00 7343-BOLI Wage Rate Requirements.

G. Pursuant to ORS 645.001 et seq. OAR Chapter 437, Div. 3 and OAR Chapter 437-002-0320 through OAR Chapter 437-002-0325, the Contractor shall comply with the following conditions under any contract to provide the District with goods or services.

1. Contractors and their employees shall comply with the requirements of the above cited Laws, Rules, Policies and Regulations

2. The Contractor shall review the Material Safety Data Sheets filed by the District to determine if there are any chemicals stored at the site of Work which the Contractor or any subcontractors will use, or could be exposed to in an emergency

3. Workers shall inform the executive officer at the location where services are being performed of all hazardous chemicals which they or their sub-contractors bring upon education facility property, and upon request, provide the District with M.S.D.S. for such chemicals

H. Each bid shall identify whether the bidder is an Oregon resident bidder, as defined in ORS 279A.120.

I. Pursuant to ORS 279C.830 (3), the contractor and every subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).

1.7 BID SECURITY

A. No bid will be considered unless accompanied by a cashier's check or bid bond executed in favor of the District and associated facility for an amount equal to at least ten percent (10%) of the base bid and shall accompany the bid as evidence of good faith and as guarantee that if awarded the contract the bidder will execute the contract and provide a performance bond and payment bond as required. The successful bidder's check or bid bond will be retained until he has entered into a satisfactory contract and furnished a 100% performance bond and payment bond. The Owner reserves the right to hold the bid security as hereinafter noted.

B. The bid bond shall be furnished by a bonding company licensed to do business in the State of Oregon.

C. Should the successful bidder fail to execute and deliver the signed agreement and a satisfactory payment bond and performance bond within ten (10) days after the bid has been accepted by the Owner, the cashier’s check or bid bond may be forfeited as liquidated damages at the option of the Owner. The date of acceptance of the bid and the award of the contract as contemplated by the contract documents shall mean the day on which the Owner takes official action in making the award.

1.8 EXECUTION OF THE BID FORM

A. The bid form invites bids on definite drawings and specifications. Only the amounts and information asked for on the bid form furnished will be considered as the bid. Each bidder shall bid upon the Work exactly as specified and provided in the bid form. The bidder shall include in a sum to cover the cost of all items contemplated by the bidding documents.

B. The bid form included in the project manual as Document 00 4100 is the official bid form that will be used in submitting a bid. Only the official bid form may be used in submitting a bid.

C. All blank spaces in the official bid form shall be filled and numbers shall be stated both in writing

and in figures. If the bid is made by a partnership, it shall contain the names of each partner and shall be signed in the firm name, followed by the signature of the partner signing for the firm. The address of the bidder shall be typed or printed on the bid form.

D. Bids which are incomplete, or which are conditioned in any way, or which contain erasures or alterations may be rejected.

1.9 SUBMISSION OF BID

A. The bid proposal shall be sealed in an opaque envelope, addressed as follows:

BID PROPOSAL
TABLE ROCK ELEMENTARY SCHOOL PROJECT
EAGLE POINT SCHOOL DISTRICT 9
46 N Front St, Suite 201
Medford, Oregon 97501
Attn: Josh Whitaker, Project Manager

B. Bids will be received up to **2:00 pm, local time, April 25, 2023** at the address listed above.

C. Any bid submitted after the scheduled closing time will be returned to the bidder unopened.

1.10 OPENING OF BIDS

A. A public bid opening will be held immediately following the scheduled closing. Each and every bid received prior to the closing time will be publicly opened and read aloud irrespective of any irregularities or informalities contained in such bids.

1.11 DURATION OF BID PROPOSALS

A. The base bid shall be irrevocable for a period of sixty (60) days from the date and time of bid opening.

B. The base bid may be adjusted for alternate prices and / or unit prices for a period of sixty (60) days from the date and time of bid opening.

1.12 CONTRACT AND BOND

A. Within ten (10) days after receipt of Notice of Award, any bidder to whom a contract is awarded shall execute a formal written contract and shall furnish corporate surety bonds with a surety company satisfactory to the District in an amount equal to the full contract sum based upon the estimated quantities of items covered by the contract for the faithful performance of said contract and all provisions thereof; provided, the formation of said contract shall not be completed and the District shall not be liable thereon until said formal written contract has been executed both by the successful bidder and by the District and a performance bond and a payment bond, properly executed has been delivered and accepted by the District.

B. The cashier's check or bid bond of the bidder with whom a contract is entered into will be returned when said contract has been properly executed by the bidder and said performance and payment bond, properly executed, has been delivered to and accepted by the District. The cashier's check or bid bond to each bidder who was not awarded a contract will be returned promptly after the contract and bond of the successful bidder, properly executed, has been delivered to and accepted by the District.

C. Any bidder to whom a contract is awarded and who shall default in executing said formal written contract or in furnishing a satisfactory performance and payment bond within the time and in the manner required by these specifications shall be liable to the District for whatever damages, including expenses and attorney's fees as may be incurred by the District in recovering to another bidder whether by a single action or by successive actions, shall not operate to release any defaulting bidder from said liability. The parties agree that the cashiers check or bid bond amount is fair determination of the amount of damages which the District would incur as a result of any such failure on the part of the bidder and the full amount will be forfeited as liquidated damages and will not constitute a penalty. In the event competent tribunal finds that this amount does not properly represent an award of liquidated damages, expenses and attorney's fees incurred by the District as a result of the bidder's default, then the final determination of the tribunal shall be deemed to represent the damages, expenses and attorney's fees incurred by the District as a result of the bidder's default.

1.13 SUBSTANTIAL COMPLETION AND LIQUIDATED DAMAGES

A. Substantial Completion shall occur on August 29, 2023.

B Should the building not be ready for occupancy by the time and date listed above, liquidated damages to be paid by the Contractor to the Owner for each calendar day of delay, shall be included in the terms of any contract awarded hereunder in lieu of a penalty. The amount of liquidated damages shall be $1,000.00 per day.

1.14 DISTRICT PERSONNEL EXCLUDED FROM THE CONTRACT

A. No officer, agent or employee of the District shall be permitted any interest in the contract.

1.15 RESERVATIONS

A. The Board of Directors of Eagle Point School District 9, expressly reserves the following rights:

1. To reject all bids

2. To waive any or all irregularities in bids submitted

3. To consider the responsibility and competency of bidders in making any award

4. In the event two or more bids shall be for the same amount for the same Work, to award the contract by lot or otherwise as it deems appropriate

5. To award contract to one Contractor with the aggregate low bid

6. To reject any bid or bids not in compliance with prescribed bidding procedures and requirements

7. To reject any bid or bids not meeting the specifications set forth herein

8. In the event any bidder to whom a contract is awarded shall default in executing said formal contract or in furnishing a satisfactory performance and payment bond within the time and in the manner herein before specified, to re-award the contract to another bidder.

9. To accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

1.16 ACCEPTANCE OF CONDITIONS

A. Each bidder by submission of a bid assents to each and every term and condition set forth anywhere in these contract documents and agrees to be bound thereby.

1.17 INTERPRETATION UPON CONTRACT DOCUMENTS

A. Only the Board of Directors of the Eagle Point School District 9 as represented by the Project Manager has authority to place any interpretation upon the foregoing or annexed contract documents. Any interpretation, either verbal or written, attempted to be placed thereon by any other person will not be binding upon the District.

1.18 EQUAL EMPLOYMENT

A. All bidders shall comply with the Provision of Executive Order 1246 (30 F.R. 12319-25) regarding Equal Employment Opportunity.

1.19 IMMIGRATION REFORM AND CONTROL ACT

A. All bidders shall comply with the provisions of the Immigration Reform and Control Act of 1986 regarding the verification of employment eligibility.

1.20 REFERENCES REQUIREMENTS

A. All bidders shall provide a list of three different project references for projects that the Contractor worked on within the last three years of comparable size and scope.

B. Bidders shall use their own form to supply their list of references. The list of project references shall include the following information:

1. Name of the Project

2. Project description

3. Project location

4. Project date

5. Dollar value of the Project

6. Name of the project contact person

7. Email address for contact person

8. Telephone number for contact person

C. The references will be checked to determine if they are supportive of the bidder's ability to meet the requirements of this ITB.

D. The bidder must provide references that can be contacted regarding the quality of workmanship, level of service provided, timeliness of completion, and adherence to specifications.

E. The District reserves the right to choose and investigate any reference whether or not furnished by the bidder, and to investigate past performance of any bidder with respect to its successful performance on similar projects, its completion or delivery of service on schedule, and its lawful

payment of suppliers, Subcontractors, and employees.

F. The District may postpone the award or execution of the Contract after the announcement of the apparent successful Contractor in order to complete its investigation. The District may reject a bid if, in the opinion of the District the overall reference responses indicate inadequate performance of the Contractor.

G. The District representative will make three attempts to contact the references from the list provided by the Contractor. If the reference is not contacted after three attempts that reference will be removed from the list and the bid rejected as non-responsive.

H. Each reference contacted shall be asked the same questions, including but not limited to: (1) quality of service; (2) delivery; (3) responsiveness to reported problems, including orders and billing; (4) how well the Contractor met the terms of the contract; and (5) whether or not the reference would choose to hire the Contractor again.

1.21 CRIMINAL HISTORY CHECK / PHOTO ID

A. It is the responsibility of the Contractor to submit the names of all Contractor employees and all Subcontractor employees who will be on the job site for more than one day. These employees shall fill out a criminal history form provided by the District and the Contractor must submit the completed forms to HMK Company (HMKCO). Criminal history checks will be run through the Oregon State Police as provided for in ORS 326.603. The District shall bear the cost of processing such Criminal history checks.

1. Through the signature on the criminal history form, authorization is also given to HMK Company and its representative to investigate this information. Further, with this signature, consent is given to all governmental agencies, public or private companies and individuals to release information regarding the individual to the HMK Company and to their representative. The District shall bear the cost of processing such Criminal history checks.

B. In accordance with ORS 326.603(8) the District is required to terminate the employment or contract status of any individual who refuses to consent to a criminal history check of to be fingerprinted or falsely swears to the non-conviction of any crime.

C. In accordance with ORS 326.603(7)(a) no individual found to have been convicted of any crime listed in ORS 342.143 or of an attempt to commit one of the listed crimes shall be allowed to work on any District site.

1. It is vital that employees are instructed to accurately complete criminal history forms. Crimes listed in ORS 342.143 which automatically bar an individual from employment with or contracting with the District are primarily crimes of violence, crimes against children, and sex related crimes. However, falsely swearing that you have not been convicted of a crime obligates the District to terminate employment or contract status even if the crime is not listed in ORS 342.143.

D. No Employee shall have direct contact with students.

E. All employees working on site for more than one day shall wear a Name and Photo Identification Badge. Any employee on site for less than one day shall wear a visitor badge. Badges shall be the responsibility of the Contractor to provide. Badge shall state the Eagle Point School District 9, name of the project, employee name, and company they represent.

1.22 TOBACCO FREE EDUCATION FACILITY

A. All bidders shall comply with OAR 581.021.0110 and ORS 326.051 regarding Tobacco Use on Public Grounds.

B. For the purpose of this document “tobacco” is defined to include any lighted or unlighted cigarette, cigar, pipe, clove cigarette, and any other smoking product, spit tobacco, also known as smokeless, dip, chew, snuff, in any form, nicotine or nicotine delivering devices, chemicals or devices that produce the physical effect of nicotine substances or any other tobacco substitute (e.g., e-cigarettes). This does not include FDA approved nicotine replacement therapy products used for the purpose of cessation.

C. No employee, sub-contractor, material supplier, or project visitor is permitted to smoke, inhale, dip, or chew or sell tobacco at any time, including non-education hours.

1. In any building, facility; or

2. On education facility grounds, athletic grounds, or parking lots.

END OF SECTION

DATE:_____

LEGAL NAME OF BIDDER:_____

To: Eagle Point School District 9
Board of Directors
11 N Royal Ave
Eagle Point, Oregon 97524

The Undersigned, having examined the Contract Documents, including the Bidding and Contract Requirements, the General Requirements, the Technical Specifications entitled:

TABLE ROCK ELEMENTARY SCHOOL PROJECT

As prepared by arkitek:design+architecture and Eagle Point School District 9, as well as the premises and conditions affecting the Work, hereby proposes and agrees to perform, within the time stipulated, the Work, including all its component parts, and everything required to be performed, and to provide and furnish all labor, material, tools, expendable equipment, transportation and all other services required to perform the Work and complete in a workmanlike manner ready for use, all as required by and in strict accordance with the Contract Documents for the sums computed as follows:

BASE BIDS:

Project: Table Rock Elementary School

_____ DOLLARS $_____

which lump sums are hereby designated as BASE BIDS.

TIME OF COMPLETION

The Undersigned agrees if awarded the Contract to complete all the Work in an acceptable manner in conformance with the Contract Documents and within the time specified.

ADDITIONAL REQUIREMENTS

1. The Undersigned agrees that the enclosed Bid Guarantee (bid bond, certified or cashier's check) in the amount of ten percent (10%) of the Basic Bid sum made payable to the Owner, shall be kept in escrow with the Owner; that its amount shall be a measure of liquidated damages the Owner will sustain by failure of the Undersigned to execute agreement and furnish bond, and that if the Undersigned fails to deliver the prescribed bond within ten (10) calendar days after receipt of the written notice of award, then the Bid Guarantee shall become the property of the Owner.

2. Should this proposal not be accepted within thirty (30) calendar days after the date and time of bid opening, or if the Undersigned executes Agreement and delivers bond, the Bid Guarantee shall be returned.

3. Contractor's State of Oregon Contractors' License Registration Number.
_____

4. Receipt of Addenda numbered _____ is hereby acknowledged.

5. The undersigned certifies that the Bidder is a _____ Bidder as defined in ORS 279A.120. ("Resident" or "Non-Resident", to be filled in by Bidder)

6. References are to be submitted with Bid Form as per Section 00 2113, 1.20.

SIGNATURES

Legal Name of Bidder's Firm: _____

Address: _____ Telephone: _____

_____

Email: _____

State of Incorporation, if Corporation: _____

Names of Partners, if Partnership: _____

Printed Name of Bidder: _____

Signed By: _____ Title: _____

Bids which are submitted by Bid Closing, but for which a required disclosure submittal has not been made by the specified Disclosure Deadline, are not responsive and shall not be considered for Contract award.

AGENCY SUPPLIED INFORMATION:

PROJECT NAME: **TABLE ROCK ELEMENTARY SCHOOL**

BID #:_____ BID CLOSING: Date: **April, 25, 2023** Time: **2:00 PM**
REQUIRED DISCLOSURE DEADLINE: Date: **April, 25, 2023** Time: **4:00 PM**
Deliver Form To (Agency): Eagle Point School District 9
Designated Recipient (Person): Josh Whitaker, Project Manager, HMK Company
Agency's Address: 11 N Royal Avenue
Eagle Point, Oregon 97524
Email to: josh.whitaker@hmkco.org

INSTRUCTIONS:

The contracting agency will insert "N/A" below if the contract value is not anticipated to exceed $100,000. Otherwise, this form must be submitted either with the bid or within **TWO (2)** working hours after the advertised bid closing date and time;

FAILURE TO SUBMIT THIS FORM BY THE DISCLOSURE DEADLINE WILL RESULT IN A NON-RESPONSIVE BID. A NON-RESPONSIVE BID WILL NOT BE CONSIDERED FOR AWARD.

It is the responsibility of bidders to submit this disclosure form and any additional sheets, with the bid number and project name clearly marked, and must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two (2) working hours after the advertised bid closing time at the location indicated by the specified disclosure deadline. See "Instructions to Bidders".

List below the name of each subcontractor that will be furnishing labor or materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter" NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED).

BIDDER DISCLOSURE:

SUBCONTRACTOR NAME	DOLLAR VALUE	CATEGORY OF WORK
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		

9)		
10)		
11)		
12)		
13)		
14)		
15)		
16)		

The above listed first-tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

a) Five percent (5%) of the total Contract Price, but at least $15,000. (If the Dollar Value is less than $15,000, do not list the subcontractor above);

or

b) $350,000 regardless of the percentage of the total Contract Price.

Form Submitted By (Bidder Name): _____

Contact Name: _____

Phone #: _____

END OF SECTION

AGREEMENT made as of the ___ day of _____, 2023, between **EAGLE POINT SCHOOL DISTRICT 9 (**hereinafter "the Owner") **and** _____, (hereinafter "the Contractor").

The Project is: Table Rock Elementary School Project

The Owner is: Eagle Point School District 9
Nick Hogan, Business Manager
11 N Royal Ave
Eagle Point, OR 97524

The Architect is: Christopher Brown, Architect
arkitek:design+architecture
426 A Street, Suite 101
Ashland, Oregon 97520
Phone: 541.591.9988
Email: arkitek@arkitek.us

The Contractor is:

The Owner and Contractor agree as follows:

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, the General Conditions of the Contract, any Supplementary, or other Conditions, Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are incorporated by this reference herein. The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 8.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, including such construction activity as is reasonably inferable from the Contract Documents as necessary to produce the results intended by the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement of the Work shall be the date of the date to be fixed in a notice to proceed issued by the Owner, which shall be issued no less than two (2) days prior to the date of commencement.

3.2 The Contract Time shall be measured from the date of commencement.

3.3 The Contractor shall continuously and diligently prosecute the Work and shall achieve Substantial Completion of the entire Work not later than **December 30, 2019**, subject to approved adjustments of this Contract Time as provided in the Contract Documents.

3.4. If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to recover from the Contractor as liquidated damages and not as a penalty $500.00 per day which shall commence on the first day following the expiration of the Contract Time and continuing until the date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of the damages the Owner will incur as

a result of delay in the completion of the Work. The Owner may deduct any accrued liquidated damages from any unpaid amount due or to become due to the Contractor. Any Liquidated damages not so deducted shall be paid to the Owner upon demand together with interest as provided by Oregon law.

ARTICLE 4 CONTRACT SUM

4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's proper and timely performance of the Contract and full and final completion of the Work. The Contract Sum shall be _____ Dollars ($_____). This sum includes all general conditions, profit, overhead and all other amounts due or to become due to the Contractor for the proper and timely performance of the Contract and full and final completion of the Work. The Contract sum is subject to authorized additions and deductions as provided in the Contract Documents.

4.2 PERMITS, FEES AND NOTICES

4.2.1 The Contractor shall secure and pay for:

.1 All pertinent specialty permits. (The owner is securing and paying for the plan review, building permit, and system development fees.)

4.2.2 The Contractor will be responsible for any renewals of and penalties arising from the building permit and from all other permits and governmental or utility fees. The Contractor shall secure and pay for all other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded, including without limitation electrical, sewer, water, and plumbing permits and fees.

4.3 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

4.4 Unit prices, if any, are as follows: See Section 00 4100, Bid Form

ARTICLE 5 PAYMENTS

5.1 PROGRESS PAYMENTS

5.1.1 Based upon Applications for Payment which include all the necessary supporting documentation is received by the Owners Delegated Representative, and Owner not later than the first day of the month, and Certificates for Payment are issued by the Owners Delegated Representative, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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

5.1.3 Provided that an Application for Payment and all supporting documentation, including all full and unconditional lien waivers related to the Work for which payment is requested is received by the Owners Delegated Representative and Owner not later than the first day of a month, the Owner shall make payment to the Contractor not later than the last day following the Owners Delegated Representative's approval. If an Application for Payment is received by the Owners Delegated Representative after the application date fixed above, payment shall be as set forth below.

5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such

form and supported by such data to substantiate its accuracy as the Owners Delegated Representative and any Lender may require. This schedule, unless objected to by the Owners Delegated Representative, shall be used as a basis for reviewing the Contractor's Applications for Payment, provided, however, in no instance shall the schedule of values ever exceed the reasonable value of the Work performed.

5.1.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

5.1.6 Unless otherwise provided in the Owner's agreement with any Lender, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of Five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Subparagraph 7.3.8 of the General Conditions, or as modified by the parties;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%);

.3 Subtract the aggregate of 9.5 previous Payments made by the Owner; and

.4 Subtract amounts, if any, for which the Owners Delegated Representative has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the General Conditions.

or as modified by the parties.

5.1.7 The progress payment amount determined in accordance with Subparagraph 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Owners Delegated Representative, any Lender or the Owner shall determine for incomplete Work, retainage applicable to such Work and unsettled claims;

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10.3 of the General Conditions.

5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

5.1.9 Except with the Owner's prior written approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

5.1.10 Contractor shall:

.1 Make payment promptly, as and when due, to all persons supplying to labor, materials, equipment or services;

.2 Pay all contributions or amounts due the Industrial Accident Fund from Contractor or any Subcontractor incurred in the performance of the Work;

.3 Not permit any lien or claim to be filed or prosecuted against the Owner, on account of any labor, materials, equipment or services furnished, supplied or provided;

.4 Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167;

.5 Demonstrate that an employee drug testing program as set forth herein is in place for Contractor and all Subcontractors pursuant to ORS 279C.505;

.6 To the extent that any demolition is included as a part of the Work, salvage or recycle construction and demolition debris, if feasible and cost-effective;

.7 To the extent that any lawn or landscape maintenance is included as a part of the Work, compost or mulch yard waste material at an approved site, if feasible and cost-effective.

5.1.11 If the Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or any Subcontractor by any person in connection with the Work as such claim becomes due, the proper officer or officers representing the Owner may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due the Contractor by reason of this Agreement.

5.1.12 If the Contractor or a first-tier Subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with the Work within 30 days after receipt of payment from the Owner or the Contractor, the Contractor or first-tier Subcontractor shall owe the person the amount due plus interest charges commencing at the end of the 10-day period that payment is due under ORS 279C.505 and 279C.580 and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.505 and 279C.580. The rate of interest charged to the Contractor or first-tier Subcontractor on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after the date when payment was received from the Owner or from the Contractor, but the rate of interest shall not exceed 30 percent. The amount of interest may not be waived.

5.1.13 If the Contractor or a Subcontractor fails neglects or refuses to make payment to a person furnishing labor or materials in connection with the Work, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.505 and 279C.580.

5.1.14 The payment of a claim in the manner authorized in this Agreement shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

5.1.15 No person shall be employed by the Contractor or any Subcontractors, which are subject to the statutory limitations of Oregon law for more than ten (10) hours in any one (1) day, or 40 hours in any one (1) week, except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases, the employee shall be paid at least time and a half pay:

.1 For all overtime in excess of eight (8) hours a day or 40 hours in any one (1) week when the work week is five (5) consecutive days, Monday through Friday; or

.2 For all overtime in excess of ten (10) hours a day or 40 hours in any one (1) week when the work week is four (4) consecutive days, Monday through Friday; and

.3 For all Work performed on Saturday and on any legal holiday specified in ORS 279.334.

5.1.16 The Contractor shall give notice to employees in writing, either at the time of hire or before commencement of Work on the Project, or by posting a notice in a location frequented by employees, of

the number of hours per day and days per week that the employees may be required to work. The Contractor shall include an identical provision in its subcontracts and require all Subcontractors, of any tier, to include an identical provision in all subcontracts.

5.1.17 The Contractor shall promptly, as and when due, make payment to any person, co-partnership, association or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums which the Contractor agrees to pay for such services and all moneys and sums which Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.

5.1.18 Every Subcontractor will comply with ORS 656.017, unless it is an exempt employer under ORS 656.126.

5.1.19 The Contractor is not a contributing member to the Public Employees' Retirement System and will be responsible for any and all federal, state and local taxes applicable to payments received under this Agreement. The Contractor will not be eligible for any benefits from these contract payments of federal Social Security, employment insurance, Workers' Compensation or the Public Employees' Retirement System.

5.1.20 The hourly rate of wage to be paid by the Contractor or every Subcontractor subject to prevailing wage rates to workers, shall be not less than the prevailing rate of wage for an hour's work in the same trade or occupation in the locality where such labor is performed.

5.1.21 The Contractor and every Subcontractor subject to prevailing wage rates to employees shall keep the prevailing wage rates for that project posted in a conspicuous and accessible place in or about the project.

5.1.22 The Contractor and every Subcontractor subject to prevailing wage rates to employees and shall also provide for or contribute to a health and welfare plan or a pension plan, or both, for its employees on the Project and shall post notice describing such plans in a conspicuous and accessible place in or about the Project. The notice preferably shall be posted in the same place as the notice required under 5.1.16. In addition to the description of the plans, the notice shall contain information on how and where to make claims and where to obtain further information.

5.1.23 The Contractor represents and agrees that the specifications contain a sufficient provision stating the existing prevailing rate of wage which must be paid to workers in each trade or occupation required for such public work employed in the performance of the Work either by the Contractor or any Subcontractor or other person doing or contracting to do the whole or any part of the Work contemplated by the contract. Such workers shall be paid not less than such specified minimum hourly rate of wage.

5.1.24 The District represents and agrees that the specifications contain a sufficient provision stating that a fee is required to be paid to the Commissioner of the Bureau of Labor and Industries as provided in ORS 279C.825. The fee shall be paid to the commissioner pursuant to the administrative rule of the commissioner.

5.1.25 The Contractor or the Contractor's surety and every Subcontractor or Subcontractor's surety subject to prevailing wage rates shall file certified statements with the Owner in writing in the form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker which Contractor or the Subcontractor has employed upon such public work, and further certifying that no worker employed upon such public work has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the contract, which certificate and statement shall be verified by the oath of Contractor or the Contractor's surety or Subcontractor or the Subcontractor's surety that the Contractor or Subcontractor has read such statement and certificate and knows the contents thereof and that the same is true to the Contractor's or subcontractor's knowledge. The certified statements shall set

out accurately and completely the payroll records for the prior week including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid. Each certified statement required shall be delivered or mailed by Contractor or the Subcontractor to the public contracting agency. Certified statements for each week, during which the Contractor or the Subcontractor employs a worker upon the Project shall be submitted once a month, by the fifth (5^{th}) business day of the following month.

5.1.26 The Contractor or Subcontractor shall preserve the certified statements for a period of three (3) years from the date of completion of the contract.

5.1.27 Per ORS 279C.855, the Contractor represents and agrees that the Owner has fully and timely included a provision in the Contract Documents that the Contractor and any Subcontractor shall comply with ORS 279C.840 in the invitation for bids, the request for bids, the contract specifications, the accepted bid or elsewhere in the Contract Documents and that the Owner has no liability for unpaid minimum wages.

5.1.28 Owner shall make progress payments on the contract monthly as Work progresses. Payments shall be based upon estimates of Work completed that are approved by the Owner. A progress payment shall not be considered acceptance or approval of any Work or waiver of any defects therein. In instances when an invoice is filled out incorrectly, or when there is any defect or impropriety in any submitted invoice or when there is a good faith dispute, the Owner shall so notify the Contractor within 15 days stating the reason or reasons the invoice is defective or improper or the reasons for the dispute. A defective or improper invoice, if corrected by the Contractor within seven days of being notified by the Owner, shall not cause a payment to be made later than specified in this section.

5.1.29 If requested in writing by a first-tier Subcontractor, Contractor, within ten (10) calendar days after receiving the request, shall send to the first-tier Subcontractor a copy of that portion of any invoice, request for payment submitted to the Owner or pay document provided by the Owner to the Contractor specifically related to any labor or materials supplied by the first-tier Subcontractor.

5.1.30 Payment of interest may be postponed when payment on the principal is delayed because of disagreement between Owner and Contractor.

5.1.31 The Owner may reserve as retainage from any progress payment an amount not to exceed five percent of the payment. As Work progresses, the Owner may in its sole discretion reduce the amount of the retainage and the Owner may in its sole discretion eliminate retainage on any remaining monthly contract payments after 50 percent of the Work under the contract is completed if, in the Owner's sole opinion, such Work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by the Contractor, which application shall include written approval of the Contractor's surety; except that when the contract Work is 97-1/2 percent completed the Owner may, at its discretion and without application by the Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of a written application by the Contractor, the Owner shall respond in writing within a reasonable time.

5.1.32 The retainage held by the Owner shall be included in and paid to the Contractor as part of the final payment of the contract price. The Contractor shall notify the Owner in writing when the Contractor considers the Work complete and the Owner shall, within 15 days after receiving the written notice, either accept the Work or notify the Contractor of Work yet to be performed on the contract.

5.1.33 The Contractor shall not request payment from the Owner of any amount withheld or retained in accordance herewith.

5.1.34 Such time as the Contractor has determined and certified to the Owner that the Subcontractor is entitled to the payment of such amount. A dispute between the Contractor and a first-tier Subcontractor relating to the amount or entitlement of a first-tier Subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to the terms hereof does not constitute a

dispute to which the Owner is a party. The Owner shall not be included as a party in any administrative or judicial proceeding involving such a dispute. The Contractor shall include in each subcontract for property or services entered into by the Contractor and a first-tier Subcontractor, including a material supplier, for the purpose of performing a construction contract:

.1 A payment clause that obligates the Contractor to pay the first-tier Subcontractor for satisfactory performance under its subcontract within ten (10) days out of such amounts as are paid to the Contractor by the Owner under such contract; and

.2 An interest penalty clause that obligates the Contractor, if payment is not made within 30 days after receipt of payment from the Owner, to pay to the first-tier Subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract pursuant to subparagraph .1 of this 5.1.34. The Contractor or first-tier Subcontractor shall not be obligated to pay an interest penalty if the only reason that the Contractor or first-tier Subcontractor did not make payment when payment was due is that the Contractor or first-tier Subcontractor did not receive payment from the Owner or the Contractor when payment was due. The interest penalty shall be:

(A) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(B) Computed at the rate specified in ORS 279C.515(2).

5.1.35 The Contractor shall include in each of its subcontracts, for the purpose of performance of such contract condition, a provision requiring the first-tier Subcontractor to include a payment clause and an interest penalty clause conforming to the standards of 5.1.33 in each of its subcontracts and to require each of its Subcontractors to include such clauses in their subcontracts with each lower-tier Subcontractor or supplier.

5.1.36 If the Contractor is an employer, the Contractor is a subject employer under Oregon's Workers' Compensation Law and shall comply with ORS 656.017 and shall provide Workers' Compensation coverage for all their "subject workers" as defined in ORS Chapter 656.

5.1.37 The Contractor and all Subcontractors subject to licensing with the Oregon Construction Contractors Board shall be duly licensed therewith at the time they bid any Work, enter into any contract to perform any Work, perform any Work and at all times under which any warranty or repair obligation applies. The Contractor and all Subcontractors performing any Work which requires any other governmental licensing, such as those with the Elevator and Electrical Board, Plumbing Board or Landscape Contractors Board, shall be duly licensed with all appropriate governmental agencies at the time they bid any Work, enter into any contract to perform any Work, perform any Work and at all times under which any warranty or repair obligation applies.

5.1.38 If federal funds are involved, federal laws, rules and regulations applicable to the grant shall govern in the event they conflict with any provision of this Agreement or other required by law. The Contractor certifies that it is not currently employed by the federal government. This provision does not preclude the Contractor from holding another contract with the federal government.

5.1.39 The Contractor shall timely provide the Owner its name, address, social security, federal employee identification number and such other information as the Department of Revenue may require or request.

5.1.40 The Contractor shall comply and require all Subcontractors to comply with the applicable requirements of all laws, codes, ordinances, regulations and statutes, including but not limited to those in ORS Chapters 279A, B and C. To the extent that ORS Chapters 279A, B and C, or any other law, code, ordinance or regulations, requires any tender or condition to be included in this Agreement, such tender or condition is hereby incorporated by this reference. Nothing contained herein shall be construed so as to

require the commission of any act contrary to law, code, rule, statute, ordinance or regulation, and wherever there is any conflict between any provisions contained herein and any statute, law, code, ordinance, rule or regulation the provision of this Agreement which is affected shall be curtailed and limited only to the extent necessary to bring it within the requirements of the law, code, rule, statute, ordinance or regulation.

5.1.41 If the Contractor is a foreign Contractor and the contract price exceeds $10,000, the Contractor shall promptly report to the Department of Revenue on forms to be provided by the Department of Revenue the total contract price, terms of payment, length of contract and such other information as the Department of Revenue may require before final payment can be received on the public contract. For purposes of this A.3 l, a foreign Contractor is one who is not domiciled in or registered to do business in the State of Oregon.

5.1.42 The Contractor represents and agrees that the bid documents make sufficient specific reference to federal, state and local agencies that have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the performance of the contract and have allocated all known environmental and natural resource risks to the Contractor by listing such environmental and natural resource risks with specificity in the bid documents.

5.1.43 The Contractor shall not discriminate against minority, women or emerging small business enterprises in the awarding of subcontracts. The Contractor shall certify that the Contractor has not and will not discriminate against minority, women, or emerging small business enterprises in obtaining any required subcontracts.

5.1.44 The Contractor shall use recyclable products to the maximum extent economically feasible in the performance of the Contract Work set forth in this document.

5.1.45 As referenced herein, an employee drug testing policy shall be as follows:

.1 The Contractor or Subcontractor shall have in place at the time of the execution of this Contract, and shall maintain during the term of this Contract, a Qualifying Employee Drug Testing Program for its employees that includes, at a minimum, the following:

(A) A written employee drug testing policy;

(B) Required drug testing for all new Subject Employees or, alternatively, required testing of all Subject Employees every 12 months on a random selection basis; and

(C) Required testing of a Subject Employee when the Contractor or Subcontractor has reasonable cause to believe the Subject Employee is under the influence of drugs.

A drug testing program that meets the above requirements will be deemed a "Qualifying Employee Drug Testing Program." For the purposes of this section an employee is a "Subject Employee" only if that employee will be working on the Project job site.

.2 The Contractor shall require each Subcontractor providing labor for the Project to:

(A) Demonstrate to the Contractor that it has a Qualifying Employee Drug Testing Program for the Subcontractor's Subject Employees, and represent and warrant to the Contractor that the Qualifying Employee Drug Testing Program is in place at the time of subcontract execution and will continue in full force and effect for the duration of the subcontract; or

(B) Require that the Subcontractor's Subject Employees participate in Contractor's Qualifying Employee Drug Testing Program for the duration of the subcontract.

5.2 FINAL PAYMENT

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

.1 A final Certificate for Payment has been issued by the Owners Delegated Representative.

5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Owners Delegated Representative's final Certificate for Payment.

ARTICLE 6 TERMINATION OR SUSPENSION

6.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.

6.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

6.3 The Owner shall, in addition to the Right to Stop the Work, have the right to require that the Contractor replace or remove construction personnel assigned to the Work, if, in the Owner's sole determination, specific construction personnel are impairing or impeding the prosecution of the Work.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

7.3 The Owner's representative is: Josh Whitaker, Project Manager, HMK Company. The Owner may change this representative at any time.

7.4 The Contractor's Representative is: _____.

7.5 Neither the Owner's nor the Contractor's Representative shall be changed without ten (10) days written notice to the other party.

7.6 CONTRACTOR'S CONSTRUCTION SCHEDULES

7.6.1 Within ten (10) days after issuance of the Notice to Proceed, the Contractor shall submit a preliminary schedule of the Work. Within 30 days after issuance of the Notice to Proceed, and before any progress payment need be made, the Contractor, after consultations with its Subcontractors and Suppliers of any tier, shall submit six copies of a Contractor's Construction Schedule to the Owners Delegated Representative and one copy to the Owner. Not less than ten percent of the Progress Payment may be withheld until a Contractor's Construction Schedule in a form satisfactory to the Owners Delegated Representative and Owner has been submitted. Neither the Owner nor the Owners Delegated Representative will review the substance of the Contractor's Construction Schedule.

7.6.2 The Contractor's Construction Schedule shall be based upon a critical path method ("CPM") analysis of construction activities and sequence of operations needed for the orderly performance and completion of all separable parts of the Work in accordance with the Contract and within the Contract Time. The schedule shall be a critical path method type in the form of a precedence diagram and activity listing and shall be time-scaled. It shall include the Notice to Proceed date, the Date(s) of Substantial Completion, and the Date(s) of Final Completion in accordance with the Contract Documents. The Critical Path shall be

clearly indicated on the Contractor's Construction Schedule. No more than 20% of the progress activities shall be on the critical path, and no more than 30% shall have less than five days of float. The value of any single activity shall not exceed $50,000, except that 5% of the total activities may exceed this limit without prior approval. The time-scaled network diagram shall be summarized on a single sheet not to exceed 11"x 17".

7.6.2.1 The network diagram shall show in detail and in order the sequence of all significant activities, their descriptions, start and finish dates, durations and dependencies, necessary to complete all Work and any separable parts thereof. The activity listing shall show the following information for each activity on the network diagram:

.1 Description;

.2 Duration (not to exceed fifteen working days);

.3 Craft;

.4 Equipment (including hours of usage);

.5 Start and finish dates;

.6 Total float time and free float time;

.7 Dates that work must be performed and completed by other Contractors or Subcontractors to support the Work and the interfaces with such other Contractors; and

.8 Cost-loading, correlated to the Schedule of Values, which, upon approval, shall be used as a basis for determining action on progress payments throughout the Project.

7.6.2.2 A schedule for the purchase and receipt of items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated with the Contractor's Construction Schedule. The Contractor shall furnish the Owners Delegated Representative with copies of all purchase orders and acknowledgments and fabrication, production, and shipping schedules for all major items on the critical path within ten days of the Contractor's receipt of each purchase order, acknowledgment or schedule. Neither the Owners Delegated Representative nor the Owner shall be deemed to have approved or accepted any such material, or its schedule, nor deemed to have waived this requirement if some or all of the material is not received.

7.6.2.3 Milestone completion dates shall be clearly defined on the Contractor's Construction Schedule.

7.6.2.4 If abbreviations are used in the Contractor's Construction Schedule, a legend shall be provided to define all abbreviations.

7.6.2.5 The Contractor shall prepare and keep current a schedule of submittals, coordinated with the Contractor's Construction Schedule, which allows the Owners Delegated Representative at least ten (10) days to review the submittals.

7.6.2.6 The Progress Schedules shall be submitted as both a paper copy and in electronic format using the latest version of Microsoft Project. The Contractor may request to use different project management software, such as, Suretrak, but must first receive approval from the Owner, by demonstrating its capabilities. This can be accomplished by submitting a sample CPM printout of similar scope. If the alternative software is accepted, the Contractor will be required to supply the Owner an authorized copy of the software with all user support manuals.

7.6.2.7 At each monthly meeting with the Owner, the Contractor shall submit (a) a bar chart schedule showing the activities planned for the next month, and (b) a report showing actual starts and finishes from the previous month. The bar-chart schedule shall show all Work activities numbered according to the CPM, any submittal or delivery activities with less than five (5) days, one (1) float, and any permitting, testing, or inspection activities by others.

7.6.3 Within ten days after receipt by the Owners Delegated Representative, two copies of the Contractor's Construction Schedule will be returned to the Contractor with comments, following review by the Owner. Review by the Owner and Owners Delegated Representative of the Contractor's Construction Schedule shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing, or its ability to complete the Work in a timely manner.

7.6.4 The Contractor shall utilize and comply with the Contractor's Construction Schedule. The Contractor shall not be entitled to any adjustment in the Contract Time, the Contractor's Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule.

7.6.5 Should the Contractor fail to meet any scheduled date as shown on the current Contractor's Construction Schedule, the Contractor shall, if requested, be required at its own expense to submit within ten days of the request an updated Contractor's Construction Schedule. If the Contractor's progress indicates to the Owner that the Work will not be Substantially Completed within the Contract Time, the Contractor shall, at its own expense, increase its work force and / or working hours to bring the actual completion dates of the activities into conformance with the Contractor's Construction Schedule and Substantial Completion within the Contract Time. The Contractor shall also submit a revised Contractor's Construction Schedule at its own expense within ten days of notice from the Owners Delegated Representative that the sequence of Work varies significantly from that shown on the Contractor's Construction Schedule. Neither the Owner nor the Owners Delegated Representative will, however, review the substance or sequence of the Contractor's Construction Schedule.

7.6.6 Schedule Float Utilization. Float belongs to the benefit of the Project for the Owner's use and no float shall be used without the Owner's written approval. Any float time to activities not on the critical path shall be used by the Contractor to optimize its construction process. Any float time between the end of the final construction activity and the final completion date shall be used by the Owner in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the Owner. The Contractor will not be entitled to any adjustment in the Contract Time, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the Owner's use of float time between the end of the final construction activity and the final completion date.

7.6.7 Delays. The Contractor shall, within seven days of the event, notify the Owner and Owners Delegated Representative in writing of any proposed changes in the Contractor's Construction Schedule or the Contract Time and of any event which could delay performance or supplying of any item of the Work and shall indicate the expected duration of the delay, the anticipated effect of the delay on the Contractor's Construction Schedule, and the action being taken to correct the delay situation. In the event the Contractor is entitled to a change in the Contract Time, the adjustment to the Contract Time shall be limited to the change in the critical path of construction activities.

7.6.8 Final Completion. The Contractor shall attain Final Completion of the Work in accordance with the Contract within 60 days after the date of Substantial Completion.

7.6.9 Meetings. During the period commencing with the issuance of Notice to Proceed and ending with the date of Final Completion of the Work, the Contractor shall attend and participate in and ensure applicable Subcontractors of any tier and Suppliers attend and participate in:

.1 A pre-contract meeting;

.2 A pre-construction meeting;

.3 Regular weekly Project status meetings scheduled by the Owner or by the Owners Delegated Representative to review progress of the Work, to discuss the Contractor's progress reports, to obtain necessary Owner's or Owners Delegated Representative's approvals, and generally to keep the Owner and Owners Delegated Representative informed and involved in the progress of the Project; and

.4 Regular on-site meetings scheduled by the Owner or by the Owners Delegated Representative to review progress of the Work and other pertinent matters.

7.7 Any and all references to "Engineer" or "the Engineer" in this Agreement or in the General Conditions of the Contract shall be deemed for all purposes to mean and refer to: Owners Delegated Representative.

7.8 If any provision of this Agreement or application thereof to any extent shall be invalid or unenforceable the remainder of the Agreement or its application thereof shall not be affected thereby and the provision or application shall be enforced to the fullest extent permitted by law.

7.9 The Contractor shall not assign this Agreement without the prior written permission of the Owner. Contractor shall assign to Owner any and all rights that the Contractor now has or hereafter may acquire pursuant to a contract related to the Project which rights the Owner shall thereafter be entitled to assign to another person or entity including without limitation any Lender, upon the request of the Owner, provided, however, until the exercise of such rights of assignment by the Owner, there shall be no privity or contractual relationship between the Owner and such persons and entities. The Contractor hereby consents to the free assignment of this Agreement in whole or in part by the Owner to any other person or entity including but not limited to any Lender.

7.10 The Contractor represents and warrants to the Owner who relies thereon as follows:

7.10.1 It and all of its Subcontractors are financially solvent, able to pay debts as they become due and have sufficient working capital to timely perform and complete all obligations related to the Project.

7.10.2 That it is able to timely and completely furnish all the labor, material, equipment and services to necessary to fully complete the Work within the Contract Time.

7.10.3 It and all of its Subcontractors are duly and properly licensed with the Oregon Construction Contractors Board and all other governmental agencies and are signatories to collective bargaining agreements.

7.10.4 It has visited the site, undertaken any and all tests it deems advisable, is familiar with the structure and that it is unaware of any potential condition with would increase the Contract Sum or Contract Time.

7.10.5 It and all of its Subcontractors possess a high level of experience and expertise in projects similar to the Project.

7.10.6 Neither Contractor nor any of its Subcontractors are "exempt" from the requirement to provide Workers' Compensation Insurance under Oregon law.

7.10.7 It is fully authorized to execute this Agreement and perform all the obligations required of it hereunder.

7.11 The representations and warranties of 7.11 are in addition to and not in lieu of any other obligation or law and survive the execution of this Agreement and final completion of the Project.

ARTICLE 8 ENUMERATION OF CONTRACT DOCUMENTS

8.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 This Agreement.

8.1.2 The General Conditions.

8.1.3 The Supplementary and other Conditions of the Contract.

8.1.4 The Specifications are those contained in the Project Manual dated March 29, 2023.

8.1.5 The Drawings are bound in the project manual.

8.1.6 The Addenda, if any, are as follows:

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 8.

8.1.7 Other documents, if any, forming part of the Contract Documents are as follows:

a. Exhibits _____

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies, of which one is to be delivered to the Contractor, one to the Owners Delegated Representative for use in the administration of the Contract, and the remainder to the Owner.

CONTRACTOR		**EAGLE POINT SCHOOL DISTRICT 9**	
By:	_____	**By:**	_____
			Nick Hogan
Title:	_____	**Title:**	**Business Manager**
Date:	_____	**Date:**	_____
Federal ID #:	_____		

ARTICLE 1 GENERAL PROVISION

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), the Request for Bids or Proposals. Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, and Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Consultant. Contractor acknowledges and represents that it has examined all Contract Documents and will examine all Contract Documents created after execution of the Agreement. Contractor represents that such Contract Documents are suitable and sufficient to enable Contractor to timely complete the Work for the Contract Sum within the Contract Time.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Consultant and Contractor, (2) between the Owner and any Subcontractor, including, but not limited to, any Sub-subcontractor, (3) between the Owner and Consultant or (4) between any persons or entities other than the Owner and Contractor. The Consultant shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Consultant's duties.

1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes any and all labor (including, but not limited to, supervision and management), transportation, materials, equipment and services provided or to be provided by the Contractor to timely fulfill the Contractor's obligations and render the Project complete and usable for its intended purpose. The Work includes all labor, material, equipment and services incidental to or which may be inferred from any of the Contract Documents. The Work may constitute the whole or a part of the Project.

1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

1.1.7 THE PROJECT MANUAL

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In case of any conflict in the requirements of the Contract Documents, the Contractor is deemed to have included the better Quality and larger Quantity of the Work.

1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2.3 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.3 CAPITALIZATION

1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents.

1.4 INTERPRETATION

1.4.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.5 EXECUTION OF CONTRACT DOCUMENTS

1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Consultant shall identify such unsigned Documents upon request.

1.5.2 Execution of the Agreement by the Contractor is a representation that the Contractor has visited the site, become fully familiar with the nature, location and character of the site and surrounding areas, weather conditions, availability of labor, materials, equipment and services, site conditions, surface conditions, subsurface conditions, the Contract Documents, existing local conditions under which the Work is to be performed, the time period for performance and completion of the Work. Contractor represents that it has performed personal observations and correlated the observations with the requirements of the Contract Documents such that the Contractor is not aware of any discrepancies, omissions, ambiguities or conflicts in or among any of the Contract Documents.

1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

1.6.1 The Drawings, Specifications and other documents, including any in electronic form, prepared by the Consultant and the Consultant's consultants are documents through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, including, but not limited to, any Sub-subcontractor or material or equipment supplier shall

own or claim any intellectual property rights in the Drawings, Specifications and other documents prepared by the Consultant or the Consultant's consultants. All copies of the documents, except the Contractor's record set, shall be returned or suitably accounted for to the Consultant, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Consultant and the Consultant's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, including, but not limited to, any Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Consultant and the Consultant's consultants. The Contractor, Subcontractors, including, but not limited to, any Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Consultant and the Consultant's consultants appropriate to and for use in the execution of their Work under the Contract Documents only. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Consultant and the Consultant's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the any intellectual property right or other reserved rights.

ARTICLE 2 OWNER

2.1 GENERAL

2.1.1 The Owner is the entity identified as such in the Agreement and is referred to throughout the Contract Documents. The Owner may designate in writing a representative who subject to the limitations provided by law, shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Subparagraph 4.1, the Consultant does not have such authority. The term "Owner" means the Owner or the Owner's Authorized Representative.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 Except for permits and fees, including those required under Subparagraph 3.7, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.3 OWNER'S RIGHT TO STOP THE WORK

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 1.1.3, or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, nor give rise to any claim for additions to the Contract Sum or Contract Time.

2.3.2 The Owner shall, in addition to the Right to Stop the Work, have the right to require that the Contractor replace or remove construction personnel assigned to the Work, if, in the Owner’s sole determination, specific construction personnel are impairing or impeding the prosecution of the Work.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, immediately without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the

reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Consultant's additional services made necessary by such default, neglect or failure. Such change order shall be deemed signed by the Contractor for the purposes of this Agreement even if the Contractor fails to physically sign such Change Order. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall promptly pay the difference to the Owner. The rights stated herein shall be in addition to and not in lieu of any rights afforded the Owner.

ARTICLE 3 CONTRACTOR

3.1 GENERAL

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's Authorized Representative.

3.1.2 The Contractor shall perform and complete the Work in accordance with the Contract Documents for the Contract Sum and within the Contract Time.

3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Consultant in the Consultant's administration of the Contract, or in the performance of its obligations or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner, shall take field measurements of any existing conditions, including all general reference points and interfering site conditions related to that portion of the Work and shall observe any conditions at the site affecting it and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing such activities. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions known, recognized or discovered by the Contractor shall be reported promptly to the Consultant in writing as a request for information in such form as the Consultant may require.

3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Consultant in writing, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity recognized discovered by or made known to the Contractor shall be reported promptly to the Consultant in writing. The accuracy of grades, elevations, dimensions, locations or otherwise of existing conditions are not warranted to be accurate. The Contractor is solely responsible for verifying the accuracy of grades, elevations, dimensions, locations or otherwise of existing conditions prior to entering in to the Contract.

3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Consultant in response to the Contractor's notices or requests for information pursuant to Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Subparagraphs 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. Except as provided herein, the Contractor shall not be liable to the Owner or Consultant for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract

Documents unless the Contractor discovered, had knowledge of, recognized or should have recognized such error, inconsistency, omission or difference and failed to report it to the Owner and to the Consultant or accepted the responsibility to verify the same. If the Contractor performs any construction activity it knows or reasonably should have known involves an error, inconsistency or omission in the Contract Documents or reports referenced therein without such notice to the Owner and the Consultant, the Contractor shall assume responsibility for such performance and shall bear the costs attributed to the correction.

3.2.4. In addition to and not in derogation of the Contractor's duties the Contractor shall take all field measurements and verify all field conditions and shall carefully compare such field measurements and conditions with all other information known to the Contractor or included in any of the Contract Documents before commencing any construction activity for the Work. The Owner shall not be liable for any errors, inconsistencies or omissions which should have been reasonably discovered and the Contractor shall report in writing to the Consultant and Owner any errors, inconsistencies or omissions.

3.2.5. Any investigations of subsurface conditions have been made for design purposes only. The results of these investigations may be available for the convenience of the Bidders and the Sub-bidders but are not a part of the Contract Documents. While the Contractor may rely on such investigation results there is no representations or warranties, express or implied that the conditions indicated are representative of those existing at the site or that unforeseen developments may not occur. The Contractor is solely responsible for reasonably interpreting the information and extrapolating beyond the location of each individual boring, test pit, or other testing location.

3.2.6. The Contractor shall do no work without applicable Drawings, Specifications, or written modifications or, where required, Shop Drawings, Product Data, or Samples, unless instructed to do so in writing by the Consultant and Owner.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. Contractor shall review any specified construction or installation procedure and shall advise the Owner and the Consultant in writing if the specified procedure deviates from acceptable construction practices will impact any warranty or if the Contractor has any objection thereto.

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, of any tier, and their agents and employees, and any other persons or entities performing portions of the Work for or on behalf of the Contractor or any Subcontractors of any tier and for any damages, losses, costs and expenses resulting from such acts or omissions.

3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

3.3.4. The Contractor shall inspect, prior to installation, all materials and equipment delivered to, installed at, or fabricated at the site and shall reject that which will not conform to the Contract Documents when fully and properly installed.

3.4 LABOR AND MATERIALS

3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, telephone, data transmission, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.4.2 The Contractor may make substitutions only with the written consent of the Owner, after evaluation by the Consultant and in accordance with a Change Order.

3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner and Consultant that the Work, including, but not limited to, any and all materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Consultant, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. In addition, the Contractor assigns to the Owner any and all warranties. The Contractor further warrants that all construction activity of the Work shall be performed on the Work so as to preserve all such warranties. To the extent that any warranty is non-assignable, Contractor warrants that it will pursue such warranty claim for the use and benefit of the Owner without cost or expense to the owner. The Contractor shall require this provision to be included in all subcontracts of any tier.

3.6 TAXES

3.6.1 The Contractor shall pay as and when due sales, consumer, property, occupational, Social Security benefits, unemployment compensation, use and similar taxes, excises, duties and assessments for the Work provided by the Contractor.

3.7 PERMITS, FEES AND NOTICES

3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received, negotiations concluded or the Contract is executed. To the extent that there is any difference in these requirements the most stringent requirements on the Contractor shall apply.

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work. If the Contractor fails to comply or give such notices it will be liable for and shall to the fullest extent permitted by law defend indemnify and hold the Owner and Consultant and their respective employees, officers and agents harmless from any costs, loss, penalty or damage.

3.7.3 Except as otherwise provided herein, it is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor becomes aware, gains knowledge, recognizes or observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Consultant and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing the construction activity to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Consultant and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs, loss, damages and penalties attributable to correction.

3.8 ALLOWANCES

3.8.1 The Contractor shall include in the Contract Sum any and all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at-the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (I) the difference between actual costs and the allowances under Clause 3.8.2.1 and (2) changes in Contractor's costs under Clause 3.8.2.2.

3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

3.9 SUPERINTENDENT

3.9.1 The Contractor shall employ an experienced and competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during performance of the Work including completion of the punch list. The Contractor shall notify the Consultant and the Owners Representative as to the identity of the superintendent who shall not be changed during the course of the Work without prior written notification to the Consultant and Owner Representative. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 The Contractor, promptly and within ten (10) days after being awarded the Contract, shall prepare and submit for the Owner's and Consultant's information a preliminary Contractor's construction schedule for the Work consistent with the with the requirements of the Contract Documents. Prior to submitting its first Application for Payment, the Contractor, after consultation with its subcontractors, shall submit six (6) hard copies and one electronic copy of the Contractor’s construction schedule consistent with the requirements of the Contract Documents. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The construction schedule shall not be changed without the prior written consent of the Owners Representative.

3.10.2 The Contractor shall prepare and keep current, for the Consultant's review, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Owner and the Consultant reasonable time to review in accordance with the Specifications and submittal procedures. The Contractor should expect a response time of approximately 21 days from the Consultant and Consultant’s consultants. Neither the Consultant nor Owner can represent or guarantee response times from governmental authorities, such as permitting agencies. Neither the Contractor's preparation, nor the Consultant’s receipt or review shall modify the Contractor’s responsibility to make required submittals or to do so in a timely manner.

3.10.3 The Contractor shall perform the Work in accordance with the most recent schedules submitted to the Owner and accepted by the Owner and shall promptly notify the Owner of any deviations from the schedule. Should the Contractor fail to comply with the schedule, or in the Owner's opinion fail, refuse, or neglect to supply a sufficient amount of labor, materials, equipment or services in the prosecution of the Work, the Owner shall have the right to direct the Contractor to furnish such additional labor, materials, equipment or services to comply with the schedule and all costs thereof shall be borne by the Contractor and shall not increase the Contract Sum. All schedules submitted shall be in the form acceptable to the Owner using critical path methodology (CPM) clearly showing overall Project and specific items and tasks of construction activities, dependencies and durations as well as overall and specific commencement and completions dates. The critical path activities shall be highlighted, float and non-critical activities shall be shown and the start and stop times for each activity shall be listed. Float belongs to the benefit of the Project for the Owner's use and no float shall be used without the Owner's written approval. The Contractor shall at all times monitor the progress of the Work for conformance with the CPM schedule accepted by the Owner and shall promptly advise the Owner and Consultant of any impacts or delays or potential impacts or delays. The Contractor shall also update the construction schedule to reflect actual conditions and shall propose plans in order to avoid or correct any impact or delays.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

3.11.1 The Contractor shall maintain at the site for the Owner one (1) record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one (1) record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be accessible to inspectors and available to the Consultant and Owner and shall be delivered to the Consultant for submittal to the Owner upon completion of the Work and before Contractor's request for final payment.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Consultant or any other person is subject to the limitations of Subparagraph 4.2.7. Information submittals upon which the Consultant is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Consultant without action.

3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Consultant, Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Consultant without action.

3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Consultant.

3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by any approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Consultant and Owner in writing of such deviation at the time of submittal and (1) the Consultant has given specific written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the, any person's approval thereof.

3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Consultant on previous submittals. In the absence of such written notice, any person's approval of a resubmission shall not apply to such revisions. Contractor shall submit Shop Drawings, Product Data, Samples and similar submittals in forms and in a manner reasonably acceptable to the Consultant. Contractor shall submit no less than two (2) copies or examples for review of any Shop Drawings, Product Data, Samples or similar submittals at Contractor’s sole cost and expense.

3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of Architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Consultant will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Consultant. The Owner and the Consultant shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and Consultant have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Subparagraph 3.12.10, the Consultant will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

3.13 USE OF SITE

3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Notwithstanding anything contained in the Contract Documents to the contrary, the Contractor shall, as part of the Work, not disrupt or interfere in any manner with any of the Owner’s or Owner’s authorized provider’s operations at the Project site or any other locations, including, without limitation any and all educational, social, athletic or recreational programs, activities, classes or events. Contractor shall not park or otherwise

utilize any other area designated by the Owner or typically used by Owner's employees, staff, students, parents or visitors or local residents or businesses.

3.14 CUTTING AND PATCHING

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

3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. To the extent that the Work involves renovation, alteration or repair of existing improvements, cutting and patching essential for the Project shall be successfully completed and Contractor shall perform the Work so that it is fully integrated into the existing improvements operationally and aesthetically.

3.15 CLEANING UP

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

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 ACCESS TO WORK

3.16.1 The Contractor shall provide the Owner and Consultant and their employees. agents and officers access to the Work in preparation and progress wherever located.

3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

3.18 INDEMNIFICATION

3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Paragraph 11.2, the Contractor shall indemnify and hold harmless the Owner, Consultant, Consultant's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, any Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be

construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.

3.18.2 In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.1 CONSULTANT OR OWNER'S REPRESENTATIVE

4.1.1 The term "Consultant" as used in the Contract Documents, shall mean arkitek:design+architecture, or "Owner's Representative", as used in the Contract Documents, shall mean HMK Company (HMKCO), and its respective personnel.

> **4.1.2.1** If a licensed Consultant is engaged by Owner who is not designated as the "Owner's Representative", the Owner shall make written directive and notification to Contractor, which shall perform any Contract Administration duties. For ease of reference and consistency, the term "Consultant" shall be used in the Contract Documents to refer to the contract administrator.

4.1.2 Duties, responsibilities and limitations of authority of the Consultant as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, and Consultant.

4.1.3 If the employment of the Consultant is terminated, the Owner shall employ a new Consultant under such terms and conditions as are agreeable between the Owner and the new Consultant.

4.2 CONSULTANT'S ADMINISTRATION OF THE CONTRACT

4.2.1 The Consultant may provide administration of the Contract as described in the Contract Documents, and may be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 12.2. The Consultant will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

4.2.2 The Consultant, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Consultant will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Consultant will neither have control over or charge of, nor be responsible for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Subparagraph 3.3.1.

4.2.3 The Consultant will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Consultant will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, any Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

4.2.4 Communications Facilitating Contract Administration. The Owner, Owners Representative and Contractor may communicate with each other through the Consultant about matters arising out of or relating to the Contract. The Contractor shall also PROVIDE THE OWNER AND OWNERS REPRESENTATIVE WITH A DIRECT COPY OF ALL WRITTEN COMMUNICATIONS TO THE CONSULTANT, including all notices, requests, Claims and potential changes in the Contract Sum or Time, but not including Shop Drawings, Product Data or Samples. Communications by and with the Consultant's consultants shall be through the Consultant. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

4.2.5 Based on the Consultant's evaluations of the Contractor's Applications for Payment, the Consultant may review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

4.2.6 The Consultant may have authority to reject Work that does not conform to the Contract Documents. Whenever the Consultant considers it necessary or advisable, the Consultant may have authority to require inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Consultant nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Consultant to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

4.2.7 The Consultant will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Consultant's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Consultant's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Consultant's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Consultant's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Consultant, of any construction means, methods, techniques, sequences or procedures. The Consultant's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.2.8 The Consultant may prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Consultant may conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, may receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and may issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.2.10 If the Owner and Consultant designate, the Consultant will provide one or more project representatives to assist in carrying out the Consultant's responsibilities at the site.

4.2.11 The Consultant may interpret and decide matters concerning performance under and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Consultant's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Consultant shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Consultant to furnish such interpretations until 5 days after written request is made for them.

4.2.12 Interpretations and decisions of the Consultant, if any, will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the Consultant will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

4.2.13 The Consultant's decisions on matters relating to aesthetic effect may be final if consistent with the intent expressed in the Contract Documents. The terms and conditions of the Owner's agreement with the Consultant shall govern the Consultant's responsibilities.

4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, and extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Time Limits on Claims. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Consultant and the other party.

4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.4 Claims for Concealed or Unknown Conditions. Except as otherwise provided herein, if conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall give written notice to the Owner and the Consultant promptly before conditions are disturbed and in no event later than seven (7) days after first observance of the conditions. The Consultant may promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both, consistent with the requirements of the Contract Documents. If the Consultant determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Consultant may so notify the Owner and Contractor in writing, stating the reasons. Any claim of the Contractor arising from the Consultant’s determination shall be made in accordance with the dispute resolution procedures set forth in Paragraphs 4.4 through 4.6. No adjustment in the Contract Time or Sum shall be permitted, however, if connection with any concealed or unknown condition which does not materially differ from those disclosed or which should have reasonably been discovered by the Contractor’s prior visits, observations, tests or for which the Contractor assumed any responsibility to verify.

4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work, and a Claim must be made in accordance with Paragraphs 4.4 through 4.6 or it will be deemed waived. Prior notice is not required for Clams relating to an emergency endangering life or property arising under Paragraph 10.6.

4.3.6 If the Contractor believes additional cost is involved for reasons, including, but not limited to:

.1 a written interpretation from the Consultant

.2 an order by the Owner to stop the Work where the Contractor was not at fault

.3 a written order for a minor change in the Work issued by the Consultant

.4 failure of payment by the Owner

.5 termination of the Contract by the Owner

.6 Owner's suspension or

.7 other reasonable grounds, Claim shall be filed in accordance with this Paragraph 4.3.

All Claims for additional costs shall include any and all costs, including, but not limited to, any and all direct and indirect costs thereof.

4.3.7 Claims for Additional Time

4.3.7.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given and a Claim shall be made as provided herein. The Contractor's Claim shall include an estimate of any cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. If the delay was not caused by the Owner, the Contractor, a Subcontractor of any tier, or the Consultant, or anyone acting on behalf of any of them, the Contractor shall be entitled only to an increase in the Contract Time, in accordance with the Contract documents, but not a change in the Contract Sum. If the delay was caused by the Contractor, a Subcontractor of any tier, or anyone acting on behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or in the Contract Sum.

4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction, and that the Work was on schedule (or was not behind schedule through the fault of the Contractor) at the time the adverse weather conditions occurred. Neither the Contract Time nor the Contract Sum will be adjusted for normal inclement weather. The Contractor shall be entitled to a change in the Contract Time only if the Contractor can substantiate to the reasonable satisfaction of the Owner and Consultant that there was materially greater than normal inclement weather considering the full term of the Contract Time and using a ten-year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale of the Project, and that the alleged abnormal inclement weather actually extended the critical path of the Work. IF the total net accumulated number of calendar days lost due to inclement weather from commencement of the Work until Final Completion exceeds the total net accumulated to be expected for the same period from the aforesaid data, and the Owner grants the critical path.

4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

4.3.9 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

4.3.10 Time is of the Essence. The parties agree that the Owner shall be entitled to recover liquidated damages at the rate stated in the Agreement, which shall commence on the first day following the expiration of the Contract Time and continuing until the date of Substantial completion.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

4.4.1 In an effort to reduce the incidence and costs to all parties of extended disputes, all Claims, direct or indirect, arising out of, or relating to, the Contract Documents or the breach thereof, except claims which have been waived under the terms of the Contract Documents, shall be decided exclusively by the following alternative dispute resolution procedure unless the parties mutually agree in writing otherwise.

4.4.2 The Contractor shall submit a written notice of any Claim to the Owner and the Consultant within 14 days of the occurrence of the event giving rise to such Claim and shall include a clear description of the event leading to or causing the Claim. The Contract shall submit a written Claim as providing herein within 30 days of the notice. Claims shall include a clear description of the Claim and any proposed change in the Contract Sum (showing all components and calculations) and/or Contract Time (showing cause of and analysis of the resultant delay in the critical path) of the Claim and shall provide data fully supporting the Claim. Failure to properly submit the notice of Claim shall constitute waiver of the Claim. The Claim shall be deemed to include all changes, direct and indirect, in cost and in time to which the Contractor (and Subcontractors of any tier) is entitled. Any claim of a Subcontractor of any tier may be brought only through, and after review by, the Contractor.

4.4.3 Upon receipt of a Claim against the Contractor or at any time thereafter, the Consultant or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Consultant or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.4.4 If a claim relates to or is the subject of a mechanic’s lien or construction lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Consultant, by mediation or by litigation.

4.4.5 Within 30 days of the Owner’s receipt of the written Claim, the Contactor may require that an officer of the Contractor, a principal of the Consultant, and the Owner’s Superintendent or designee (all with authority to settle) meet, confer, and attempt to resolve the Claim during the following 21 days. The Owner may continue the meeting to a time after it has assembled and reviewed data. If the Claim is not resolved, the Contractor may bring no claim against the Owner unless the Claim is first subject to nonbinding mediation as described in Paragraph 4.5. This requirement cannot be waived except by an explicit written waiver.

4.4.6 The Contractor agrees that the Owner may join the Contractor as a party to any litigation/arbitration involving the alleged fault of the Contractor or Subcontractor of any tier.

4.5 MEDIATION

4.5.1 Any Claim arising out of or relating to the Contract, except Claims relating to aesthetic effect and except those waived shall be subject to mediation as a condition precedent to the institution of legal or equitable proceedings by either party. This requirement cannot be waived except by an express written waiver.

4.5.2 The parties shall endeavor to resolve their claims by mediation, which unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rule of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. Mediation shall proceed in advance of legal or equitable proceedings, which shall be stayed pending mediation unless stayed for a longer period by agreement of the parties or court order.

4.5.3 The parties to the mediation shall share the mediator's fee and any filing fees equally. The medication shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

4.5.4 An officer of the Contract and the Owner's Superintendent or designee must attend the mediation session with authority to settle the Claim. To the extent there are other parties in interest, such as the Consultant or Subcontractors, their representatives, also with the authority to settle the Claim, shall also attend the mediation session. Unless the Owner and the Contractor mutually agree in writing otherwise, all unresolved Claims shall be considered at a single mediation session which shall occur prior to Final Acceptance by the Owner.

4.6 LITIGATION

4.6.1 The Contractor may bring no litigation on Claims unless such Claims have been properly raised and considered in the procedures of Subparagraphs 4.4.1 through 4.4.3 above. All unresolved Claims of the Contractor shall be waived and released unless the Contractor has complied with the time limits of the Contract Documents, and litigation is served and filed within the earlier of (a) 120 days after the Date of Substantial Completion approved in writing by the Owner or (b) 60 days after Final Acceptance. This requirement cannot be waived except by an explicit written waiver signed by the Owner and the Contractor. The pendency of mediation shall toll these deadlines until the later of the mediator providing written notice to the parties of impasse or 30 days after the date of the last mediation session. Neither the Contractor nor a Subcontractor of any tier, whether claiming under a lien statute or otherwise, shall be entitled to attorneys' fees directly or indirectly from the Owner (but may recover attorneys' fees from the statutory Retainage fund itself to the extent allowable under law).

4.6.2 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Consultant makes reasonable objection to such substitute. The Contractor shall require bids and contracts from Subcontractors to be submitted in a format which specifically sets for the amount of any credit that the Owner will ultimately be the benefit of, if all or any portion of any Subcontractor's Work is deleted. In no instance shall the Owner be obligated to pay any fee, profit or overheard for Work which is deleted from any Subcontractor's scope or from that of the Contractor.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner or Consultant. Each subcontract agreement shall preserve and protect the rights of the Owner and Consultant under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with

other Subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner or to another contractor should Owner so elect and consent, provided that:

.1 assignment is effective only after termination of the Contract by the Owner and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

5.4.2 Each subcontract shall specifically provide that the Owner (or other contractor) shall only be responsible to the subcontractor for those obligations that accrue after the Owner's or other contractor's exercise of rights under the conditional assignment required hereby.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 4.3.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make without an increase in the Contract Time or Sum any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors' reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall

connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Consultant apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor or any Subcontractors. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, and damage to the Work or defective construction of a separate contractor.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor or Subcontractors to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Consultant may allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

7.1 GENERAL

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, solely by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Consultant; a Construction Change Directive requires agreement by the Owner and Consultant and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Consultant alone.

7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

7.1.4 Before effectuating a change in the Work, the Owner may request the Contractor to propose the amount of change in the Contract Sum, if any, and the extent of change in the Contract Time, if any, arising from the proposed change in the Work. The Contractor shall submit its responsive proposal as soon as possible and within 14 days and shall in good faith specify the components and amounts by which the Contract Sum and/or Contract Time would change. Labor, materials and equipment shall be limited to and itemized in the manner described in Paragraph 7.5 for the Contractor and major Subcontractors. If the Contractor fails to respond within this time, the Owner may withhold some or all of a progress payment otherwise due until the tardy proposal is received. If the Owner accepts the proposal in writing, the Owner will be immediately bound, the change will be included in a future Change Order, and the change in the Work shall commence expeditiously. The Owner may reject the proposal, in which case the Owner may either not effectuate the change in the Work or may order the change through a Construction Change

Directive or an order for a minor change in the Work. The Consultant may confer directly with Subcontractors of any tier concerning any item proposed to the Owner under this Article.

7.2 CHANGE ORDERS

7.2.1 A Change Order is a written instrument which may be prepared by the Consultant and signed by the Owner, Contractor and which may be signed by the Consultant, stating their agreement upon all of the following:

.1 change in the Work;

.2 the amount of the adjustment, if any, in the Contract Sum; and

.3 the extent of the adjustment, if any, in the Contract Time.

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3. Agreement on a Change Order shall constitute full and final settlement of all issues and matters related to the change in Work which is subject to the Change Order including, without limitation, any and all direct and indirect costs and all adjustments in the Contract Time and Sum. There shall be no fee due or to become due to the Contractor related to deductive Change Orders.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order which may be prepared by the Consultant and signed by the Owner, and which may be signed by the Consultant, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 unit prices stated in the Contract Documents or subsequently agreed upon;

.3 cost to be determined in a manner agreed upon by the parties (accompanied by an itemized estimate of probable cost) and a mutually acceptable fixed or percentage fee; or

.4 as provided in Subparagraph 7.3.6.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved. As soon as possible and within seven (7) days of receipt the Contractor shall advise the Consultant in writing of the Contractor's agreement or disagreement with the proposed adjustment or the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time. The Contractor's response shall reasonably specify the reasons for its disagreement and the adjustment or other terms that it proposes. Without such timely written response, the Contractor shall conclusively be deemed to have accepted the Owner’s adjustment. The Contractor’s disagreement shall not relieve the Contractor of its obligations to comply promptly with any written notice issued by the Owner or the Consultant. The adjustment shall then be determined by the Consultant in accordance with the provisions of the Contract Documents.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be incorporated into and be construed and interpreted as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, or if cost is to be determined under Clause 7.3.3.3, the Contractor shall keep and present itemized in the categories of Paragraph 7.5 and in such form as the Consultant may prescribe, an itemized accounting together with appropriate supporting data. In order to facilitate checking of such quotations, all proposals, except those so minor that their propriety can be seen be inspection, shall be accompanied by complete itemization of costs, including labor, equipment, material and subcontract costs. Labor, equipment and materials shall be itemized in the manner described in Paragraph 7.5. When major cost items arise from Subcontractors of any tier, these items shall also be similarly itemized. Approval may not be given without such itemization. Failure to provide data within 21 days of the Owner's request shall constitute waiver of any Claim for changes in the Contract Time or Contract Sum. The total cost of any change, including a Claim under Paragraph 4.3 or 4.4, shall be limited to the reasonable value, as determined by the Consultant (subject to appeal through the dispute resolution procedure of Paragraph 4.4), of the items in Paragraph 7.5. Unless otherwise agreed in writing by the Owner, the cost shall not exceed the lower of the prevailing cost for the work in the locality of the Project or the cost of the work in the current edition of R.S. Means Company, Inc., Building Construction Cost Data as adjusted to local costs and conditions. The Consultant and the Owner may communicate directly with Subcontractors concerning costs of any Work included in a Construction Change Directive. If the Contractor disagrees with the method for the adjustment in the Contract Time, the adjustment and method shall be referred to the Consultant for determination, and any adjustment shall be limited to the change in the actual critical path of the Contractor's Construction Schedule directly caused thereby.

7.3.7 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be the largest of (1) the reasonable and prevailing value of the deletion or change; (2) the line item value in the Schedule of Values: or (3) the actual net cost as confirmed by the Consultant. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner and provided that any amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. If the Contractor adds a reservation of rights that has not been initialed b the Owner, all the amounts for the Construction Change Directive shall be considered disputed unless costs are renegotiated or the reservation is withdrawn or changed in a manner satisfactory to the Owner.

7.3.9 When the Owner and Contractor agree with the determination made by the Consultant concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

7.4 MINOR CHANGES IN THE WORK

7.4.1 The Consultant and the Owner will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out any and all such written orders promptly. If at the option of the Owner, the Consultant exercises any authority, right(s) or duty(ies) stated anywhere in this Agreement or any other Contract Document as an authority, right or duty the Consultant may perform, the Contractor shall comply with, be bound by and respond therewith and thereto, including, but not limited to, the exercise of any authority, right(s) or duty(ies) related to minor work.

7.5 PRICING COMPONENTS

7.5.1 The total cost of any changed Work or of any other increase or decrease in the Contract Sum, including a Claim, shall be limited to the following components:

.1 Basic wages: The hourly wage (without markup, fringe benefits or labor burden) not to exceed that specified in the applicable "Intent to Pay Prevailing Wage" for the laborers, apprentices, journeymen, and foremen performing and/or directly supervising the changed Work on the site. The premium portion of overtime wages is not included unless pre-approved by the Owner.

.2 Fringe benefits: Fringe benefits paid by the Contractor as established by the Oregon Bureau of Labor and Industries or contributed to labor trust funds as itemized fringe benefits, whichever is applicable. Costs paid or incurred by the Contractor for vacations, per diem, bonuses, stock options, or discretionary payments to employees are not reimbursable.

.3 Workers' insurances: Direct contributions to the State of Oregon as industrial insurance; medical aid; and supplemental pension by class and rates established by the Oregon Bureau of Labor and Industries.

.4 Federal insurances: Direct contributions required by the Federal Insurance Compensation Act (FICA); Federal Unemployment Tax Act (FUTA); and State Unemployment Compensation Act (SUCA).

7.5.2 Direct material costs: This is an itemization, including material invoice, of the quantity and cost of additional materials reasonable and necessary to perform the change in the Work. The unit cost shall be based upon the net cost after all discounts or rebates, freight costs, express charges, or special delivery costs, when applicable. No lump sum costs will be allowed except when approved in advance by the Consultant. Discounts and rebates based on prompt payment may be included, however, if the Contractor offers but the Owner declines the opportunity.

7.5.3 Construction equipment usage costs: This is an itemization of the actual length of time that construction equipment appropriate for the Work will be used solely on the change in the Work at the site times the applicable rental cost as established by the lower of the local prevailing rate published in The Rental Rate Blue Book by Data Quest, San Jose, California, or the actual rate paid to an unrelated third party as evidenced by rental receipts. Actual, reasonable mobilization costs are permitted if the equipment is brought to the Site solely for the change in the Work. If equipment is required for which a rental rate is not established by The Rental Rate Blue Book, an agreed rental rate shall be established for the equipment, which rate and use must be approved by the Consultant prior to performing the work. If more than one rate is applicable, the lowest rate will be utilized. The rates in effect at the time of the performance of the changed Work are the maximum rates allowable for equipment of modern design and in good working condition and include full compensation for furnishing all fuel, oil, lubrication, repairs, maintenance, and insurance. Equipment not of modern design and/or not in good working condition will have lower rates. Hourly, weekly, and/or monthly rates, as appropriate, will be applied to yield the lowest total cost. The rate for equipment necessarily standing by for future use on the changed Work shall be 50% of the rate established above. The total cost of rental allowed shall not exceed the cost of purchasing the equipment outright.

7.5.4 Cost of change in insurance or bond premium. This is defined as:

.1 Contractors' liability insurance: The cost (expressed as a percentage) of any changes in the Contractor's liability insurance arising directly from the changed Work; and

.2 Public works bond: The cost (expressed as a percentage) of the change in the Contractor's premium for the Contractor's bond arising directly from the changed Work.

Upon request, the Contractor shall provide the Owner with supporting documentation from its insurer or surety of any associated cost incurred.

7.5.5 Subcontractor costs: These are payments the Contractor makes to Subcontractors for changed Work performed by Subcontractors. The Subcontractors' cost of changed Work shall be determined in the same manner as prescribed in this Paragraph 7.5.

7.5.6 Fee: This is the allowance for all combined overhead, profit and other costs, including all office, home office and site overhead (including project manager, project engineers, project foreman, estimator, superintendent and their vehicles), taxes (except for sales tax), warranty, safety costs, quality control/assurance, purchasing, small or hand tool or expendable charges, preparation of as-built drawings, impact on unchanged Work, Claim preparation, and delay and impact costs of any kind, added to the total cost to the Owner of any Change Order, Construction Change Directive, Claim or any other claim of any kind on this Project. It shall be limited in all cases to the following schedule:

.1 The Contractor shall receive 15% of the cost of any materials supplied or work properly performed by the Contractor's own forces.

.2 The Contractor shall receive 8% of the amount owed directly to a Subcontractor or Supplier for materials supplied or work properly performed by that Subcontractor or Supplier.

.3 Each Subcontractor of any tier shall receive 12% of the cost of any materials properly supplied or work properly performed by its own forces.

.4 Each Subcontractor of any tier shall receive 8% of the amount it properly incurs for materials supplied or work properly performed by its suppliers or subcontractors of any lower tier.

.5 The cost to which this Fee is to be applied shall be determined in accordance with Paragraph 7.5.1-7.5.4.

.6 The total summed Fee of the Contractor and all Subcontractors of any tier shall not exceed 25%. None of the fee percentages authorized in this Paragraph 7.5.6 may be compounded with any other fee percentage or percentages authorized in this paragraph.

If a change in the Work involves both additive and deductive items, the appropriate Fee allowed will be added to the net difference of the items. If the net difference is negative, no Fee will be added to the negative figure as a further deduction.

ARTICLE 8 TIME

8.1 DEFINITIONS

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

8.1.2 The date of commencement of the Work is the date established in the Agreement.

8.1.3 The date of Substantial Completion is the date certified by the Consultant in accordance with Paragraph 9.8.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined. Time is expressly declared of the essence as it relates to the performance of the Contractor's Work. Without limiting the foregoing, Contractor must complete the Project in the manner required hereby on the date required hereby. The failure to so complete the Project shall cause the Owner to incur substantial costs and expenses, including, but not limited to, those related to staffing, teachers,

management, transportation, publication, communication, signage, and rental, all of which costs and expenses the Contractor shall be liable for.

8.2 PROGRESS AND COMPLETION

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

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article II to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. The Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is unreasonably delayed at any time .in the commencement or progress of the Work (1) by an act or neglect of the Owner or Consultant, or of an employee of either, or of a separate contractor employed by the Owner, or (2) by changes ordered in the Work only to the extent reflected in approved Change Orders providing for specific extensions of the Contract Time, or (3) b unanticipated, abnormal weather (see Paragraph 4.3.7), or (4) by unexpected industry-wide labor disputes, fire, unusual delay in deliveries, governmental delays (including permit delays not caused by the Owner), unavoidable casualties or other causes beyond the Contractor's control, or (5) by delay authorized by the Owner pending mediation and litigation, or (6) by other causes which the Consultant determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time, limited to the change in the actual critical path of the Contractor's Construction Schedule directly caused thereby, as the Consultant may determine consistent with the provisions of the Contract Documents. In no event, however, shall the Contractor be entitled to any extension of time absent proof of (1) delay to an activity on the critical path of the Contract Schedule, also as to actually delay the Project completion beyond the date of Substantial Completion, or (2) delay transforming an activity into the critical path of the Contract Schedule, so as to actually delay the Project completion beyond the date of Substantial Completion.

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraphs 4.3 and 4.4. That the Owner or Consultant may be aware of the occurrence or existence of a delay through means other than the Contractor’s written notification shall not constitute a waiver of a timely or written notice or Claim.

8.3.3 This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

.1 If the delay was not caused by the Owner, the Contractor, a Subcontractor of any tier, or the Consultant, or anyone acting on behalf of any of them, the Contractor is entitled only to an increase in the Contract Time in accordance with the Contract Documents, but not a change in the Contract Sum. If the delay was caused by the Contractor, a Subcontractor of any tier, or anyone acting on behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or in the Contract Sum. The Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from the Owner where the Contractor could have reasonably avoided the delay by the exercise of due diligence. The Contractor shall be able to recover an increase in the Contract Sum, consistent with the terms of the Contract Documents, only if a delay in the critical path was unreasonable and caused by the Owner. A Subcontractor is not entitled to damages, an equitable adjustment or an increase in the Contract Sum for any delay that does not increase the Contract Time.

.2 In the event the Contractor (including any Subcontractors of any tier) is held to be entitled to damages from the Owner for delay beyond the payment permitted in Subparagraph 7.5.6, it is agreed that the total combined damages to the Contractor and any Subcontractors of any tier for each day of delay shall be limited to the same daily liquidated damage rate specified in the Contract Documents due the Owner for the Contractor's delay in achieving Substantial Completion. No damages will be allowed for any time prior to 14 days before receipt of written notice of the Claim of the delay pursuant to Subparagraph 4.4.2.

.3 The Contractor shall not in any event be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant under run; trade stacking; reassignment of workers; rescheduling of work, concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages; or similar damages.

.4 The Contractor shall not be entitled to any adjustment in the Contract Time or in the Contract Sum, or to any additional payment of any sort, by reason of the loss or the use of any float time, including time between the Contractor's anticipated completion date and the end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule.

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Within seven (7) days of the execution of this the Agreement and with each Application for Payment, the Contractor shall submit to the Consultant a schedule of values in a form satisfactory to the Consultant and Owner allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Consultant may require. This schedule, unless objected to by the Consultant or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Consultant an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized and supported by such data substantiating the Contractor's right to payment as the Owner or Consultant may require, such as copies of requisitions from Subcontractors and material suppliers and reflecting Retainage if provided for in the Contract Documents.

9.3.1.1 As provided in Subparagraph 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Consultant, but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to any Subcontractor including any material supplier.

9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's free and clear title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, be free and clear of any and all liens, claims, security interests or encumbrances in favor of the Contractor, and any all Subcontractors, including any material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Consultant may, within seven (7) days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Consultant determines is properly due, or notify the Contractor and Owner in writing of the Consultant's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

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

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 The Consultant may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if, in the Consultant's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Consultant is unable to certify payment in the amount of the Application, the Consultant may notify the Contractor and Owner as provided in Subparagraph 9.4. I. If the Contractor and Consultant cannot agree on a revised amount, the Consultant may promptly issue a Certificate for Payment for the amount for which the Consultant is able to make such representations to the Owner. The Consultant may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Consultant's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 3.3.2, because of:

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security is acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 Any other failure to comply with the Contract Documents or Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.6 PROGRESS PAYMENTS

9.6.1 After the Consultant has received all the necessary documents and properly issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents and may so notify the Consultant.

9.6.2 If not done previously, The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.6.3 The Consultant or Owner may on request, furnish to any Subcontractors or any other person or entity, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Consultant and Owner on account of portions of the Work done by such Subcontractor.

9.6.4 Neither the Owner nor Consultant shall have an obligation to pay nor to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided for Subcontractors because by the definitions of this Agreement they are a Subcontractor.

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

9.6.7 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

9.7 FAILURE OF PAYMENT

9.7.1 If the Consultant does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Consultant or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Consultant, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately, and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work, or portion thereof designated and approved by the Consultant and Owner, when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can fully occupy and utilize the Work, or designated portion thereof, for its intended use. All Work other than incidental corrective or punch list work and final cleaning shall have been completed, including but not limited to the following:

.1 Obtain temporary occupancy permits, pressure vessel permits, elevator permits, and similar approvals or certificates by governing authorities and franchised services, assuring the Owner’s full access and use of completed Work.

.2 Submit the Contractor’s punch list of items to be completed or corrected and written request for inspection.

.3 Complete final start-up, testing, and commence instruction and training sessions on all major building systems, including HVAC and controls, intercom, data communications, fire alarm, telephone, fire sprinkler, security and clocks.

.4 Make final changeover of locks and transmit new keys to the Owner, and advise the Owner of the changeover in security provisions.

.5 Discontinue or change over and remove temporary facilities and services from the project site.

.6 Advise the Owner on coordination of shifting insurance coverages, including proof of extended coverages as required.

The Work is not Substantially Complete unless the Consultant reasonably judges that the Work can achieve Final completion within 60 days, appropriate cleaning has occurred, all systems and parts are commissioned and usable, including balancing of the HVAC system, utilities are connected and operating normally, all required temporary occupancy permits have been issued and the work is accessible by normal vehicular and pedestrian traffic routes. The fact that the owner may occupy the Work or a designated portion

thereof does not indicate that the work is Substantially Complete or is acceptable in whole or in part, nor does such occupation toll or change any liquidated damages due the Owner.

9.8.1.2 Date of commissioning of Critical Systems. The following systems of the Work, and any other systems designated in the Contract Documents, are considered “Critical Systems”: the HVAC system, the data communication system(s), the intercom system, the life safety system(s) and the security system. When the Contractor considers that the Critical Systems are up and running and ready for normal operation as specified for each phase, the Contractor shall so notify the Consultant in writing a minimum of 14 days prior to the Date of Substantial Completion for that portion or phase as fixed in the contract Documents. The Consultant will then schedule a pre-commissioning inspection of these systems to determine whether the Critical Systems are complete and ready for normal operation. If the Consultant’s inspection discloses that the Critical Systems are not Substantially Complete or that any item which is not in accordance with the requirements of the Contract Documents, the Contractor shall expeditiously, and before the Date of Commissioning, complete or correct such item upon notification by the Consultant. The Contractor shall then submit a request for another inspection by the Consultant to determine completion of the Critical Systems and pay the costs associated with the re-inspection, including fees of the Consultant and its consultants. When the Critical Systems are complete, the Consultant will notify the Owner in writing, which shall establish the Date of Commissioning. Warranties on the Critical Systems required by the Contract Documents shall commence on the Date of Commissioning, unless otherwise provided. The Date of Commissioning shall not have an effect on the duties of the parties at Substantial Completion.

9.8.1.3 Indemnification. The Contractor shall defend, indemnify, and hold harmless the Owner and the Consultant and their agents, employees, and consultants, successors and assigns from and against all claims, damages, losses and expenses of third parties, direct and indirect, or consequential, including costs, design professional fees, and attorneys’ fees incurred by the owner related to such claims and in proving the right to indemnification, arising out of or resulting from the failure of the Contractor to attain the Date of Commissioning less than 30 days prior to the Date of Substantial Completion fixed by the Contract Documents. In particular, the Contractor acknowledges that a 30-day period after the Date of Commissioning and prior to occupancy is specified during which the HVAC system is scheduled to operate under a procedure intended to dissipate out-gassing that may occur from interior and other materials.

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

9.8.3 Upon receipt of the Contractor's list, the Consultant and the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Consultant's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy and utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Consultant or Owner. In such case, the Contractor shall then submit a request for another inspection by the Consultant to determine Substantial Completion. If the Owner or Consultant determines that the Work or designated portion is not substantially complete, then the contractor shall expeditiously complete the Work or designated portion, request another inspection and pay all costs associated with any re-inspection.

9.8.4 When the Work or designated portion thereof is substantially complete, the Consultant may prepare a Certificate of Substantial Completion which, upon approval of the Owner, may establish the date of

Substantial Completion shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Contractor shall attach and submit with the executed Certificate or Substantial Completion a written list of each outstanding and unresolved Claim; any Claim not so submitted and identified, other than Retainage and the undisputed balance of the Contract Sum, shall be deemed waived and abandoned. If the Owner or Consultant determines that the Work or designated portion is not substantially complete, the Contractor shall expeditiously complete the Work or designated portion, again request an inspection, and pay the costs associated with the re-inspection, including Consultant and consultant fees.

9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Any items not included by the Consultant but required or necessary for Final Completion of the Contract shall be supplies and installed by the Contractor as a part of the Contract Sum, notwithstanding their not being recorded by the Consultant. Upon written acceptance of the Certificate of Substantial Completion and upon the Contractor's application, the Owner shall make payment as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. No further payment will be due or owing until the payment at Final Completion.

9.8.6 The Contractor shall prepare, continue to monitor with the Consultant, and cause to be completed, all punch lists with respect to the activity of each Subcontractor and report weekly to the Owner on outstanding punch list items. Beginning 90 days before the scheduled date of Substantial Completion, the Contractor shall prepare reports weekly, identifying items to be competed in order to obtain temporary and permanent certificates of occupancy and make recommendations to the Owner with respect to effectuating the earliest possible completion.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Clause 11.3.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, Retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Consultant and Owner as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Consultant.

9.9.2 Immediately prior to such partial occupancy or use, the Owner and Contractor shall, and Consultant may, jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 FINAL COMPLETION.

9.10.1.1 If, at thirty (30) days after the Date of Substantial Completion, the Owner considers that the punch list items are unlikely to be completed within sixty (60) days of Substantial Completion, the Owner may, upon seven (7) days' written notice to the contractor, take over and perform some or all of the punch list items. If the Contractor fails to correct the deficiencies within the period required, the Owner may deduct the actual cost of performing this punch list work, including costs, plus 10% to account for the Owner's transaction costs from the Contract Sum.

9.10.1.2 Upon receipt of written notice from the Contractor that the Work is ready for final inspection and acceptance, the Consultant may promptly make such inspection accompanied by the Contractor and, when the Consultant finds all punch list items fully completed and the Work acceptable under the Contract Documents and the Contract fully performed, the Consultant may promptly notify the Contractor and the Owner in writing that to the best of the Consultant's knowledge, information and belief, and on the basis of the Consultant's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents. If the Consultant determines that some or all of the punch list items are not fully completed, then the Contractor shall be responsible to the Owner for all costs, including re-inspection fees, associated with any subsequent Consultant's inspection. The Consultant's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.1.3 The Contractor is liable for, and the Owner may deduct from any amounts due the Contractor, all Consultant, architect, engineer or other design consultant fees incurred by the Owner for services performed more than 60 days after Substantial Completion of all the Work, whether or not those services would have been performed prior to that date had Final Completion been achieved in a timely manner.

9.10.1.4 When the Consultant finds that the Work has been concluded, a final occupancy permit has been issued, and the Contractor has submitted all the items in Subparagraph 9.10.2.1 to the Consultant, the Contractor may submit a final Application for Payment. The Consultant will then promptly issue a final Certificate for Payment stating that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. The Consultant's final Certificate for Payment shall establish the date of Final Completion upon its execution by the Owner.

9.10.1.5 "Final Completion" will be attained when the Contractor has accomplished the following:

.1 Complete all requirements listed in Paragraph 9.8 for Substantial Completion.

.2 Complete all remaining punch list items, notify Consultant and Owner that all work is complete.

.3 Obtain permanent occupancy permits.

.4 Submit final change order and final Application for Payment.

.5 Submit recorded documents, final property survey, and operation and maintenance manuals.

.6 Deliver tools, spare parts, extra stock of material and similar physical items to the Owner.

.7 Complete final cleaning.

.8 Complete instruction and train in sessions on all major building systems including HVAC, intercom data communications, fire alarm, telephone, fire sprinkler, security and clocks.

9.10.2 FINAL ACCEPTANCE AND PAYMENT

9.10.2.1 Final payment shall not become due until after the Owner's Board of Directors has formally accepted the Project "Final Acceptance". To achieve Final Acceptance, the Consultant must have issued a final Certificate of Payment under Subparagraph 9.10.1, Final Completion must have occurred, and the Contractor must have submitted to the Consultant the following:

.1 an affidavit that any and all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied together with full and final unconditional waivers by the Contractor and all Subcontractors in a form and with content acceptable to the Owner, except for any Subcontractor claims that are specifically identified on the affidavit,

.2 a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,

.3 a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents,

.4 consent of surety, if any, to final payment,

.5 other data establishing payment or satisfaction of or protection against obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor shall furnish a bond satisfactory to the Owner to indemnify the Owner against such lien or cash deposit off such lien or claim whichever the Owner may request. Such cash deposit shall be paid with the Contractor's own funds. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees,

.6 an “Affidavit of Wages” from the Contractor and each Subcontractor of every tier certified by all required governmental authorities.

.7 a letter from the Consultant indicating that the Work is complete and recommending Final Acceptance of the Project by the Owner.

.8 certification that all materials in the Work are "lead-free" and "asbestos-free," and

.9 all warranties, guarantees, training manuals, operation instructions, certificates, spare parts, maintenance stock, specified excess material, as-built drawings and other documents or items required by the Contract Documents or local governmental entities.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor, and the Consultant so confirms, the Owner shall, upon application by the Contractor and certification by the Consultant, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted to the extent permitted by statute. If the remaining balance for Work not fully completed or corrected is less than Retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Consultant prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.10.4 If a Subcontractor of any tier or supplier refuses to furnish a release or waiver required by the Owner the Owner may (a) retain in the fund, account, or escrow funds in such amount as to defray the cost of foreclosing the liens of such claims and to pay attorneys' fees, the total of which shall be no less than 150% of the claimed amount, or (b) accept a bond from the Contractor, satisfactory to the owner, to indemnify the Owner against such lien. If any such lien remains unsatisfied after all payments from the Retainage are made, the Contractor shall refund to the Owner all moneys that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.5 Release of Retainage. Retainage will be held and applied by the Owner as required by law. Release of Retainage will be processed in the ordinary course of business upon expiration of sixty (60) days following Final Acceptance of the Work by the Owner provided that no notice of lien shall have been given as provided by law, and that no claims have been brought to the attention of the Owner and that the Owner has no claims under this Contract.

9.10.6 WAIVER OF CLAIMS

9.10.6.1 Final Payment by Owner. The making of final payment shall not constitute a waiver of any Claims by the Owner.

9.10.6.2 Final Payment to Contractor. Acceptance of final payment by the Contractor, or any Subcontractors including but not limited to any material supplier shall constitute a waiver of claims by that payee except those previously timely made in writing delivered to the Owner, Consultant and identified by that payee as unsettled and attached to Contractor's final Application for Payment.

9.10.6.3 Change Orders. The execution of a Change Order shall constitute a waiver of Claims by the Contractor arising out of the Work to be performed or deleted pursuant to the Change Order, except as specifically described in the Change Order. Reservations of rights will be deemed waived and are void unless the reserved rights are specifically described in detail to the satisfaction of the Owner and are initialed by the Owner.

9.10.7 The Contractor shall maintain books, ledgers, records, documents, estimates, correspondence, logs, electronic data and other evidence pertaining to the costs incurred by the Contractor in connection with or related to the Contract ("records") to such extent and in such detail as will property reflect and fully support compliance with requirements of the Contract Documents and with all costs, charges and other amounts of whatever nature under the contract. The Contractor shall preserve such records for a period of three (3) years following the date of Final Acceptance under the contract and for such longer period as may be required by any other provision of the contract. Within seven (7) days of the Owner's requires, the Contractor agrees to make available at the office of the Contractor during normal business hours all records for inspection, audit and reproduction by the Owner or its representatives. These requirements shall be applicable to each Subcontractor of any tier and included in each Subcontract and purchase order issued with respect to the Work, except fixed-price Subcontracts where the price is $25,000 or less.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall use best efforts and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall use best efforts to take precautions for safety of, and provide protection to prevent damage, injury or loss to:

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall use best efforts to erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities and to protect adjacent property and improvements from any damage. Any damage to such property or improvements shall be promptly remedied at Contractor’s sole cost and expense.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and notify the Owner and Consultant in advance to such storage. To the extent that Owner's Operations limit the use or storage of explosives or other hazardous materials or equipment they shall not be used or stored at the Project.

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractors, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Consultant or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Consultant.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.2.8 Contractor shall specifically comply with any and all laws, rules and regulations related to hazardous materials (including without limitation asbestos) and hazardous material abatement including by not limited to those relating to contracting and the performance of such work.

10.3 HAZARDOUS MATERIALS

10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos, encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and promptly report the condition to the Owner and Consultant in writing. By executing this Contract, Contactor represents and warrants that it has no knowledge of any material or substance which would give rise to any obligation of the Owner under any provision of 10.3.

10.3.2 The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Consultant the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Consultant will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Consultant has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Consultant have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately, and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided in Article 7.

10.4 The Owner shall not be responsible under Paragraph 10.3 for materials and substances brought to the site by the Contractor.

10.5 EMERGENCIES

10.5.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractors discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by any Subcontractors, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 claims for bodily injury or property damage arising out of completed operations; and

.8 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverage's, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

11.2 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

11.2.1 The Owner may also in addition to or in the alternative require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Consultant's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Clauses 11.1.1.2 through 11.1.1.5.

11.2.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Consultant waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

11.2.3 The Owner may require the Contractor to include the Owner, Owners Representative, Consultant or any other persons or entities as additional insureds on the Contractor's Liability Insurance coverage under Paragraph 11.1 or as set out elsewhere in the Contract Documents.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

11.3.1.1 Property insurance may be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and may cover reasonable compensation for Consultant's and Contractor's services and expenses required as a result of such insured loss.

11.3.1.2 If the Owner does not intend to purchase such insurance the Owner shall so inform the Contractor. The Contractor may, then following 14 days prior written notice to the Owner by the Contractor effect such insurance which will protect the interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and if approved by the Owner in its discretion and in writing before the purchase thereof the costs thereof may be charged to the Owner.

11.3.1.3 If the property insurance requires deductibles, the Owner need not pay costs not covered because of such deductibles and they shall be paid by Contractor.

11.3.1.4 This property insurance, if any may at the Owner's option cover portions of the Work stored off the site, and also portions of the Work in transit.

11.3.1.5 Partial occupancy or use in accordance with Paragraph 9.9 may commence absent the insurance company or companies providing property insurance having consented to such partial occupancy or use by endorsement or otherwise.

11.3.2 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

11.3.3 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies

other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.5 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.4 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverage's required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

11.3.5 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Consultant, Consultant's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Consultant, Consultant's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

11.3.6 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.3.7. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.3.7 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Paragraphs 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in any of the Contract Documents.

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 If a portion of the Work is covered contrary to the Consultant's or Owner's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Consultant or Owner, be uncovered for the Consultant's or Owner's observation or examination and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Consultant or Owner has not specifically requested to examine prior to its being covered, the Consultant or Owner may request to see such Work and it shall be uncovered by the Contractor. If such Work is in full and strict accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in full and strict accordance with the Contract Documents, correction shall be at the Contractor's sole expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

12.2 CORRECTION OF WORK

12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

12.2.1.1 The Contractor shall promptly correct Work rejected by the Consultant or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Consultant's services and expenses made necessary thereby, shall be at the Contractor's expense. If prior to Substantial Completion the contractor or any Subcontractors or anyone they are responsible for uses or damages any portion of the Work, they shall return it to “like new” condition without any increase in the Contract Time or Sum.

12.2.2 AFTER SUBSTANTIAL COMPLETION

12.2.2.1 In addition to the Contractor's obligations under Paragraph 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly (but in no event later than seven days) after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a full and final written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work promptly during that period after receipt of notice from the Owner or Consultant, the Owner may correct it in accordance with Paragraph 2.4.

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

12.2.2.3 The one-year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Paragraph 12.2.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 The Contractor shall bear the sole cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.5 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 ACCEPTANCE OF NONCONFORMING WORK

12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the State of Oregon.

13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents.

13.2.2 The Owner may, without consent of the Contractor, assign the Contract to any person or entity. In such event, they shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

13.3 WRITTEN NOTICE

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice. Notice by e-mail or facsimile shall not constitute written notice unless the Owner shall otherwise agree.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise

imposed or available by law.

13.4.2 No action or failure to act by the Owner, Consultant or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall timely make all arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. Except as otherwise provided herein, the cost of private-independent tests by third-parties to this Agreement shall be at Owner's expense. The Contractor shall give the Consultant and Owner timely notice of when and where tests and inspections are to be made so that the Consultant and Owner may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2 If the Consultant, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Consultant may, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Consultant and Owner of when and where tests and inspections are to be made so that the Consultant and Owner may be present for such procedures. Such costs, except as provided in Subparagraph 13.5.3, or otherwise in the Contract Documents shall be at the Owner's expense.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Consultant's and Owner's services and expenses shall be at the Contractor's sole cost and expense.

13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Consultant.

13.5.5 If the Consultant is to observe tests, inspections or approvals required by the Contract Documents, the Consultant will do so reasonably and, where practicable, at the normal place of testing.

13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.6 INTEREST

13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

13.7.1 As between the Owner and Contractor any applicable statute of limitations shall accrue as provided by law in all events before substantial completion, between substantial completion and final certificate for

payment, after final certificate for payment and otherwise.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or any Subcontractors, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped:

.2 an act of government, such as a declaration of national emergency which requires all Work to be stopped; or

.3 because the Consultant has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents following 30 prior written notice to the Owner.

14.1.2 If one of the reasons described in Subparagraph 14.1.1 exists, the Contractor may, upon seven days' written notice to the Owner and Consultant, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including agreed reasonable overhead and profit.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 The Owner may terminate the Contract if the Contractor:

.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

14.2.2 When any of the above reasons exist, the Owner, upon certification by the Consultant that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor (but not the construction equipment owned, operated and used by Subcontractors in the performance of their Work);

.2 accept assignment of subcontracts pursuant to Paragraph 5.4; and

.3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

14.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Consultant's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Consultant, upon application, and this obligation for payment shall survive termination of the Contract. Contractor hereby fully, finally and unconditionally waives any and all other claims, including but not limited to those for lost or anticipated profits or overhead.

14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Subparagraph 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination as provided in 14.4.4,

14.4.4. Upon on such termination Contractor shall recover as its sole remedy payment for Work properly and timely performed and installed prior to the effective date of the termination and for items properly and timely fabricated off the site and delivered and stored in accordance with the Owner's instructions prior to the effective date of termination. Contractor hereby fully, finally and unconditionally waives any and all other claims, including but not limited to those for lost or anticipated profits, or overhead. Owner shall be credited for payments previously made and claims the Owner has.

END SECTION

PAYMENT BOND

Bond No. _____

The undersigned, _____ as Principal and _____ as Surety, a corporation organized and existing under the laws of the state of _____, are held and bound unto EAGLE POINT SCHOOL DISTRICT 9 and its heirs, executers, administrators, and assigns as Obligee, for the use and benefit of all persons or entities that provide labor, materials, equipment or supplies for use under the Contract described below, in the penal sum of_____ Dollars ($_____), lawful money of the United States of America, for the payment of which Principal and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS Principal has entered into a Construction Contract ("Contract") dated _____, 2023 with Obligee for the TABLE ROCK ELEMENTARY SCHOOL PROJECT ("Project"), which Contract is made a part hereof as if fully incorporated herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if Principal shall promptly make payment to all persons or entities that provide labor, material, equipment or supplies for use under said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect. In the event that Principal shall be, and declared by Obligee to be in default under the Contract, the Surety, at the request of the Obligee, shall promptly remedy the default in a manner acceptable to the Owner.

In any event, this obligation shall remain in full force and effect for the applicable period of limitations or repose, whichever is longer.

Surety acknowledges that Obligee does not owe any duty to Surety to advise, notify or consult with Surety on any matters relating to the Principal or the Project, including, but not limited to, Principal's payments to Architect, Subcontractors or Principal's use of Project funds.

Principal and Surety hereby jointly and severally agree that any person or entity that provides labor, material, equipment or supplies for use under said Contract and has not been paid in full, and any other party entitled to make claim on the bond under ORS 279C, if notice is given within the applicable time period set forth in ORS 279C.605 may sue on this bond for the use of such person or entity, prosecute the suit to final judgment for such sums as may be justly due and owing claimant and have execution thereon. Obligee shall not be liable for the payment of any damages, costs or expenses (including attorney fees) awarded in any such suit.

No prepayment or delay in payment and no change, extension, assignment, addition or alteration of any provision of said Contract and no forbearance on the part of Obligee shall operate to relieve Surety from liability on this bond, and Surety hereby consents to any such changes, extensions, additions and alterations without further notice to or consent by Surety.

In the event arbitration, litigation or any other proceeding is brought upon this bond by Obligee and judgment or award is entered in Obligee's favor, Surety shall pay all of Obligee's costs incurred in such arbitration, litigation or other proceeding, including any attorney and expert witness fees.

Nonpayment of the bond premium will not invalidate this bond, nor shall any Obligee be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

Executed this _____ day of _____, 2023.

_____
PRINCIPAL

_____
Title

_____
Address

_____
SURETY

_____
Title

_____
Address

COUNTERSIGNED:

_____
Resident Agent

_____
Address

PERFORMANCE BOND

Bond No. _____

The undersigned, _____ as Principal and _____ as Surety, a corporation organized and existing under the laws of the state of _____, are held and bound unto EAGLE POINT SCHOOL DISTRICT 9 and its heirs, executers, administrators, and assigns as Obligee, in the penal sum of _____ Dollars ($_____), lawful money of the United States of America, for the payment of which Principal and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS Principal has entered into a Construction Contract ("Contract") dated _____, 2023 with Obligee for TABLE ROCK ELEMENTARY SCHOOL PROJECT ("Project"), which Contract is made a part hereof as if fully incorporated herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if Principal shall faithfully, punctually and completely perform and abide with the covenants, terms, conditions and provisions of said Contract and any extensions thereof in all respects and within the time prescribed therein, including, but not limited to, the terms of any warranty and guarantee required under the said Contract; shall pay all laborers, mechanics, subcontractors, material and equipment suppliers and all persons supplying to Principal or its subcontractors and suppliers at any tier labor, materials, supplies or equipment for the prosecution of the work or any part thereof; shall fully defend, indemnify and hold Obligee harmless from all cost and damage that Obligee may suffer by reason of Principal's failure to do so; and shall in all respects perform said Contract according to applicable law, then this obligation shall be null and void; otherwise, it shall remain in full force and effect. In the event that Principal shall be, and declared by Obligee to be in default under the Contract, the Surety, at the request of the Obligee, shall promptly remedy the default in a manner acceptable to the Owner.

In any event, this obligation shall remain in full force and effect for the applicable period of limitations or repose, whichever is longer.

Surety acknowledges that Obligee does not owe any duty to Surety to advise, notify or consult with Surety on any matters relating to the Principal or the Project, including, but not limited to, Principal's payments to Subcontractors or Contractor's use of Project funds.

No prepayment or delay in payment and no change, extension, assignment, addition or alteration of any provision of said Contract and no forbearance on the part of Obligee shall operate to relieve Surety from liability on this bond, and Surety hereby consents to any such changes, extensions, additions and alterations without further notice to or consent by Surety.

In the event arbitration, litigation or any other proceeding is brought upon this bond by Obligee and judgment or award is entered in Obligee's favor, Surety shall pay all of Obligee's costs incurred in such arbitration, litigation, or other proceeding, including any attorney and expert witness fees.

In the event there is an arbitration clause in said Contract, Surety agrees to participate in and to be bound by any such arbitration to the same extent Principal is bound.

Nonpayment of the bond premium will not invalidate this bond, nor shall any Obligee be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

Executed this _____ day of _____, 2023.

_____
PRINCIPAL

_____
Title

_____
Address

_____
SURETY

_____
Title

_____
Address

COUNTERSIGNED:

_____
Resident Agent

_____
Address

PART 1 GENERAL

1.01 MINIMUM WAGE RATES

A. The minimum wage rates to be paid all crafts and labor on this contract shall be the prevailing wage for the individual crafts involved in the Jackson County area during the life of the contract and as determined by the Commissioner of the Oregon Bureau of Labor and Industries, or in the case of a Federal-Aid project, the wage determination decision of the Federal Secretary of Labor, along with conformance to ORS 279C, as may be applicable to the supplying of the services and/or materials called for in the bid.

B. Every contractor and subcontractor shall pay workers not less than the specified minimum hourly rate of wage for each trade or occupation in each locality. When a public works project is subject to Davis-Bacon Act (40 U.S.C. 3141 et seq) that would otherwise be subject to state prevailing wages, if the state prevailing rate of wage is higher than the federal prevailing rate of wage, the contractor and every subcontractor on the project shall pay at least the state prevailing rate of wage.

C. Each worker in each trade or occupation employed in the performance of the contract either by the contractor, subcontractor or other person doing or contracting to do or contracting for the whole or any part of the work on the contract, must be paid not less than the applicable state prevailing rate of wage in accordance with ORS 279C.383 and 279C.840, or the applicable federal prevailing rate of wage, whichever is higher.

1.02 GENERAL REQUIREMENTS

A. If a dispute arises as to what the prevailing wage rate for any class of worker is, and if the dispute cannot be settled by the parties involved, it may be referred to the Commission of the Bureau of Labor and Industries, State of Oregon, for final determination. The Wage Rates are minimum rates only and the Owner will not consider any claims or additional compensation because of payment made by Contractor or a Sub-Contractor of any wage rate in excess of the prevailing rate.

B. Prevailing Wage Rates:

1. Pursuant to ORS Ch. 279C.800 - 279C.870, "Prevailing Wage Rates for Public Works Contracts in Oregon," effective January 5, 2023, and amendments, if any, are bound hereinafter and are included as a part of this Specification.

C. Other requirements related to Prevailing Wage are listed in Section 00 5000 – Agreement for Stipulated Sum.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

ARTICLE 11 - INSURANCE AND BONDS

Revise 11.1.2: Add the following:

The insurance required by 11.1.1 shall be written for not less than the following limits, or greater if required by law and underwritten by an insurance company rated A or A+ by A.M. Best & Co. and approved of by the Fire District.

1. **Workers' Compensation:** Statutory

2. **Comprehensive General Liability** (**including Premises-Operations:** Independent Contractor's Protective; Products and Completed Operations; Explosion, Underground & Collapse; Broad-Form Property Damage, Blanket Contractual Liability, Personal Injury with Employment Exclusion Deleted):

   (a) Bodily Injury
   $2,000,000 Each Occurrence
   $4,000,000 Annual Aggregate

   (b) Property Damage
   $2,000,000 Each Occurrence
   $4,000,000 Annual Aggregate

   (c) Products and Completed Operations to be maintained for two (2) years after final payment.

   (d) Property Damage Liability Insurance shall provide X, C and U coverages.

3. **Comprehensive Automobile Liability:**

   (a) Bodily Injury
   $1,000,000 Each Person
   $1,000,000 Each Occurrence

   (b) Property Damage
   $1,000,000 Each Occurrence

4. The Owner shall be named as the Certificate Holder.

5. In addition, furnish true umbrella coverage, which provides excess limits over the primary layer and broader scope, in an amount not less than $2,000,000.

6. Insurance shall be written by a firm licensed to do business in the State of Oregon and as approved by the Owner. The Owner's specification or approval of this insurance or of its amount shall not relieve or decrease the liability of the Contractor under the Contract Documents or otherwise.

11.1.3: Add the following:

The Contractor shall furnish one copy of the General Liability and Automobile Liability policy. The policies shall name the Eagle Point School District 9 and its members, partners, officers, directors, agents, and employees, and the successors in interest of the foregoing, as Certificate Holder, using ISO additional insureds endorsement CG 20 10 11 85 or a substitute providing equivalent coverages within ten (10) days after the Owner issues a "Notice of Intent to Award Contract". The Contractor shall furnish to the Owner copies of any subsequently issued endorsements amending, modifying, altering or restricting coverage or limits.

END OF SECTION

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Table Rock Elementary School

B. Owner's Name: Eagle Point School District 9

C. Architect/Consultant's Name: arkitek:design+architecture

D. The Project consists of site work, utility connections, sidewalks, construction of a covered pavilion, and finishes in factory-built building.

1.02 CONTRACT DESCRIPTION

1.03 WORK BY OWNER

A. Items noted OFOI (Owner-Furnished, Owner-Installed) will be supplied and installed by Owner before Substantial Completion. Some items include:

B. Items noted OFCI (Owner-Furnished, Contractor-Installed) will be supplied by the Owner for installation by Contractor before Substantial Completion. Some items include:

C. Items noted OFOICC (Owner Furnished, Owner Install, Contractor Coordinated) will be supplied by the Owner, installed by the Owner's contractor, but the responsibility of the Contractor to coordinate installation before Substantial Completion.

1.04 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Except as otherwise stipulated herein, Contractors will have complete use of the Premises within the boundaries of the project as shown on the Drawings for the execution of the Work.

B. The possession, use, or distribution of illicit drugs and alcohol on the Owner's premises is prohibited. Prescription medications brought to the project site shall be in the original container bearing the name of the drug, the name of the physician and the prescribed dosage.

C. TOBACCO FREE INSTITUTION: All bidders shall comply with OAR 581.021.0110 and ORS 326.051 regarding Tobacco Use on District Building and Grounds. For the purpose of this rule "tobacco" is defined to include any lit or unlit cigarette, cigar, pipe, bidi, clove cigarette, vapor cigarette or E cigarette, and any other smoking product, and spit tobacco, also known as smokeless, dip, chew, and snuff, in any form. No employee, sub-contractor, material supplier, or project visitor is permitted to smoke, inhale, dip, or chew or sell tobacco at any time, including non-business hours.

D. Tools and building materials shall never be left out when an unsecured work area is vacated.

E. Ladders and scaffolding will be taken down when an unsecured work area is vacated.

F. Open holes and other tripping hazards shall be fenced or barricaded when an unsecured work area is vacated.

G. "Secured Work Area" is defined as an area having a perimeter cyclone fence at least 6 feet in height, with gates which close and lock so that no casual entrance is possible by unauthorized personnel.

H. Operations resulting in vapors, emissions or flying objects shall be conducted in such a way as to prevent exposure to any unprotected parties or property.

1.06 WORK SEQUENCE

1.07 DUST PROTECTION AND SAFETY BARRIERS

A. The Contractor shall erect temporary Dust and Safety Barriers around all of the Construction Operations to keep dust and debris within the localized work area, and to protect the owner, staff, and the public from construction activities. Additional requirements may be required if airborne dust is judged by the Owner to be a problem.

B. The Contractor shall take precautions to protect existing smoke detectors from damage or deterioration from dust caused by work of this contract.

1.08 OVERTIME WORK

A. The Contractor shall notify the Owner in writing, at least 48 hours in advance of any overtime work, including nights, weekends, and holidays. Do no overtime work without Owner's prior approval.

B. The Contractor shall reimburse the Architect and Owner for any expenses incurred by them because of Contractor's overtime work.

1.09 WORK IN PUBLIC RIGHT-OF-WAY

A. The Contractor shall obtain any required Permits, pay Permit Fees, arrange for inspections by Regulatory Agencies, and comply with governing Regulatory Agency requirements.

1.10 PROTECTING EXISTING UTILITIES

A. Original Building Drawings and Site Survey Drawings indicate approximate location of any known, concealed Utility Lines. Before starting work, Contractor shall determine exact location of any of these Lines that could be damaged by Contract Work.

B. Contractor shall assume that other unknown Utility Lines do exist, and Contractor shall proceed with caution when working in areas that could conceal unknown Utilities.

C. If such Utility Lines are encountered, immediately request disposition instructions from Architect.

D. If Utility Lines are damaged; remove, repair, or replace Lines as directed. Additional compensation and/or extension of time, if any, caused by removing, repairing, or replacing Lines will be determined in accordance with General Conditions.

1.11 PROTECTING EXISTING LANDSCAPING & TREES

A. Protect existing Trees, not designated for removal, against damage caused by work of this contract.

B. Provide necessary Fencing and Barricades. Erect prior to Work, and unless otherwise instructed, remove after Work completion.

C. Prohibit Earth stockpiling, Material storage, and Vehicle Parking and Traffic within Drip-line of Trees.

D. Prohibit dumping of Refuse, Chemicals, and other Materials and puddling or running Water which may injure Plant growth including Root systems.

E. Prohibit Foot and Vehicle Traffic which may compact Soil over Root Systems.

F. Prohibit any unnecessary cutting, breaking and skinning of Branches and Roots, and prohibit skinning and bruising of Bark. All tree pruning activities shall be conducted by a certified arborist.

G. Prohibit all cutting, breaking, and skinning of branches and roots, and skinning or bruising of bark of any trees within the street Right of Way. Consult with a certified arborist and the Authority havign jurisdiction prior to starting and construction activities that may threaten to damage street trees.

H. Prohibit Fires, High-heat and Smoke adjacent to Trees.

I. Repair or replace with plants of equal size, any material damaged by Construction Operations.

J. Where damaged Trees cannot realistically be repaired or replaced, pay Owner, as Liquidated Damage, value of Trees as determined by Council of Tree & Landscape Appraisers and as distributed by International Society of Arborculture. Copies can be obtained from Society at Box 71, Urbana, IL 61801.

1.12 PROTECTING EXISTING SUBGRADE

A. Contractor shall protect against damage, existing Subgrade and Earthwork provided under this Contract.

B. Where necessary to accomplish required protection, provide additional Temporary Fill or other approved Cover over Work to be protected.

1.13 PROTECT EXISTING STRUCTURES

A. Contractor shall protect against damage, existing building parts not scheduled for repair or remodel under this contract.

B. Where necessary to accomplish required protection, provide additional Temporary barricades, cushioning, or other approved Cover over material to be protected.

1.14 HAZARDOUS MATERIALS

A. Building Materials Containing Asbestos and Lead have been found in this building in the past. The Owner has previously removed or encapsulated most of the asbestos. By this notice, the Contractor and the Sub-contractors, and their workers, are asked to be aware of the possible presence of Asbestos Bearing Materials, lead and other hazardous materials and if found, or even suspected, to immediately stop work in the area, and notify the Architect and the Owners Project Mnager of the location and condition. A separate independent contract will be issued by the Owner to have the suspected material tested and if needed removed or encapsulated.

B. The Contractor and Sub-contractors, and their workers shall be extremely careful when working around any asbestos or encapsulated asbestos materials, and take any necessary precautions to

avoid disturbing the asbestos or the encapsulation materials. If the asbestos or the encapsulation is disturbed, immediately stop work in the area, and notify the Engineer and the Owners Facility Manager of the location and condition.

1.15 CRIMINAL HISTORY CHECK / PHOTO ID

A. The names of all Contractor and all Subcontractor employees who will be on the job site for more than one day must be submitted to the District. These employees shall fill out a criminal history form provided by the District. Criminal history checks will be run through the Oregon State Police as provided for in ORS 326.603. The District shall bear the cost of processing such Criminal history checks.

1. Through the signature on the criminal history form, authorization is also given to HMKCO and its representative to investigate this information. Further, with this signature, consent is given to all governmental agencies, public or private companies and individuals to release information regarding the individual to the HMKCO and to their representative. The District shall bear the cost of processing such Criminal history checks.

B. In accordance with ORS 326.603(8) the District is required to terminate the employment or contract status of any individual who refuses to consent to a criminal history check of to be fingerprinted or falsely swears to the non-conviction of any crime.

C. In accordance with ORS 326.603(7)(a) no individual found to have been convicted of any crime listed in ORS 342.143 or of an attempt to commit one of the listed crimes shall be allowed to work on any District site.

1. It is vital that employees are instructed to accurately complete criminal history forms. Crimes listed in ORS 342.143 which automatically bar an individual from employment with or contracting with the District are primarily crimes of violence, crimes against children, and sex related crimes. However, falsely swearing that you have not been convicted of a crime obligates the District to terminate employment or contract status even if the crime is not listed in ORS 342.143.

D. All employees working on site shall wear a Name and Photo Identification Badge. The Contractor shall provide all Photo ID badges. Badges shall state Eagle Point School District 9, name of the project, employee name, and company they represent.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

F. Schedule of Values.

G. Payments for products stored off site.

1.02 RELATED REQUIREMENTS

A. Document 00 5000 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.

B. Document 00 6000 - General Conditions and Document 00 8000 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.

C. Section 00 7343 - Prevailing Wage Rates.

1.03 SUBMITTALS

A. Submit a preliminary draft to the Consultant 3 weeks prior to the submittal for the first Application. The purpose preliminary draft is to confirm the level of detail required by the Design Team. The Contractor is to make adjusted requested by the Consultant. The level of detail may include values as separate lines (entities) for each Specification Section. The Consultant will not review any Application submitted until changes requested by the Consultant to the preliminary draft have been incorporated.

1.04 SCHEDULE OF VALUES

A. Form to be used: AIA G703 or equivalent.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Consultant for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1. The purpose of the preliminary draft is to confirm the level of detail required by the Design Team, and the Contractor is to make adjustments as requested. The Consultant will not review any Application submitted until changes requested by the Consultant to the preliminary draft have been incorporated.

E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify the following.

1. Each major Work Item.

2. Each subcontracted Work Item. For each major Subcontract (i.e. mechanical, electrical and plumbing), list products and operations of that Subcontract as separate line items. List labor and materials seperately for each major subcontractor.

3. Any Products to be stored, for which separate payments will be requested.

F. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

G. Revise schedule to list approved Change Orders, with each Application For Payment.

H. Round off values to nearest dollar.

I. Sum of values listed shall equal total Contract Sum.

J. Substantiating Data: When requested by Consultant, submit justifying Substantiating Data and Line Item Amounts in question.

1.05 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Monthly.

B. Form to be used: AIA G702 and G703.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Consultant for approval.

D. Forms filled out by hand will not be accepted.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work. Include individual line items for change orders involving multiple items.

H. Submit one digital copy in PDF format of each Application for Payment.

I. Include the following with the application:

1. Construction progress schedule, revised and current as specified in Section 01 3216.

2. Payment for materials and equipment stored off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner.

J. When Consultant requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

K. Submit Applications for Payment to Consultant at times stipulated below.

L. When Consultant finds Application properly completed and correct, Consultant will transmit 3 copies of Certificate for Payment to Owner for approval of payment, with one copy to Contractor, and one retained for files.

1.06 ALTERNATE CONSTRUCTION PAYMENT MANAGEMENT SYSTEMS:

A. Nothing contained herein would prohibit the Contractor from proposing the use of a Construction Payment Management System that substantially complies with the requirements of this section. The contractor shall pay all additional fees associated with the Owner and Consultant's use of this system.

1.07 PAYMENT FOR PRODUCTS STORED OFF THE PROJECT SITE

A. When delay or added cost to Owner can be avoided by storing Products off Site, Owner will make payment to Contractor for said Products provided that

B. Contractor shall:

1. Locate Storage Facilities within 20 miles of the Consultant's Office or the Project Site.

2. Make Storage Facilities available for Consultant's visual inspection.

3. Segregate and label Stored Products for specified Project.

4. Assume all risk for loss.

5. Assume responsibility for exceeding Product "Shelf-Life".

6. Protect Stored Products and provide applicable Insurance against their damage, discoloration, and theft, listing the Owner and any Mortgagee as Additional Named Insured.

7. Submit itemized Inventory and Schedule of Values for Stored Products together with Certificate of Insurance.

8. Submit payment requests to Owner as part of Contractor's regular Progress Payment Request. Payment requests can only be for the actual invoiced amount to the contractor or sub-contractor by their respective material supplier. Provide copies of invoice to justify amount requested.

9. Reimburse Owner for damages sustained if Stored Products are not delivered to Jobsite when needed.

10. Submit to Owner, with copy to Consultant, a written Waiver of Lien insuring Owner against claims for unpaid Storage Costs.

11. Upon receipt of payment from Owner, prepare and issue to Owner, with a copy for Consultant, and any Mortgagee, a Bill of Sale for Stored Products.

1.08 PREVAILING WAGE PAYMENT CERTIFICATION

A. Submit Prevailing Wage Payment Certification Forms as required by Section 00 7343.

1.09 APPLICATION PAYMENT SCHEDULE

A. Within 15 Days, following Owner's approval of payment of in-order Application for Payment, the Owner will:

1. Until Substantial Completion, pay Ninety-Five Percent (95%) as defined in General Conditions during the previous month, as estimated by Consultant.

B. After execution of Certificate of Substantial Completion, and within 15 days, following Owner's approval of payment of the next in-order Application for Payment, the Owner will pay:

1. Balance due under Contract, excluding a Retainage Amount of at least $1,000, or double the estimated value of uncompleted and/or unacceptable portions of Work, whichever is the greater amount.

C. Thirty (30) days after final inspection and acceptance by Owner, and within 15 days following Owner's approval of payment of final in-order Application for Payment, the Owner will pay:

1. Balance due under Contract, provided Work be then fully completed and Contract be then fully performed.

1.10 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.

B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Consultant will issue instructions directly to Contractor.

C. For other required changes, Consultant will issue a Construction Change Directive document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.

1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.

2. Promptly execute the change.

D. For changes for which advance pricing is desired, Consultant will issue a Proposal Request document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 7 calendar days.

E. Contractor may propose a change by submitting a request for change to Consultant, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

1. For change requested by Consultant for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.

2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Consultant.

3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.

4. For change ordered by Consultant without a quotation from Contractor, the amount will be determined by Consultant based on the Contractor's substantiation of costs as specified for Time and Material work.

G. Substantiation of Costs: Provide full information required for evaluation.

1. On request, provide the following data:

a. Quantities of products, labor, and equipment.

b. Taxes, insurance, and bonds.

c. Overhead and profit.

d. Justification for any change in Contract Time.

e. Credit for deletions from Contract, similarly documented.

2. Support each claim for additional costs with additional information:

a. Origin and date of claim.

b. Dates and times work was performed, and by whom.

c. Time records and wage rates paid.

d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

H. Execution of Change Orders: Consultant will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.11 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Submittals for review, information, and project closeout.

D. Number of copies of submittals.

E. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 00 6000 - General Conditions.

B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.

C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

D. Section 01 7800 - Closeout Submittals: Project record documents.

1.03 CONSTRUCTION ORGANIZATION & START-UP

A. Responsible Parties:

1. Immediately following Contract execution, Owner will and Contractor shall identify who, within their respective organizations, will be responsible for Project Coordination.

B. The Contractor shall establish on-site Lines of Authority and Communications including the following:

1. Schedule attendance at Preconstruction Meeting and schedule and conduct Progress Meetings as specified in Section 01 3000.

2. Establish procedures for Intra-project Communications including:

a. Submittals.

b. Reports & Records.

c. Recommendations.

d. Coordination Drawings.

e. Schedules.

f. Resolution of Conflicts.

3. Technical Documents Interpretation:

   a. Consult with Consultant to obtain interpretation.

   b. Assist in resolution of questions or conflicts which may arise.

   c. Transmit written interpretations to Subcontractors and to other concerned parties.

4. Permits & Approvals:

   a. Verify that Subcontractors have obtained required Permits and Inspections for Work and for Temporary Facilities.

5. Control use of Site:

   a. Supervise Field Engineering and Project Layout.

   b. Allocate Field Office Space and Work and Storage Areas for use of each Subcontractor.

1.04 COORDINATING SUBCONTRACTORS' WORK

A. Coordinate the Work of all Subcontractors and make certain that, where the Work of one Trade is dependent upon the Work of another Trade, the Work first installed is properly placed, installed, aligned, and finished as specified or required to properly receive subsequent Materials applied or attached thereto.

B. Direct Subcontractors to correct defects in Substrates they install when Subcontractors of subsequent Materials have a reasonable and justifiable objection to such surfaces.

C. Do not force Subcontractors to apply or install Products to improperly placed or improperly finished Substrates that would result in an unsatisfactory or unacceptable finished Product.

1.05 COORDINATING WORK WITH WORK OF OWNER OR OTHER CONTRACTS

A. Coordinate, and make certain that, where Work of either party is dependent upon the other party, the Work first performed is properly placed, installed, aligned, and finished as required to permit the proper installation of the Work following.

B. If the Owner's Work in any way interferes with the Contractor's Work, so notify the Owner sufficiently in advance so that the Owner has reasonable time to make necessary adjustments.

C. If the Contractor's Work in any way interferes with Owner's Work, so notify the Owner as soon as possible. If the Contractor's Work must be modified to accommodate the Owner's Work, except as described elsewhere in this Specification, the Contract Sum and/or the Contract Time will, when necessary be adjusted by a Change Order.

D. Mechanical & Electrical Equipment start-up:

   1. Coordinate check-out of Utilities, Operational Systems, and Equipment.

2. Assist in initial start-up and testing.

3. Record starting dates of Systems and Equipment operation.

E. At completion of Work of each Subcontract, conduct inspection to assure that:

1. Work is acceptable.

2. Specified cleaning has been accomplished, and Temporary Facilities and Debris has been removed from Site.

F. Substantial Completion: See Section 002113 1.13

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Award.

B. Attendance Required:

1. Owner.

2. Consultant.

3. Contractor.

4. Contractor's Superintendent.

5. Major Subcontractors.

C. Agenda:

1. Introductions.

2. Execution of Owner- Contractor Agreement.

3. Submission of executed bonds, insurance certificates and background checks.

4. Description of Project

5. Distribution of Contract Documents.

6. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.

7. Designation of personnel representing the parties to Contract, Owner and Consultant.

8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

a. Written Change Order requests required

b. Supporting back-up will be required for all Change Orders

c. Describe Contractor's procedure for review and oversight in the preparation of Change Orders

d. Mark-up limitations on Change Orders (See General Conditions Article 7.1.4)

e. Processing time required

f. Applications for Payment

1) Use AIA documents G702 and G703 latest edition

2) Provide 4 signed and notarized copies

3) Wage certifications to be attached

9. Scheduling, start date and date of substantial completion.

10. Building permit status.

11. Prevailing wage requirements.

12. Public Agency submittal of RESPONSIBILITY DETERMINATION FORM to Construction Contractor's Board.

13. Communications.

14. Role of Owner's Project Manager.

15. Employee Security Screening and Identification Badging.

16. Submittals required per Contract Documents.

17. MSDS Information

18. Erosion control procedures

19. Waste management procedures

20. Environmental quality requirements

21. Hazardous materials

22. Construction activities, working hours, use of site and building.

23. Staging and parking areas.

24. Temporary facilities and utilities.

25. Request for information and clarification of design

26. Correction of Defects.

27. Weekly on-site progress meetings.

28. Safety and Emergency Procedures.

29. Verify that Contractor's Mandatory Drug Testing Program is in place.

30. Daily Clean-up

31. Project Closeout, substantial completion, final completion.

32. Record drawings and Operations and Maintenance Manuals

33. Tour of Project by Owner's staff and guests (if applicable)

34. Additional Comments

D. Consultant will record minutes and distribute copies within [five] days after meeting to participants, with digital copies to Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:

1. Contractor.

2. Owner.

3. Consultant.

4. Contractor's Superintendent.

5. Major Subcontractors.

D. Agenda:

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identification of problems that impede, or will impede, planned progress.

5. Review of submittals schedule and status of submittals.

6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule.

8. Corrective measures to regain projected schedules.

9. Planned progress during succeeding work period.

10. Coordination of projected progress.

11. Maintenance of quality and work standards.

12. Effect of proposed changes on progress schedule and coordination.

13. Other business relating to Work.

E. The Owner's Project Manager will record minutes and distribute copies within five days after meeting to participants, with digital copies to Contractor, Owner, participants, and those affected by decisions made.

3.03 PRE-INSTALLATION CONFERENCES

A. When required in individual specification sections, the Contractor shall convene a pre-installation meeting prior to commencing work of that section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Consultant minimum four days in advance of meeting date.

D. The Contractor shall be responsible to prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.

2. Review coordination with related work.

E. The Contractor shall be responsible to record minutes and distribute copies within four days after meeting to participants, with copies to Consultant, Owner's Project Manager, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

1. Product data.

2. Shop drawings.

3. Samples for selection.

4. Samples for verification.

5. Other information required in individual specification sections.

B. Submit to Consultant for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Product Data:

1. Clearly mark each copy to identify pertinent Products.

2. Show performance characteristics and capacities.

3. Show dimensions, field dimensions, and required clearances.

4. Show wiring and piping diagrams, and controls.

5. Show standard schematic drawings and diagrams:

a. Modify to delete information not applicable to Work.

b. Supplement standard information to provide information specifically applicable to Work.

c. Assure that any photo copied material is clearly legible or provide all original material.

D. Samples will be reviewed only for aesthetic, color, or finish selection.

E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

1. Design data.

2. Certificates.

3. Test reports.

4. Inspection reports.

5. Manufacturer's instructions.

6. Manufacturer's field reports.

7. Other information required in individual specification sections.

8. Other types indicated.

B. Submit for Consultant's knowledge as contract administrator or for Owner. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:

1. Project record documents.

2. Operation and maintenance data.

3. Warranties.

4. Bonds.

5. Other information required in individual specification sections.

6. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; two of which will be retained by Consultant.

1. After review, produce duplicates.

2. Retained samples will not be returned to Contractor unless specifically so stated.

3. Show full range of color, texture & pattern.

3.09 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.

2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Transmit each submittal with a transmittal form that clearly describes submittal contents and the quantity of items delivered.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

G. Deliver submittals to Consultant at business address.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Notify Consultant in writing, at submission time, of any deviations in Submittals from Contract Document requirements.

L. Provide space for Contractor and Consultant review stamps.

M. When revised for resubmission, identify all changes made since previous submission.

N. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

O. Submittals not requested will not be recognized or processed.

P. Submit Shop Drawings, Product Data, and Samples only for those Items specifically required. The Consultant will not be obligated to review Shop Drawings, Product Data, or Samples other than those required by the Contract Documents.

Q. Perform no Work or Fabrication requiring Submittal until Consultant approves Submittal.

END OF SECTION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Related Requirements

B. General Requirements

C. Definition of Schedule Documents and Submittal Requirements

D. Contractor's Schedule Management

E. Coordination

F. Schedule Format Requirements

G. Weather Impacts and Delays

H. Schedule Updates and Schedule (Network) Revisions

I. Time Impact Analysis for Changed Conditions

J. Recovery Schedule

K. Timeliness of Schedule Document Submittals

L. Owner Review of Schedule Submittals

1.02 RELATED REQUIREMENTS

A. The General Provisions, and General Requirements of the Specifications apply to the work specified in this Section.

B. Section 00 0120 – Bidder-Designed Items and Deferred Submittals

C. Section 01 6300 – Approval For Substitution and Product Options

1.03 GENERAL REQUIREMENTS

A. The Schedules (and schedule documents) described herein are for the following purposes:

1. To define the Contractor's Baseline Plan (including logic and use of resources) for completing the Work

2. To report progress in completion of the Work

3. To evaluate any changes to the Contractor's Baseline Plan and subsequent updated plans

B. In addition, the schedule documents shall serve as a communication tool between the Owner and the Contractor, and the Contractor and its subcontractors. The Owner encourages the Contractor to use the Schedule to establish an understanding with all parties of the assumptions regarding the Work, and the various constraints and opportunities that are possible within the plan. As the work progresses, the Contractor and the Owner's Representative will use the Schedule to assess impacts and to formulate the best methods to complete the Work on, or ahead of the contractual completion dates. The schedule documents will also be used by the Contract Administrator to

evaluate the Contractor's monthly progress payment requests.

C. The Work shall be scheduled and performed pursuant to the provisions of the Contract including any specific dates for Contract completion milestones, phase completion and the like or requirements included in the General Conditions, the Owner-Contractor Agreement, or elsewhere in the Contract documents. All Contract milestone and completion dates listed in these specifications, or elsewhere in the Contract documents, represent only interface dates or major items of the Work. The Contractor is responsible for completion of all aspects of the Work in accordance with the Contract.

D. At any time throughout the course of the Work, the Owner reserves the right to require additional activities to be added to the Schedule to further define the Contractor's plan and intentions regarding the execution of the Work. In each instance, such activities or changes shall be made by the Contractor at no cost or delay to the Owner. The Owner's Representative suggestions would not waive the contractor's right to establish its means and method or its obligation to execute the project in a timely and efficient manner.

E. Should the Contractor desire or intend to complete the Work, or any portion of the Work, earlier than the specified Contract milestone, phase, or similar dates or the overall Contract completion date, the Owner will not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the Work before Contractor's earlier milestone or completion dates. The duties and obligations of Owner to the Contractor shall be consistent with and applicable only to the completion of the Work on the specified Contract milestone dates or the Contract completion dates unless the Owner and the Contractor otherwise agree in writing, formalized by a change order. The Contractor may finish early but shall not make any claims for additional time-related costs before the expiration of the specified Contract milestone, phase, or similar dates or the overall Contract completion date.

F. The services provided by the Owner's Representative, the existence of schedules, networks or any other charts or services prepared or performed by the Owner's Representative, shall in no way relieve the Contractor of the responsibility for complying with all of the requirements of the Contract documents, including, but not limited to, the responsibility for completing the Work within the Contract Time and the responsibility of planning, scheduling, and coordinating the Work.

G. It is understood that during the prosecution of certain aspects of the work, i.e., phasing; commissioning; work with possible impacts to facilities and/or tenant operations; or utility shutdowns, a separate detailed scheduled will be required. The Contractor shall prepare these schedules in a timely manner as required for distribution by the Owner's Representative to all affected parties. The Contractor shall provide these schedules at no additional cost.

H. In addition to requirements specified herein, schedules shall include the following activities specific to Owner:

1. Delivery of Operational and Maintenance Training Manuals.

2. Submittal and expected approval of manufacturer's recommended spare parts list.

3. System inspection and punch list preparation.

I. The Contractor, including his Project Manager and Superintendent shall hold an orientation meeting with Owner, wherein the Contractor presents his approach to planning the work, developing the schedules, and meeting the requirements of this Section. This orientation meeting shall be held prior to submittal of the Baseline Schedule. The Contractor shall not delay preparation of the required schedules and schedule documents prior to this meeting; however, the Contractor shall be responsible for any changes or corrections to his scheduling as a result of this meeting.

1.04 DEFINITION OF SCHEDULE DOCUMENTS AND SUBMITTAL REQUIREMENTS

A. The following outlines the schedules and schedule documents required by this section to be submitted by the Contractor. Details on each item (and all items) to be submitted are provided in further paragraphs in this Section and in referenced sections.

1. Preliminary (4-Month) Schedule: This schedule is to detail all Contractor work, including procurement activities, mobilization, submittals, and construction activities for the first four months following the date of Notice to Proceed, and be used while the Contractor is developing his baseline schedule. All critical or completion dates required in the contract shall be incorporated into this schedule. The following submittal requirements apply to the preliminary schedule:

   a. The Preliminary Schedule shall be submitted in a format and with content acceptable to the Owner's Representative and shall be submitted to the Contract Administrator no later than 10 calendar days after Notice to Proceed.

   b. For purposes of this Preliminary Schedule, the Contractor is to assume that construction activities will occur within 30 calendar days after Notice to Proceed.

   c. Allow five (5) working days for initial review and five (5) working days for resubmittal reviews by the Contract Administrator.

2. Baseline Schedule: This is a detailed schedule including a narrative of schedule status developed using the Critical Path Method (CPM). It represents the Contractor's plan for the Work from the date of award of the Contract and will be used to make the first Progress Schedule.

   a. Submittal requirements: The Baseline Schedule shall be submitted in Primavera P6 format and with content acceptable to the Owner's Representative. The Contractor shall obtain (1) perpetual license of Primavera P6 EPPM for use by the District PM and (1) license for use by the contractor during the contract duration.

   b. Narrative of Schedule Status: This is a narrative that describes the key aspects of the submitted schedules. The Baseline Schedule narrative shall define the key aspects of the Contractor's plan for the Work that includes the following key sections. The narratives submitted with the Baseline Schedules are required to be stand-alone documents that do not require Baseline Schedules to be attached in order to be comprehensible:

      (1) The layout and logic used in the Schedule

      (2) Critical submittals

      (3) Long-lead equipment and material procurement.

      (4) The critical path

      (5) An overall float analysis

      (6) Any interface concerns with Owner

      (7) Costs to date

c. Activities: The schedule shall be grouped by the following work activities:

(1) Mobilization Activities

(2) Procurement Activities

(3) Manufacturing Activities

(4) Quality Control Activities

(5) Installation Activities

(6) Testing Activities

(7) Commissioning Activities

(8) Demobilization Activities

3. Master Summary Schedule: The cost-loaded Master Summary Schedule shall be developed by the Contractor and submitted to the Contract Administrator with the Baseline Schedule and each monthly Progress Schedule.

a. The Master Summary Schedule shall show the sequence in which Contractor proposes to perform the Work, all completion dates and critical dates indicated in the Contract Documents, and the dates on which Contractor plans to start and finish major portions of the Work. The Contractor shall include enough activities in the Master Summary Schedule, so that all significant portions of the Work, critical interfaces, coordination with Owner and milestone and completion dates are addressed.

b. The Summary Schedule shall be cost-loaded, at a high level, to develop a cash flow curve.

4. Critical Path Schedule: This schedule shall show the critical path derived first from the Baseline Schedule and subsequently from the current Progress Schedule. This is a time-scaled network logic diagram, showing only the current critical path of the Work along with its current progress. In the event of near critical path work (less than 10 days of float), the Owner's Representative may request the near critical paths also be shown. The following submittal requirements apply to the Critical Path Schedule:

a. Submittal Requirements:

(1) Submit with Baseline Schedule.

(2) Update and submit with the Progress Schedule.

(3) Export Primavera P6 schedule data to the client in live file format for all submissions.

5. Progress Schedule: This is a detailed schedule, developed using the Critical Path Method (CPM), which is derived from the Baseline Schedule. The first Progress Schedule is the initial monthly progress update of the Baseline Schedule. Subsequent Progress Schedules will be submitted on a monthly basis that updates the previously issued Progress Schedule. The Progress Schedule will also be used to compare percent complete requested by the Contractor in the monthly progress payment applications, to analyze delays and impacts

in all Time Impact Analyses (TIA), and to determine whether a Recovery Schedule is needed from the Contractor.

a. Submittal requirements: Progress schedules are due monthly to coincide with the progress payment requests. The updated progress schedule will be targeted against the approved baseline and will include baseline start, finish, float, and original duration.

b. Narrative of Schedule Status: This is a narrative that describes the key aspects of the submitted schedules. The Progress Schedule narrative shall define the key aspects of the Contractor's plan for the Work that includes the following key sections. The narratives submitted with the Progress Schedules are required to be stand-alone documents that do not require Progress Schedules to be attached in order to be comprehensible:

(1) Progress in Last Period

(2) Critical Path Progress and Concerns

(3) Potential Delays and Time Impact Analyses

(4) Submittal Status (focus on critical submittals and concerns)

(5) Equipment and Material Delivery Status

(6) Quality Control Status

(7) Manufacturing Status

(8) Costs to Date

6. Weekly Short Interval Schedule: This is a three-week Look-Ahead Schedule for use in the weekly schedule review meetings. The weekly interval schedules shall include the current activities from the Progress Schedule and all other schedule information deemed necessary.

a. Submittal requirements:

(1) Provide the schedule in a format acceptable to the Owner's Representative.

(2) Submitted no later than 24 hours before the weekly schedule review meeting.

(3) Distribute the final weekly interval schedule to all field supervision no later than the next workday following the weekly schedule review meeting.

7. Recovery Schedule: This schedule will be required from the Contractor in the event that certain conditions exist such that critical or milestone dates are in jeopardy of being delayed. Recovery Schedule requirements are defined in later paragraphs of this section.

a. Submittal requirements: Submit five (5) working days after notice from the Contract Administrator that a Recovery Schedule is required.

8. Time Impact Analysis: This schedule analysis shall be part of the back-up data required from the Contractor in the event the Contractor claims that Contract changes delayed or impacted the Work and shall be included in any change proposal claiming increase in time. The Time Impact Analysis requirements are defined in later paragraphs of this section.

   a. Submittal requirements: Formal submittal of the Time Impact Analysis shall be within 15 calendar days of occurrence of the delay. Failure to submit within the 15 calendar days waives the Contractor's right to claim additional costs or time as a result of such delay.

9. Schedule of Submittals: Submit per the following table:

Deliverable	Hard Copies	Electronic Copies	Submittal Due	Remarks
Preliminary (Four-Month) Schedule	2 color copies of each sort	1	10 calendar days after the Notice to Proceed	One-time submittal. Submit using same format requirements as the Baseline Schedule
Baseline Schedule	2 color copies of each sort	1	30 calendar days after the Notice to Proceed	Acceptance is prerequisite to issuance of NTP. Critical Path Schedule is integral to Baseline Schedule. **Also, see Note (1).**
Progress Schedule		1	Monthly	Critical Path Schedule is integral to Progress Schedule. **Also, see Note (1).**
Master Summary Schedule		1	With the Baseline Schedule, then Monthly	One-time submittal. Submit with the Baseline Schedule and each Progress Schedule
As-Built Schedule	Include color copy in project O&M	1	Within 30 days of substantial completion	Project schedule shall be considered as-built for work completed and updated with each progress billing. Final document shall be included in O&M
Weekly Look-Ahead Schedule	Sufficient copies for weekly meeting attendees	1	1 Electronic copy 24 hours before weekly schedule review meeting, harmonize with sufficient copies for attendee's color copies presented at OAC Meeting	
Recovery Schedule	2 color copies	1	Within 5 days of notice to submit	
Time Impact Analysis	2 color copies	1	Within 15 days of date of delay claimed	Submit with all changes requesting time extensions

Note (1) Includes Master Summary Schedule, Narrative of Schedule Status, Manpower Loading Curve, and Subcontractor Log.

1.05 CONTRACTOR'S SCHEDULE MANAGEMENT

A. Scheduling Organization: The Contractor shall provide a Contractor's Scheduling Manager (CSM) to the implementation and management of the scheduling requirements of the Contract documents. The CSM (who may be the Contractor's Project Manager, Superintendent, or other qualified staff person) shall be on site at all times during the progress of the work, or as otherwise authorized in writing by the Contract Administrator.

B. Qualifications of Contractor's Scheduling Manager:

1. The CSM shall demonstrate acceptable professional familiarity with P6 software, hardware, and/or other scheduling systems and experience necessary to implement all scheduling requirements of the Contract in a timely and expeditious manner.

2. The Owner's Representative will monitor the performance of the CSM. The CSM's performance will be judged on the timeliness and completeness of Contractor's compliance with the scheduling requirements of the Contract documents. If the CSM fails to perform in accordance with the scheduling requirements of the Contract documents, the CSM shall, at the direction of the Contract Administrator, be replaced at no cost to Owner or delay allowable to the project.

1.06 COORDINATION

A. The Contractor shall coordinate the Work with that of Owner contractors, Owner Operations, and Owner tenants, and shall cooperate fully with the Owner's Representative in maintaining an orderly progress toward completion of the Work as scheduled.

B. A Time Impact Analysis (TIA) shall be required to support any claim by the Contractor for delay caused by failure of Owner-furnished equipment and materials to arrive as scheduled, or failure of other Owner interface work or tenants to meet their schedules. The TIA shall be based on Owner activities having the same level of predecessor and successor logic to display delay impacts as the Contractor's Work.

C. The Contractor shall inform its subcontractors of the delivery status of Owner-furnished equipment and material, and of the progress of other interfacing Owner construction work while the Work is underway.

1.07 SCHEDULE FORMAT REQUIREMENTS

A. Unless otherwise specified, the Baseline and Progress Schedules shall be produced utilizing the Microsoft Windows based Primavera P6 Project Management of the most current version.

B. The Baseline and Progress Schedules shall employ the Critical Path Method (CPM) using retained logic for the planning, scheduling and reporting of the work to be performed under this Contract. The type of schedule shall be Precedence Diagramming Method (PDM).

C. The Baseline and Progress Schedules shall include but not be limited to:

1. All Critical, Milestone, and Completion dates defined in the Contract, as well as Owner-provided equipment delivery dates.

2. Date of Contract Award, Notice To Proceed, Mobilization, Substantial Completion, and Overall Beneficial Occupancy, Completion of each Phase, Pre- final Inspections, Final Inspections, and Final Acceptance.

3. Critical procurement and submittal activities including: shop drawings and sample submittals, Owner review of submittals, re-submittals and Owner review of re-submittals, fabrication and delivery for all key, critical path, near critical path and long-lead equipment and material. Owner reserves the right to require the Contractor to add procurement activities to the schedule for any key or long-lead equipment, materials or submittals it deems necessary to monitor the Contractor's schedule for this work.

4. Quality Control Activities, Testing, Pre-Installation Activities, Commissioning, training and closeout activities.

5. Offsite activities that interface with the Contractor's Work, including work by Owner and Owner contractors, delivery of Owner-furnished materials, utilities, agencies, critical Owner operations, Owner tenants, and other similar activities.

D. Activity Descriptions and Setup

1. The description of work by activity and activity coding shall contain the specific type of work to be done and the physical area of the work to which the activity pertains.

2. Activity boundaries shall be easily measurable, and descriptions shall be clear and concise. Activity descriptions should not be prefaced with "Begin" or "Complete." The beginning and end of each activity shall be readily verifiable, and physical progress shall be quantifiable.

3. In general, each critical path and key activity shall be associated with a single performing organization (subcontractor). For other activities, where there is similar type work in an area, organizations (subcontractors) may be grouped for a single activity. Where deemed necessary to define critical, key or unusual work, Owner reserves the right to require additional activities be added to the Contractor's schedule to provide that an activity be associated with each organization (subcontractor). The organization related to the activity shall be identified in a background sort code, such that reports sorted by organization can be made using the scheduling software. Construction Specifications Institute (CSI) codes relating to the division of the work shall be assigned to activities in the same manner described above for organizations. CSI codes are also to be assigned to background sort codes that allow reports by CSI code to be made using the scheduling software.

4. Activity durations over fifteen (15) working days shall be kept to a minimum and shall be used only for non-construction activities, such as shop drawing and sample submittals, fabrication and delivery of materials and equipment, concrete curing, and General Conditions activities. Exceptions to this shall be accepted in writing by the Contract Administrator. The duration of activities shall be in workdays.

5. Activity costs shall be limited to a maximum of Two-Hundred-Fifty-Thousand Dollars ($250,000), excluding major equipment and materials. Exceptions to this shall be accepted in writing by the Contract Administrator.

6. For critical path and near critical path activities, Contractor shall use Finish-to- Start relationships to the extent possible. Contractor shall use more activities if necessary, to use Finish-to-Start relationships in preference to use of Start-to-Start relationships. The Owner reserves the right to require the addition of activities to further define critical path and near critical path work in the Schedule.

7. Activities that constitute the controlling operations or critical path will be identified by use of color (red). The critical path is defined as activities with total float less than one day. Near critical is defined as total float in the range of one to ten days. The critical path and

near critical activities shall be less than 25 percent of the total activities in the Baseline Schedule.

8. Imposed completion dates for events other than the Milestone Dates or Completion Dates are generally not permitted. Artificial constraints (imposed start dates) are generally not permitted, except possibly for use in Owner- furnished materials, Owner interface dates and the like. Upon creating a new project schedule in the software, the option planned start and planned completion dates should be appropriately inserted. This will allow the schedule calculations to identify negative float when projected dates slip past the planned completion date. All Owner-furnished materials and Owner interface dates shall have an early start/finish and late start/finish range. All Owner dates shall be related to the Contractor's Work with predecessor and successor logic such that float is correctly calculated on Owner-furnished materials and Owner interface dates.

9. Activity numbering shall be spaced (or gapped) to allow inclusion of new activities between existing activities while still maintaining a similarity of numbering for like activities. Numbering by area, level, etc. is encouraged to assist in analysis. The numbering may be alphanumeric to allow easier identification of areas, etc. At a minimum, the following code fields should be included:

    a. RESP – Responsibility (Owner, Owner's Representative, Sub Consultants, Jurisdictions, Key Third Parties, Contractors, Sub Contractor and, Vendors)

    b. PHAS – Phases

    c. AREA – Locations

    d. STEP – Steps or Sub AREAs

    e. ITEM – Specification Section Numbers

    f. CONO – Change Order Numbers

10. Activities that have started and are in progress shall be "scheduled" on each submitted schedule. Planned durations for remaining work and planned completions of remaining work on activities shall be used. Activities shall not "ride" the data date line, with scheduled completions being the remaining durations, unless the Contractor actually plans to complete work within the remaining duration. Schedules submitted with activities "riding" the data date line will not be accepted by Owner.

11. The work breakdown and coding structure (WBS) should, at a minimum, incorporate the following:

    a. Milestones/Hammocks

    b. Deferred Approvals (by CSI, including Agency Approvals)

    c. Submittals (by CSI)

    d. Quality Control Activities, Pre-Installation Activities, Commissioning, Designer of Record Observations, Mock-ups

    e. Work

        i. mobilization

ii. Grading/Underground Utilities

iii. Foundations

iv. Structures

v. Exterior Skin and Roof

vi. Interior Construction:

a. By Floor

b. By Major Unique Functional Area

c. Electrical and MEP Equipment

d. Unique Elements

e. Equipment, including OFCI, OFOI and OFOICC

f. Start-Up, Commissioning and Test & Balance (by system and element)

g. Fire and Life-Safety and Systems Pre-Tests (by system and element)

h. Fire and Life-Safety Jurisdictional Tests and Inspections (by system and element)

i. Final Sign Offs by the Design Team and Jurisdictions

E. Schedule Layout and Sequence of Activities

1. The schedule layout shall be consistent with the Project Conditions and milestones set forth in the Contract documents. Work to complete each milestone shall be easily identifiable in the Contractor's overall schedule.

2. The layout shall be consistent with the Work required to meet the Contract milestone dates. In general, it is desired to have the Work needed to meet the Contract milestones be detailed activities that summarize, or roll-up to provide plan and status information reported for the milestone. The summarized overall schedule shall allow reporting of physical progress, cost, and manpower loading for the entire work. Owner intent will be to use the Contractor's schedule for milestones to summarize activities in Owner Master Schedule for all projects.

3. The Schedule layout shall be arranged to allow easy physical progress monitoring of physical areas. Essentially, each level and area within level or area and level within area or the like shall be broken down within the Schedule. These areas and levels shall summarize (or rollup) for reporting purposes. The Contractor shall establish the layout that is needed to meet his Contract responsibilities. The Contractor shall use his selected layout to coordinate with the Contractor's submitted progress payment applications, such that the Schedule, physical progress, the progress payment application and physical progress can be compared to determine the actual progress payments to be made to the Contractor.

4. The calendar is established including agreed working times and holidays. The calendar should not be altered during the project unless the Owner's Representative expressly agrees.

5. Only activity types such "Start Milestone," "Finish Milestone," and "Task" will be allowed with prior authorization by the Owner's Representative. Level of effort (LOE) activities may be used to summarize work as needed to produce summary level schedules for presentation purposes.

6. All activities should have both predecessor and successor logic ties that accurately represent the sequence and interdependence of all related activities except Project Start (which would not have any predecessors) and the last Contract Milestone (which would not have any successors).

7. Negative lags may not be used (there will be no exceptions to this requirement). FS – Finish-to-Start with zero (0) duration logic ties are preferable.

8. SF – Start-to-Finish logic ties are not acceptable.

F. Formats of Schedules Submitted to Owner's Representative

1. The formats of schedules (and schedule documents) shall be submitted to the Owner's Representative are described below. The formats described are solely for reporting information and analysis use with Owner and are not intended to direct the Contractor in his own methods of scheduling. The Contractor may use any schedule format needed for his own use in performing his responsibilities in the Contract.

2. All schedules (and schedule documents) shall be submitted with clear identification of Owner and Contractor's job numbers, schedule names, descriptions, plot dates, data dates, file numbers, issue numbers and the like.

3. All Baseline, Progress and Summary Schedules submitted shall be formatted in a fixed sequence of summary and detail activities for the Contract duration for ease of reference in progress updates. This sequence shall be established by the Contractor and acceptable to the Owner's Representative. The sequence shall be set up in the software such that re-sequencing or reorganizing of the Schedules is not required to generate Owner required schedules and reports. This allows a one to one comparison of each Schedule issued with previous Schedules for analysis purposes, including the As-built Schedule.

4. All Baseline, Progress, and Summary Schedules shall be submitted with the activity description data listed from left to right, as follows: Activity ID, Activity Description, Original Duration, Remaining Duration, Total Float, Percent Complete, Early Start, and Early Finish. The early start and finish dates shall display an "A" after the dates if started (and finished). The Baseline Schedule shall also have the late start and late finish dates to the right of the early finish dates. The Owner reserves the right, at no cost, to require the Contractor to add the late start and late Finish dates to the Progress and Summary Schedules at any time.

5. The status bars on all schedules shall display the physical percent complete of progress. This same physical percent complete shall also be used in the data field. The percent complete of activity duration to show progress shall not be used.

6. The Baseline and Progress Schedules shall be submitted as color plotted time- scaled logic diagrams, with sufficient calendar and spacing to allow activity description information, bars and logic to be easily read. For each submitted schedule, a color plotted time-scaled logic

diagram of just critical path activities shall be submitted. The fixed format, as described above, shall be used for all time-scaled logic diagram submittals throughout the duration of the project.

7. The Baseline, Progress, and Summary Schedules shall be submitted in bar chart format with activity data on the left side and bars on the right side. Logic shall not be displayed. Activity descriptions shall be displayed in the bar area. These bar chart schedules shall be 11" x 17" in size, and readable.

8. The Progress Schedule shall be submitted in an additional bar chart format that displays the previous month's Progress Schedule as a "Target" schedule for comparison use. The first Progress Schedule shall use the Baseline Schedule as the "Target" schedule. The "Target" bars shall be of smaller size, of different color, and below the current schedule's bars. Two color copies shall be submitted. The size shall be 11" x 17".

9. The Baseline and Progress Schedules shall be submitted in a bar chart format, as described above, but shall contain only the critical path activities. In the event that the Contractor's schedule has more than 25 percent of the activities as critical path or near critical path, the Contractor shall submit an additional bar chart schedule containing both the critical path and near critical path (as previously defined) activities.

10. The Baseline and Progress Schedules shall be submitted with a tabular report that displays the activity data previously listed in this subsection, sorted by Activity Number. Owner reserves the right to request up to two additional tabular reports, in a format requested by the Owner's Representative, with any schedule submittal, Time Impact Analysis, or Recovery Schedule, at no additional cost to Owner.

11. The Baseline and Progress Schedules shall be submitted with a predecessor and successor report in 8-1/2" x 11", black and white format, displaying the activity data previously listed in this subsection and the predecessors and successors for each activity. This shall be in the fixed activity format.

12. All schedules and schedule documents submitted to the Owner's Representative shall be in hard copy, as described above, and in the submitted format via electronic transmission that contains the schedule data files.

1.08 WEATHER IMPACTS AND DELAY

A. The Contractor agrees that he shall not be entitled to a time extension due to normal inclement weather, which can be expected at the project locale due to precipitation, snow, temperature, or other weather conditions. Normal inclement weather shall be defined as the most recent five-year average of accumulated record mean values from climatological data compiled by the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) monitoring station nearest to the project site. The Contractor shall include in its Baseline Schedule and all Progress Schedules, allowances for normal inclement weather. Agreed rain days will be tied to specific activity sequences in specific seasons.

B. The Contractor shall only be entitled to an extension of Contract time, if the Contractor can substantiate that the severity of the weather was in excess of the normal inclement weather, and such weather conditions actually delayed the critical path of the Work. Time extensions will not be allowed for weather delays to non- critical path portions of the Work.

C. No extension of time will be made for abnormal inclement weather after the portions of the Work in progress at the time are enclosed, except for site work. Site work delays at that time will be allowed only if the abnormal weather causes a critical path delay to the Contract Time or milestone date

related to that site work. For the purpose of this paragraph, the term enclosed is defined to mean when the Work in an area of a structure or building is sufficiently closed in (portions of exterior walls up and portions of roof in place), so as to permit adequate conditioning of the air to allow the various trades to perform the Work.

D. The Contractor is responsible for providing any temporary weather enclosures necessary for Work to proceed without weather delays.

1.09 SCHEDULE UPDATES AND SCHEDULE (NETWORK) REVISIONS

A. During the course of the Work and issuance of the Progress Schedules, updating to reflect actual progress shall not be considered revisions to the Schedule. Such updating shall include revisions to activity durations and certain sequences on a monthly basis. Included in the Progress Schedule updates shall be activities and changes that have already been reviewed and accepted by Owner such as the effect of accepted Owner changes, the agreed duration of delays caused by acts of God or other conditions or events which have affected the progress of the Work. The Progress Schedules, when formally submitted, shall display current progress, as well as displaying the forecast or projected Work to the end of the Project.

B. On all Progress Schedule submittals, the Contractor shall submit a printed list of all schedule logic changes along with the reason for each change. This list is an integral part of the Schedule submittal. This list shall be generated from the scheduling software and be the same logic included electronic transmission. Owner shall accept this list as part of its overall Progress Schedule submittal review and acceptance process.

C. Should the Contractor, after Owner acceptance of the Baseline Schedule and any Progress Schedules, desire to change the logic of its plan of construction, the Contractor shall submit in writing its requested revisions to the Owner's Representative. The request shall include a written narrative of the reasons for the activity and logic changes, a description of the logic for rescheduling the work, and the methods of maintaining adherence to critical and milestone dates. In addition, for changes affecting sequences of the Work, the Contractor shall provide a time-scaled logic diagram that compares the original sequence of work to the requested revised sequence of work. The Contractor shall submit the requested revision in a timely manner such that Owner may review the request submittal the same time frame and manner as required for other schedule submittals. Upon Owner acceptance of the request, the Contractor shall include the revision in the next upcoming Progress Schedule.

D. Neither the updating or revision of the Contractor's Progress Schedule, nor the submittal, updating, change or revision of any schedule (or schedule document) for the Owner's review and acceptance shall have the effect of amending or modifying, in any way, the Contract Time, any Contract completion date, or Contract milestone dates or of modifying or limiting in any way Contractor's obligations under this Contract.

1.10 TIME IMPACT ANALYSIS FOR CHANGED CONDITIONS

A. If delays are experienced that the Contractor believes are caused by Owner, the Contractor shall submit a formal written Time Impact Analysis (TIA). The TIA shall define the impact of each change or delay to the current accepted Progress Schedule. The TIA shall include a written narrative of the impact of such delays, and a schedule in time- scaled logic diagram format that depicts how the changed or delayed work affects other activities in the current accepted Progress Schedule.

B. In addition to the Contractor's presentation of the impact in the TIA, the Contractor shall include in the TIA, a mitigation plan that reduces or eliminates the claimed delay. The mitigation plan shall include specific Owner and Contractor actions as well as the cost to the Contractor to proceed with the mitigation.

C. In the event that the Contractor requests a Contract time extension, the time impacts to critical path activities in the current accepted Progress Schedule shall be clearly shown on a schedule in time-scaled logic diagram format. Extensions of time will be granted only to the extent that such changes or delays cause the time for the changed activity and related activities to exceed the total float along the affected path of activities at the time of Owner directive to proceed with the change or the actual commencement of the delay included in the TIA.

D. Schedule float is not for the exclusive use or benefit of either the Contractor or Owner. Neither Owner nor the Contractor “owns” the float. The project or Work “owns” the float. Liability for delay to Contract or milestone dates rests with the party whose action (or inaction) caused the delay beyond the float that was available at the time of the delaying action (or inaction).

E. Each formal TIA shall be submitted as an integral element of the Contractor’s change order proposal.

F. A copy of Owner accepted TIA will be incorporated in the change order signed by Owner and the Contract Administrator for such change. Any changes to the Schedule will be incorporated into the next update of the Progress Schedule following the Owner’s acceptance of the TIA.

G. The Contractor shall be responsible for all costs associated with the preparation of the TIA and the incorporation of accepted TIA’s, or portion of TIA’s, in the Progress Schedule.

H. If agreement is not reached on a TIA, or a portion of a TIA, the Progress Schedule, including any time extensions, shall be revised only to the extent accepted by Owner. For any TIA, or portion of a TIA, that is not accepted by Owner, the Contractor may submit a claim in accordance with the Conditions of the Contract.

1.11 RECOVERY SCHEDULE

A. Should any conditions exist, such that certain activities shown on the Contractor's Progress Schedule fall behind schedule to the extent that any of the mandatory critical dates or milestone completion dates are at risk of being delayed, the Contractor shall be required, at no cost to Owner, to prepare and submit to the Owner’s Representative a supplementary Recovery Schedule. The Recovery Schedule shall be in a form and detail appropriate to the need, to explain and display to the Owner’s Representative how the Contractor intends to re-schedule those activities to regain compliance with the last previously accepted Progress Schedule.

B. After determination by the Owner’s Representative of the requirement for a Recovery Schedule, the Contractor shall, within five (5) calendar days, submit to Owner’s Representative, the Recovery Schedule. The Recovery Schedule shall represent the Contractor's best judgment as to how the Contractor’s work shall be reorganized such that the work may return to the accepted Progress Schedule within the maximum one-month period. The Recovery Schedule shall be prepared at a similar level of detail as the Progress Schedule and shall be based on the accepted Progress Schedule.

C. The Owner’s Representative will have seven (7) calendar days to review the Recovery Schedule submittal. Any revisions that result from the Owners Representative’s review shall be resubmitted within three (3) workdays by the Contractor for acceptance by the Contract Administrator. The accepted Recovery Schedule shall then be the Schedule that the Contractor shall use in planning, organizing, directing, coordinating, performing and executing the Work (including all activities of subcontractors, equipment vendors and suppliers) that is included on the Recovery Schedule. All other Work shall proceed per the accepted Progress Schedule.

D. No later than five (5) calendar days prior to the expiration of the Recovery Schedule, the Owner’s Representative and Contractor will meet to determine whether the Contractor has regained

compliance with the accepted Progress Schedule. At the direction of the Owner's Representative, one of the following will occur:

1. If, in the opinion of the Owner's Representative, the Contractor is still behind schedule, the Contractor shall prepare another Recovery Schedule, at the Contractor's expense, to take effect for a maximum of one additional month from the start of the new Recovery Schedule.

2. If, in the opinion of the Owner's Representative, the Contractor has sufficiently regained compliance with the Progress Schedule, the use of the Progress Schedule shall be resumed.

1.12 TIMELINESS OF SCHEDULE DOCUMENT SUBMITTALS

A. The Schedule (and schedule documents) shall be submitted in a timely manner, as required by this Section. Failure to submit the Schedule and schedule documents on time and in an acceptable format shall result in withholding of payments and other remedies.

1.13 OWNER REVIEW OF SCHEDULE SUBMITTALS

A. All schedule documents shall be formally submitted and will be reviewed by Owner and returned to the Contractor with the required acceptance or action noted.

B. In providing review comments on schedule (and schedule document) submittals, and in this section, Contract Administrator may use the word "accepted", "not accepted" or variations thereof in conveying its review comments to the Contractor. At any time, the "accepted" or similar wording is used, such wording shall have no different meaning than similar wording, such as "no exceptions taken."

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Testing and inspection agencies and services.

D. Control of installation.

E. Mock-ups.

F. Tolerances.

G. Manufacturers' field services.

H. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 00 3100 - Available Project Information: Soil investigation data.

B. Document 00 6000 - General Conditions: Inspections and approvals required by public authorities.

C. Section 01 3000 - Administrative Requirements: Submittal procedures.

D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).

B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

G. OSSC - Oregon Structural Specialty Code, latest edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Design Data: Submit for Consultant's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Consultant and to Contractor.

1. Include:

a. Date issued.

b. Project title and number.

c. Name of inspector.

d. Date and time of sampling or inspection.

e. Identification of product and specifications section.

f. Location in the Project.

g. Type of test/inspection.

h. Date of test/inspection.

i. Results of test/inspection.

j. Conformance with Contract Documents.

k. When requested by Consultant, provide interpretation of results.

2. Test report submittals are for Consultant's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Consultant, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

2. Certificates may be recent or previous test results on material or product, but must be acceptable to Consultant.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Consultant's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Consultant's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

2. Data indicating inappropriate or unacceptable Work may be subject to action by Consultant or Owner.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Consultant before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Consultant shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Consultant before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Consultant will use to judge the Work.

C. Integrated Exterior Mock-ups: construct integrated exterior mock-up as indicated on Drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.

D. Notify Consultant fifteen (15) working days in advance of dates and times when mockups will be constructed.

E. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.

F. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

G. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

H. Obtain Consultant's approval of mock-ups before starting work, fabrication, or construction.

I. Accepted mock-ups shall be a comparison standard for the remaining Work.

J. Where mock-up has been accepted by Consultant and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Consultant.

K. Where possible salvage and recycle the demolished mock-up materials.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Consultant before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections and the current building code for testing and inspection required.

B. Testing Agency Duties:

1. Provide qualified personnel at site. Cooperate with Consultant and Contractor in performance of services.

2. Perform specified sampling and testing of products in accordance with specified standards.

3. Ascertain compliance of materials and mixes with requirements of Contract Documents.

4. Promptly notify Consultant and Contractor of observed irregularities or non-conformance of Work or products.

5. Perform additional tests and inspections required by Consultant.

6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the Work.

3. Agency may not assume any duties of Contractor.

4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:

1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.

2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

3. Provide incidental labor and facilities:

a. To provide access to Work to be tested/inspected.

b. To obtain and handle samples at the site or at source of Products to be tested/inspected.

c. To facilitate tests/inspections.

d. To provide storage and curing of test samples.

4. Notify Consultant and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Consultant.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Consultant 30 days in advance of required observations.

1. Observer subject to approval of Consultant.

2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary telecommunications services.

B. Temporary sanitary facilities.

C. Temporary Controls: Barriers, enclosures, and fencing.

D. Security requirements.

E. Vehicular access and parking.

F. Waste removal facilities and services.

G. Project identification sign.

H. Field offices.

1.02 RELATED REQUIREMENTS

A. Section 01 5100 - Temporary Utilities.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.04 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:

1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.

2. Telephone Land Lines: One line, minimum; one handset per line.

   a. Cell phone service with voice mail for the project superintendent is an acceptable alternative to a fixed telephone device for this project.

3. Internet Connections: Minimum of one; DSL modem or faster.

4. Email: Account/address reserved for project use.

5. Facsimile Service: Minimum of one dedicated fax machine/printer, with dedicated phone line.

   a. This service may reside at the Contractor's office for this project if someone in the office can regularly check the device for messages.

C. Provide a digital camera at the site capable of taking pictures of job conditions and sending.jpg images via e-mail to Owner and Architect.

1.05 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

A. Provide barriers to protect workers on the site and the public against injury.

B. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

C. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

D. Provide protection for plants designated to remain. Replace damaged plants.

E. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

F. Traffic Controls: Provide as required to maintain safe working environment for Owner and Contractor personnel using the site.

1.07 TEMPORARY FIRE PROTECTION

A. Provide and maintain necessary facilities and equipment to safeguard Project against Fire Damage.

1.08 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.09 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.10 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1. Maximum flame spread rating of 75 in accordance with ASTM E84.

1.11 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.12 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

G. Existing parking areas may be used for construction parking.

H. Do not allow vehicle parking on existing pavement.

I. Use designated drop off and delivery areas for short term parking only.

J. Do not use Owner's Parking Lots for overnight vehicle storage.

K. Designate one parking space for Owner and Architect use.

L. Repair existing facilities damaged by use, to original condition.

M. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.13 MATERIAL STORAGE SPACE

A. Maintain within Project Limits in accordance with Architect's and Owner's instructions. Do not block exitways or overload structure.

1.14 WASTE REMOVAL

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Encourage the separation of waste materials and sorting and disposal at a local recycling center.

C. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

D. Provide containers with lids. Remove trash from site periodically.

E. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

F. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

A. A project sign is not required for this project.

B. No other signs are allowed without Owner permission except those required by law.

1.16 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture and storage space for drawings and all project documents.

B. Provide space for Project meetings, with table and chairs to accommodate 8 persons.

C. Provide office within 15 days from Notice to Proceed, maintain, and remove prior to Substantial Completion or as agreed by Owner.

D. Contractor shall provide a field office, minimum 8'x20' for Owners Rep: Weathertight, with lighting, electrical outlets, internet, heating, cooling equipment, and equipped with sturdy furniture and storage space for drawings and all project documents. Provide separate keyed lock.

1. Provide space for Project meetings, with table and chairs to accommodate 8 persons.

2. Provide office within 15 days from Notice to Proceed, maintain, and remove prior to Substantial Completion or as agreed by Owner.

3. Provide Utilities: power and internet.

1.17 VISITOR PERSONAL PROTECTION EQUIPMENT

A. Provide six sets of Personal Protection Equipment (PPE) for use by official visitors to the project site during construction. Visitor PPE shall include as a minimum, hard hat and protective eye goggles. Provide high visibility garments when moving vehicles are in use on the construction site. Store in Field Office and reserve for use by visitors to the project site.

B. Maintain in good condition through the course of the project and replace equipment that does not meet personal safety requirements.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.02 RELATED REQUIREMENTS

A. Section 01 5000 - Temporary Facilities and Controls:

1. Temporary telecommunications services for administrative purposes.

2. Temporary sanitary facilities required by law.

1.03 CONSERVATION

A. It is the Owner's practice to utilize natural resources responsibly. Exercise appropriate energy and water conservation measures at all times.

1.04 TEMPORARY ELECTRICITY

A. Cost of Labor, Material and Energy: By Contractor.

B. Provide power service required from utility source.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.

D. Provide main service disconnect and over-current protection at convenient location and meter.

E. Permanent convenience receptacles may be utilized during construction.

F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be utilized during construction.

1.06 TEMPORARY HEATING

A. Cost of of Labor, Material and Energy: By Contractor.

B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.07 TEMPORARY COOLING

A. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.

B. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.08 TEMPORARY VENTILATION

A. Existing ventilation equipment may not be used.

1.09 TEMPORARY WATER SERVICE

A. Cost of Labor, Materials, and Water Used: By Contractor.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Connect to existing water source.

1. Exercise measures to conserve water.

D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 REFERENCE STANDARDS

A. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2007.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).

1.03 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of state and local jurisdictions for erosion and sedimentation control.

B. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

1. An erosion control permit is required. The Owner shall apply, pay for, and secure the permit. The contractor shall comply with the construction erosion control permit.

2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.

2. Prevent development of ruts due to equipment and vehicular traffic.

3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.

2. Prevent tracking of mud onto public roads outside site.

3. Prevent mud and sediment from flowing onto sidewalks and pavements.

4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

J. Open Water: Prevent standing water that could become stagnant.

K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.04 WORK INCLUDED BUT SPECIFIED ELSEWHERE

A. Erosion control products and construction work within any jurisdictional right-of-way shall conform to the requirments of that jurisdiction, in addition to the requirements herein and those shown on the private improvement drawings.

B. Erosion control products and construction work within the any jurisdictional right-of-way shall conform to the requirments of that jurisdiction, 1990 Standard Specifications for Public Works Construction published by the Oregon Chapter of APWA (Amended in 1996) and to the requirements herein and those shown on the private improvement drawings.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Erosion and Sedimentation Control Plan:

1. Submit within 2 weeks after Notice to Proceed.

2. Include:

a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.

b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.

c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.

d. Schedule of temporary preventive measures, in relation to ground disturbing activities.

e. Other information required by law.

f. Format required by law is acceptable, provided any additional information specified is also included.

3. Obtain the approval of the Plan by authorities having jurisdiction.

4. Obtain the approval of the Plan by Owner.

C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:

1. Straw or hay.

2. Wood waste, chips, or bark.

3. Erosion control matting or netting.

4. Polyethylene film, where specifically indicated only.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

C. Bales: Air dry, rectangular straw bales.

1. Cross Section: 14 by 18 inches, minimum.

2. Bindings: Wire or string, around long dimension.

D. Bale Stakes: One of the following, minimum 3 feet long:

1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.

2. Wood, 2 by 2 inches in cross section.

E. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:

1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.

2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.

3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.

4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.

5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.

6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.

7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

F. Silt Fence Posts: One of the following, minimum 5 feet long:

1. Softwood, 4 by 4 inches in cross section.

G. Gravel: See Section 32 1123 for aggregate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.

1. Width: As required; 20 feet, minimum.

2. Length: 50 feet, minimum.

3. Provide at each construction entrance from public right-of-way and where noted on drawings.

4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.

1. Provide linear sediment barriers:

a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

2. Space sediment barriers with the following maximum slope length upslope from barrier:

a. Slope of Less Than 2 Percent: 100 feet..

b. Slope Between 2 and 5 Percent: 75 feet.

c. Slope Between 5 and 10 Percent: 50 feet.

d. Slope Between 10 and 20 Percent: 25 feet.

e. Slope Over 20 Percent: 15 feet.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:

1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.

2. Straw bale row blocking entire inlet face area; anchor into pavement.

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

G. Soil Stockpiles: Protect using one of the following measures:

1. Cover with polyethylene film, secured by placing soil on outer edges.

2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

I. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:

1. Excavate minimum of 6 inches.

2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.

3. Place and compact at least 6 inches of 1.5 to 3.5 inch diameter stone.

B. Silt Fences:

1. Store and handle fabric in accordance with ASTM D4873.

2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.

3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.

4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.

5. Install with top of fabric at nominal height and embedment as specified.

6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.

7. Fasten fabric to wood posts using one of the following:

a. Four nails per post with 3/4 inch diameter flat or button head, 1 inch long, and 14 gage, 0.083 inch shank diameter.

b. Five staples per post with at least 17 gage, 0.0453 inch wire, 3/4 inch crown width and 1/2 inch long legs.

8. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Straw Bale Rows:

1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.

2. Install bales so that bindings are not in contact with the ground.

3. Embed bales at least 4 inches in the ground.

4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.

5. Fill gaps between ends of bales with loose straw wedged tightly.

6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

D. Mulching Over Large Areas:

1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.

2. Wood Waste: Apply 6 to 9 tons per acre.

3. Erosion Control Matting: Comply with manufacturer's instructions.

E. Mulching Over Small and Medium Areas:

1. Dry Straw and Hay: Apply 4 to 6 inches depth.

2. Wood Waste: Apply 2 to 3inches depth.

3. Erosion Control Matting: Comply with manufacturer's instructions.

F. Temporary Seeding:

1. When hydraulic seeder is used, seedbed preparation is not required.

2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.

4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.

5. Incorporate fertilizer into soil before seeding.

6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.

7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.

8. Repeat irrigation as required until grass is established.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:

1. Promptly replace fabric that deteriorates unless need for fence has passed.

2. Remove silt deposits that exceed one-third of the height of the fence.

3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Straw Bale Rows:

1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.

2. Remove silt deposits that exceed one-half of the height of the bales.

3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

E. Clean out temporary sediment control structures weekly and relocate soil on site.

F. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction procedures to promote adequate indoor air quality after construction.

B. Building flush-out after construction and before occupancy.

C. Testing indoor air quality after completion of construction.

1.02 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.

1. Cleaning of ductwork is not contemplated under this Contract.

2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.

1. Furnish products meeting the specifications.

2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Testing and inspection services.

B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.04 REFERENCE STANDARDS

A. ASTM D5197 - Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology); 2009.

B. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.

C. EPA 600/4-90/010 - Compendium of Methods for the Determination of Air Pollutants in Indoor Air; April 1990.

D. EPA 625/R-96/010b - Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air; January 1999.

E. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction; 2007.

1.05 DEFINITIONS

A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

C. Particulates: Dust, dirt, and other airborne solid matter.

D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA (OCC) as a guide.

1. Submit not less than 60 days before enclosure of building.
2. Identify potential sources of odor and dust.
3. Identify construction activities likely to produce odor or dust.
4. Identify areas of project potentially affected, especially occupied areas.
5. Evaluate potential problems by severity and describe methods of control.
6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
7. Describe cleaning and dust control procedures.

C. Air Contaminant Test Plan: Identify:

1. Testing agency qualifications.
2. Locations and scheduling of air sampling.
3. Test procedures, in detail.
4. Test instruments and apparatus.
5. Sampling methods.

D. Air Contaminant Test Reports: Show:

1. Location where each sample was taken, and time.
2. Test values for each air sample; average the values of each set of 3.
3. HVAC operating conditions.
4. Certification of test equipment calibration.
5. Other conditions or discrepancies that might have influenced results.

PART 2 PRODUCTS

2.01 MATERIALS

A. Low VOC Materials: See Section 01 6116.

B. Low VOC Materials: See individual sections for specific requirements for materials with low VOC content.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

A. Prevent the absorption of moisture and humidity by adsorptive materials by:

1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.

2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.

3. Provide sufficient ventilation for drying within reasonable time frame.

B. Begin construction ventilation when building is substantially enclosed.

C. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.

D. HVAC equipment and ductwork may NOT be used for ventilation during construction:

1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.

2. Exhaust directly to outside.

3. Seal HVAC air inlets and outlets immediately after duct installation.

E. Do not store construction materials or waste in mechanical or electrical rooms.

F. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.

1. Inspect duct intakes, return air grilles, and terminal units for dust.

2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.

3. Clean tops of doors and frames.

4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.

5. Clean return plenums of air handling units.

6. Remove intake filters last, after cleaning is complete.

G. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

H. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.

3.02 BUILDING FLUSH-OUT

A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required, not both.

B. Perform building flush-out before occupancy.

C. Do not start flush-out until:

1. All construction is complete.

2. HVAC systems have been tested, adjusted, and balanced for proper operation.

3. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.

4. New HVAC filtration media have been installed.

D. Building Flush-Out: Operate all ventilation systems at normal flow rates with 100 percent outside air until a total air volume of 14,000 cubic feet per square foot of floor area has been supplied.

1. Obtain Owner's concurrence that construction is complete enough before beginning flush-out.

2. Maintain interior temperature of at least 60 degrees F and interior relative humidity no higher than 60 percent.

3. If additional construction involving materials that produce particulates or any of the specified contaminants is conducted during flush-out, start flush-out over.

4. If interior spaces must be occupied prior to completion of the flush-out, supply a minimum of 25 percent of the total air volume prior to occupancy, and:

a. Begin ventilation at least three hours prior to daily occupancy.

b. Continue ventilation during all occupied periods.

c. Provide minimum outside air volume of 0.30 cfm per square foot or design minimum outside air rate, whichever is greater.

E. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

3.03 AIR CONTAMINANT TESTING

A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required, not both.

B. Perform air contaminant testing before occupancy.

C. Do not start air contaminant testing until:

1. All construction is complete, including interior finishes.

2. HVAC systems have been tested, adjusted, and balanced for proper operation.

3. New HVAC filtration media have been installed.

D. Indoor Air Samples: Collect from spaces representative of occupied areas:

1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.

2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet; take samples from areas having the least ventilation and those having the greatest presumed source strength.

3. Collect samples from height from 36 inches to 72 inches above floor.

4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.

5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.

6. When retesting the same building areas, take samples from at least the same locations as in first test.

E. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.

F. Analyze air samples and submit report.

G. Air Contaminant Concentration Limits:

1. Formaldehyde: Not more than 27 parts per billion.

2. PM10 Particulates: Not more than 50 micrograms per cubic meter.

3. Total Volatile Organic Compounds (TVOCs): Not more than 500 micrograms per cubic meter.

4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: Allowable concentrations listed in Table 4-1.

5. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.

H. Air Contaminant Concentration Test Methods:

1. Formaldehyde: ASTM D5197, EPA 625 Method TO-11A, or EPA 600 Method IP-6.

2. Particulates: EPA 600 Method IP-10.

3. Total Volatile Organic Compounds (TVOC): EPA 625 Method TO-1, TO-15, or TO-17; or EPA 600 Method IP-1.

4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: ASTM D5197, or EPA 625 Method TO-1, TO-15, or TO-17.

5. Carbon Monoxide: EPA 600 Method IP-3, plus measure outdoor air; measure in ppm; report both indoor and outdoor measurements.

I. Air Contaminant Concentration Determination and Limits:

1. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.

2. Airborne Mold and Mildew: Measure in relation to outside air; not higher than outside air.

3. Formaldehyde: Not more than 50 parts per billion.

4. Formaldehyde: Measure in micrograms per cubic meter, in relation to outside air; not more than 20 micrograms per cubic meter higher than outside air.

5. Total Volatile Organic Compounds (TVOC): Not more than 500 micrograms per cubic meter.

6. Total Volatile Organic Compounds (TVOC): Measure in micrograms per cubic meter, in relation to outside air; not more than 200 micrograms per cubic meter higher than outside air.

7. Particulates (PM10): Not more than 50 micrograms per cubic meter.

8. Total Particulates (PM): Measure in micrograms per cubic meter, in relation to outside air; not more than 20 micrograms per cubic meter higher than outside air.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

B. Section 01 4000 - Quality Requirements: Product quality monitoring.

C. Section 01 6023 - Substitution Request Form

D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

E. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.03 REFERENCE STANDARDS

A. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

B. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.; 2000.

C. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products that comply with the specifications and are proposed for use, with name of manufacturer, trade name, and model number of each product.

1. Submit within 15 days after date of Subcontract Award Notice.

2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specifies process and time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in that section.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request on Form 01-6023 with complete data substantiating compliance of proposed substitution with Contract Documents. **Include a point by point comparative analysis in matrix form.**

D. Substitutions

1. Notify Architect when Contractor is aware of materials, equipment, or products that meet the aesthetic and programmatic intent of Contract Documents, but which are more environmentally responsible than materials, equipment, or products specified or indicated in the Contract Documents.

E. A request for substitution constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Agrees to provide the same warranty for the substitution as for the specified product.

3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

F. Substitutions will not be allowed post bid.

G. Each request for substitution approval shall include:

1. Identity of Product for which substitution is requested; include Specification Section.

2. Identity of substitution; include complete Product description, drawings, photographs, performance and test data, and any other information necessary for evaluation.

3. ~~Identify compliance with any described LEED product requirements~~.

4. Quality comparison of proposed substitution with specified product.

5. Changes in other Work required because of substitution.

6. Effect on construction progress schedule.

7. Cost of proposed substitution compared with specified product.

8. Any required license fees or royalties.

9. Availability of maintenance service.

10. Source of replacement materials.

H. Architect will be sole judge of acceptability of any proposed substitution.

3.02 SUBSTITUTIONS AFTER CONTRACT AWARD

A. Approval will be granted only when:

1. Specified Product cannot be delivered without Project delay, or

2. Specified Product has been discontinued, or

3. Specified Product has been replaced by superior Product, or

4. Specified Product cannot be guaranteed as specified, or

5. Specified Product will not perform properly, or

6. Specified Product will not fit within designated space, or

7. Specified Product does not comply with governing codes, or

8. Substitution will be clearly in Owner's interest.

B. Architect will issue Change Order authorizing approved substitutions and revising Contract Sum where appropriate.

3.03 CONTRACT COMPLIANCE

A. Substitution approval does not relieve Contractor from responsibility for proper execution of the Work and for compliance with other Contract requirements.

3.04 OWNER-SUPPLIED PRODUCTS

A. See Section 01 1000 for identification of Owner-supplied products.

B. Owner's Responsibilities:

1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.

2. Arrange and pay for product delivery to site.

3. On delivery, inspect products jointly with Contractor.

4. Submit claims for transportation damage and replace damaged, defective, or deficient items.

5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:

1. Review Owner reviewed shop drawings, product data, and samples.

2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.

3. Handle, store, install and finish products.

4. Repair or replace items damaged after receipt.

3.05 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.06 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SUBSTITUTION REQUEST: DATE SUBMITTED _____

1.01 SUBMIT TO: Architect: Chris Brown, arkitek:design+architecture, llc, arkitek@arkitek.us

1.02 PROJECT: Table Rock Elementary School

1.03 SPECIFIED ITEM:

A. SECTION NAME AND NUMBER: _____

B. PRODUCT TYPE AND NAME AND MODEL: _____

C. PARAGRAPH AND PRODUCT DESCRIPTION: _____

1.04 PROPOSED SUBSTITUTION:

A. MANUFACTURER AND MODEL NUMBER(S): _____

B. PRODUCT DESCRIPTION: _____

C. Attached data includes product description, specifications, drawings, photographs, performance, test data and **point by point comparative matrix** adequate for evaluation of request including identification of applicable data portions. Attached data also includes description of changes to Contract Documents the proposed substitution requires for proper installation.

D. It is the responsibility of the requestee to assemble a comparative matrix outlining key elements of proposed substitution.

1.05 UNDERSIGNED CERTIFIES FOLLOWING ITEMS, UNLESS MODIFIED BY ATTACHMENTS, ARE CORRECT:

A. Proposed substitution does not affect dimensions shown on the drawings.

B. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.

C. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.

D. Maintenance and service parts are available locally or readily obtainable for proposed substitution.

1.06 UNDERSIGNED FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

1.07 UNDERSIGNED FURTHER CERTIFIES THAT THE MANUFACTURER OF THE PROPOSED SUBSTITUTION IS AWARE OF THIS SUBSTITUTION REQUEST AND AGREES TO THE STATEMENTS NOTED ABOVE.

1.08 UNDERSIGNED AGREES THAT THE TERMS AND CONDITIONS FOR SUBSTITUTIONS FOUND IN BIDDING DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

1.09 SUBMITTED BY:

A. NAME: _____ SIGNATURE:_____

B. FIRM NAME: _____

C. FULL MAILING ADDRESS: _____

D. PHONE: _____ E-MAIL: _____

1.10 FOR USE BY ARCHITECT OR ENGINEER

A. APPROVED OR APPROVED AS NOTED BY: _____

B. NOT APPROVED BY: _____

C. RECEIVED TOO LATE: _____

D. REMARKS: _____

E. DATE OF RESPONSE: _____

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirement for installer certification that they did not use any non-compliant products.

B. VOC restrictions for product categories listed below under "DEFINITIONS."

C. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

C. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.

D. Section 01 5721 - Indoor Air Quality Controls: Procedures and testing.

E. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS

A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:

1. Adhesives, sealants, and sealer coatings.
2. Carpet.
3. Carpet tile.
4. Resilient floor coverings.
5. Paints and coatings.
6. Insulation.
7. Gypsum board.
8. Acoustical ceilings and panels.
9. Cabinet work.
10. Wall coverings.
11. Composite wood and agrifiber products used either alone or as part of another product.
12. Other products when specifically stated in the specifications.

B. Interior of Building: Anywhere inside the exterior weather barrier.

C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.04 REFERENCE STANDARDS

A. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Carpet and Rug Institute; Current Edition.

B. GreenSeal GC-03 - Anti-Corrosive Paints; Green Seal, Inc.; 2007

C. GreenSeal GS-11 - Paints; Green Seal, Inc.; 1993.

D. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.; 2011.

E. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition; http://www.aqmd.gov/

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov

G. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.

C. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

D. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Adhesives and Joint Sealants: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168.

1. Definition: This provision applies to gunnable, trowelable, and liquid-applied adhesives, sealants, and sealant primers used anywhere on the interior of the building inside the weather barrier, including duct sealers and fire stopping.

2. LEED: Not Used

3. Certification: Require each installer to certify compliance and submit product data showing product content.

a. Evidence of Compliance: Acceptable types of evidence are:

1) Report of laboratory testing performed in accordance with requirements.

2) Published product data showing compliance with requirements.

3) Certification by manufacturer that product complies with requirements.

4) SCAQMD limits for specific product categories:

a) Architectural ApplicationsVOC Limit g/L less water

1. Indoor Carpet Adhesives 50
2. Carpet Pad Adhesives 50
3. Outdoor Carpet Adhesives 150
4. Wood Flooring Adhesive 100
5. Rubber Floor Adhesives 60
6. Subfloor Adhesives 50
7. Ceramic Tile Adhesives 65
8. VCT and Asphalt Tile Adhesives 50
9. Dry Wall and Panel Adhesives 50
10. Cove Base Adhesives 50
11. Multipurpose Construction Adhesives 70
12. Structural Glazing Adhesives 100
13. Single Ply Roof Membrane Adhesives 250

b) Specialty Applications VOC Limits g/L less water

1. PVC Welding 510
2. CPVC Welding 490
3. ABS Welding 325
4. Plastic Cement Welding 250
5. Adhesive Primer for Plastic 550
6. Computer Diskette Manufacturing 350
7. Contact Adhesive 80
8. Special Purpose Contact Adhesive 250
9. Tire Retread 100
10. Adhesive Primer for Traffic Marking Tape 150
11. Structural Wood Member Adhesive 140
12. Sheet Applied Rubber Lining Operations 850
13. Top and Trim Adhesive 250

c) Substrate Specific ApplicationsVOC Limit g/L less water

1. Metal to Metal 30
2. Plastic Foams 50
3. Porous Material (except wood) 50
4. Wood 30
5. Fiberglass 80

d) Sealants VOC Limit g/L less water

1. Architectural 250
2. Marine Deck 760
3. Nonmembrane Roof 300
4. Roadway 250
5. Single-Ply Roof Membrane 450
6. Other 420

e) Sealant Primers VOC Limit g/L less water

1. Architectural Non Porous 250
2. Architectural Porous 775
3. Modified Bituminous 500
4. Marine Deck 760
5. Other 750

C. Aerosol Adhesives: Provide only products having volatile organic compound (VOC) content not greater than required by GreenSeal GS-36.

1. LEED: Not Used
2. Certification: Require each installer to certify compliance and submit product data showing product content.
   a. Evidence of Compliance: Acceptable types of evidence are:
      1) Current GreenSeal Certification.
      2) Report of laboratory testing performed in accordance with GreenSeal GS-36 requirements.
      3) Published product data showing compliance with requirements.
3. GreenSeal limits for specific product categories:
   a. Aerosol AdhesivesVOC Weight g/L minus water

1) General purpose mist spray65% VOCs by weight

2) General purpose web spray55% VOCs by weight

3) Special purpose aerosol adhesives (all types)70% VOCs by weight

D. Paints and Coatings:

1. Definition: This provision applies to paints and coatings used anywhere on the interior of the building inside the weather barrier, including all primers and sealers.

2. Provide coatings that comply with the most stringent requirements specified in the following:

a. Architectural Paints and Coatings: Do not exceed VOC content limits established in GreenSeal GS-11.

b. Anti-Corrosive and Anti-Rust Paints: Do not exceed VOC content limits established in GreenSeal GS-03.

c. Clear Wood Finishes, Floor Coatings, Stains, Primers and Shellacs: Do not exceed the VOC content limits established in SCAQMD Rule No. 1113.

3. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

4. This provision is applicable to LEED Credit EQ 4.1; submit LEED Prohibited Content Installer Certification Forms and all support material per section 01 35 16.07.

5. Certification: Require each installer to certify compliance and submit product data showing product content.

a. Evidence of Compliance: Acceptable types of evidence are:

1) Report of laboratory testing performed in accordance with requirements.

2) Published product data showing compliance with requirements.

6. Limits for specific product categories:

a. Architectural paints, coatings and primers applied to interior walls and ceilings per GreenSeal GS-11

1) Flats: 50 g/L

2) Non-Flats: 150 g/L

3) Primers 50 g/L

b. Interior Anti-Corrosive and Anti-rust paints, coatings and primers per GreenSeal GS-03, Anti-Corrosive Paints

1) 250 g/L

c. All other coatings, paints and sealers per SCAQMD Rule #1113, Architectural Coatings

1) Coating CategoryVOC Limit g/L

(a) Bond Breakers 350

(b) Clear Wood Finishes 275

(c) Varnish 275

(d) Sanding Sealers 275

(e) Lacquer 275

(f) Clear Brushing Lacquer 275

(g) Concrete-Curing Compounds 100

(h) Concrete-Curing Compounds For Roadways and Bridges 350

(i) Dry-Fog Coatings 150

(j) Fire-Proofing Exterior Coatings 350

(k) Fire-Retardant Coatings Clear 650

(l) Fire-Retardant Coatings Pigmented 350

(m) Flats 50

(n) Floor Coatings 50

(o) Graphic Arts (Sign) Coatings 500

(p) Industrial Maintenance (IM) Coatings 100

(q) High Temperature IM Coatings 420

(r) Zinc-Rich IM Primers 100

(s) Japans/Faux Finishing Coatings 350

(t) Magnesite Cement Coatings 450

(u) Mastic Coatings 300

(v) Metallic Pigmented Coatings 500

(w) Multi-Color Coatings 250

(x) Nonflat Coatings 50

(y) Nonflat High Gloss 50

(z) Pigmented Lacquer 275

(aa) Pre-Treatment Wash Primers 420

(ab) Primers, Sealers, and Undercoaters 100

(ac) Quick-Dry Enamels 50

(ad) Quick-Dry Primers, Sealers, and Undercoaters 100

(ae) Recycled Coatings 250

(af) Roof Coatings 50

(ag) Roof Coatings, Aluminum 100

(ah) Roof Primers, Bituminous 350

(ai) Rust Preventative Coatings 100

(aj) Shellac Clear 730

(ak) Shellac Pigmented 550

(al) Specialty Primers 100

(am) Stains 100

(an) Stains, Interior 250

(ao) Swimming Pool Coatings Repair 340

(ap) Swimming Pool Coatings Other 340

(aq) Traffic Coatings 100

(ar) Waterproofing Sealers 100

(as) Waterproofing Concrete/Masonry Sealers 100

(at) Wood Preservatives Below-Ground 350

(au) Wood Preservatives- Other 350

(av) Low-Solids Coating 120

E. Carpet and Adhesive: Provide products having VOC content not greater than that required for CRI Green Label Plus certification.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Current Green Label Plus Certification.

b. Report of laboratory testing performed in accordance with requirements.

F. Carpet Tile and Adhesive: Provide products having VOC content not greater than that required for CRI Green Label Plus certification.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Current Green Label Plus Certification.

b. Report of laboratory testing performed in accordance with requirements.

G. Composite Wood and Agrifiber Products and Adhesives Used for Laminating Them: Provide products having no added urea-formaldehyde resins.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Current SCS "No Added Urea Formaldehyde" certification; www.scscertified.com.

b. Published product data showing compliance with requirements.

H. Other Product Categories: Comply with limitations specified elsewhere.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Requirements for forming openings in existing construction for all work including mechanical and electrical work.

D. Pre-installation meetings.

E. Cutting and patching.

F. Surveying for laying out the work.

G. Cleaning and protection.

H. Starting of systems and equipment.

I. Demonstration and instruction of Owner personnel.

J. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

K. General requirements for maintenance service.

L. Substantial completion

M. Final Completion

N. Additional fees for delays in completing work

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

D. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

F. Section 01 5100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.

G. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

H. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.

1. On request, submit documentation verifying accuracy of survey work.

2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.

3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.

2. Integrity of weather exposed or moisture resistant element.

3. Efficiency, maintenance, or safety of any operational element.

4. Visual qualities of sight exposed elements.

5. Work of Owner or separate Contractor.

6. Include in request:

a. Identification of Project.

b. Location and description of affected work.

c. Necessity for cutting or alteration.

d. Description of proposed work and products to be used.

e. Effect on work of Owner or separate Contractor.

f. Written permission of affected separate Contractor.

g. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.06 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.

2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.

2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

3. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.

H. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate occupancy requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.08 CONTRACTOR'S FULL TIME SUPERVISION OF THE WORK

A. Contractor shall provide an on-site project superintendent to be present full time whenever work is occurring on site.

B. Contractor's Superintendent shall maintain a Daily Log of work activities at the site during construction.

1. Submit copies of the Daliy Logs to the Owner on a weekly basis.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect seven days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.

2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.

2. Grid or axis for structures.

3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

A. The stability and integrity of the existing structure during demolition and selective demolition shall be maintained at levels generally acceptable within the construction industry by the use of temporary bracing, shoring, and underpinning until the proposed structure modifications are completed. In no case shall the existing structure be allowed to become unsafe during construction.

B. The design, installation, and removal of shoring and bracing systems required to provide temporary support of the existing structure during construction shall be the responsibility of the Contractor and shall be designed to support the dead, live, soil, earthquake, and wind loads that may be imposed on the structure during construction in accordance with industry standards and generally accepted engineering principals. Provide the services of a registered professional engineer to design these systems when required by Oregon State Statute and the building code.

C. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.

2. Report discrepancies to Architect before disturbing existing installation.

3. Beginning of alterations work constitutes acceptance of existing conditions.

D. Keep areas in which alterations are being conducted separated from other areas that are still occupied.

1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

2. Provide appropriate temporary signage including signage for exit or building egress.

E. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.

2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

F. Comply with regulatory requirements for Alteration Work:

1. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

2. Obtain required permits from authorities.

3. Do not close or obstruct egress from any building exit or site exit.

4. Do not disable or disrupt building fire or life safety systems without 3 days' prior written notice to Owner.

5. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered. Stop all work in the area and notify the Owner's representative.

    a. Owner will provide verification, abatement, and removal as required to complete the Work.

G. Remove existing work as indicated and as required to accomplish new work.

1. Remove items indicated on drawings.

2. Relocate items indicated on drawings.

3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.

4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible

H. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.

1. Notify affected utility companies before starting work and comply with their requirements.

2. Mark location and termination of utilities.

3. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.

4. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Owner. Provide temporary services during interruption of existing utilities, as acceptable to the Owner

5. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.

6. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

    a. Disable existing systems only to make switchovers and connections; minimize duration of outages.

b. Provide temporary connections as required to maintain existing systems in service.

7. Verify that abandoned services serve only abandoned facilities.

8. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

I. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.

3. Repair adjacent construction and finishes damaged during removal work.

4. Cover finish floors to remain.

5. Use only rubber tired vehicles for conveying materials in building.

J. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

K. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

L. Refinish existing surfaces as indicated:

1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.

2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

M. Clean existing systems and equipment.

N. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

O. Clean remaining structure, equipment and facilities of all dirt, dust, and debris caused by demolition work. Return areas to conditions existing prior to the start of the work.

P. Do not begin new construction in alterations areas before demolition is complete.

Q. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Sawcutting:

1. Employ experienced sawcutting contractor to make all holes, or slab and pavement cutting shown in drawings for architectural, structural, mechanical and electrical work.
2. Do not use water saws in occupied areas, unless otherwise approved.
3. Cut openings square and plumb with sharp edges. Minimize overcutting at corners.
4. Verify location of existing utilities in work area and make proper precautions to protect, disconnect and relocate, or terminate services as directed.

K. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

L. Maintain adequate Temporary Support necessary to assure structural integrity of affected Work.

M. Protect other portions of Project Work against damage and discoloration.

N. Protect Work exposed by cutting against damage and discoloration.

O. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

P. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

Q. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.08 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.10 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

3.13 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean interior floors in accordance with flooring manufacturer instructions.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

3.15 SUBSTANTIAL COMPLETION

A. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

B. Complete all required maintenance work prior to the date of substantial completion.

C. When Contractor considers Work substantially complete, as defined in General Conditions, submit to the Architect:

1. Written notice that Work, or designated portion thereof, is substantially complete.

2. List of Items to be completed or corrected.

3. Copy of Final or Temporary Occupancy Permit.

D. Architect will, as soon as possible thereafter, make an observation visit to the site to determine completion status.

E. Should Architect determine that Work is not substantially complete:

1. Architect will promptly notify Contractor in writing, giving reasons therefore.

2. Contractor shall remedy Work deficiencies, and send second notice of substantial completion to Architect.

3. Architect will review the corrected work.

F. When Architect concurs that Work is substantially complete, Architect will:

1. Prepare Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by Architect.

2. Submit Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

G. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

H. Notify Architect when work is considered finally complete.

I. Complete items of work determined by Architect's final inspection.

J. See: ***Section 00 6000 - General Conditions*** for additonal requirements.

3.16 FINAL ACCEPTANCE

A. When Contractor considers Work complete, submit written certification that:

1. Contract Documents have been reviewed.

2. Contractor has inspected Work for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and Systems have been tested in presence of Owner's Representative and are operational.

5. Work is complete and ready for final inspection.

B. Architect will, as soon as possible thereafter, make an observation visit to the site to determine completion status.

C. Should Architect consider Work incomplete or defective:

1. Architect will promptly notify Contractor in writing, listing incomplete or defective Work.

2. Contractor shall immediately remedy deficiencies, and send second written certification to Architect that Work is complete.

3. Architect will review the corrected Work.

D. When Architect finds Work acceptable under Contract Documents, Architect will request Contractor to make closeout submittals.

E. See: ***Section 00 6000 - General Conditions*** for additonal requirements.

3.17 ADDITIONAL FEES FOR DELAYS IN COMPLETING THE WORK

A. Architect will make 2 visits to the project site, one at Substantial Completion and one at Final Completion.

B. Should Architect be required to make more than the stated 2 final site visits due to Contractor's failure to correct specified deficiencies:

1. Owner will compensate Architect for additional services.

2. Owner will deduct Architect's compensation amount from Contractor's final payment as follows:

a. Principal's time at their contracted hourly rate.

b. Employees' time at their contracted hourly rate.

c. Consultant employees and Others at 1.1 times the direct cost incurred.

d. Charges will be made for necessary travel time, commercial air fare, auto expense computed at current allowable IRS mileage rate, room and board, and all other expenses incurred in making inspections.

END OF SECTION

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:

1. Aluminum and plastic beverage containers.

2. Corrugated cardboard.

3. Wood pallets.

4. Clean dimensional wood: May be used as blocking or furring.

5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 1000 - Site Clearing for use options.

6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.

7. Fluorescent lamps (light bulbs).

E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

G. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.

2. Burying on the project site.

3. Dumping or burying on other property, public or private.

4. Other illegal dumping or burying.

5. Incineration, either on- or off-site.

6. Use of Owner's trash receptacles.

H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

C. Waste Management Plan: Include the following information:

1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.

2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).

3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.

D. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.

1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.

2. Submit Report on a form acceptable to Owner.

3. Landfill Disposal: Include the following information:

a. Identification of material.

b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.

c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.

d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

4. Recycled and Salvaged Materials: Include the following information for each:

a. Identification of material, including those retrieved by installer for use on other projects.

b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.

c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.

d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.

5. Material Reused on Project: Include the following information for each:

   a. Identification of material and how it was used in the project.

   b. Amount, in tons or cubic yards.

   c. Include weight tickets as evidence of quantity.

6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Spill Response Planning - Establish spill prevention and cleanup procedures. Identify all potential spill areas and develop procedures for avoiding and responding to spills should they occur.

C. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

D. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

E. Meetings: Discuss trash/waste management goals and issues at project meetings.

   1. Pre-bid meeting.

   2. Pre-construction meeting.

   3. Regular job-site meetings.

F. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

   1. Provide containers as required.

   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.

   3. If an enclosed area is not provided, clearly lay out and label a specific area on-site.

   4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

G. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

H. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

I. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

J. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. ***Section 00 6000 General Conditions of Construction Contract*** for additonal requirements.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Substantial Completion will not commence before the Operations and Maintenance Manuals, Warranties, and the Record Drawings are submitted in accordance with Section 01 7000.

B. Project Record Documents: Submit documents to Consultant Prior to Substantial Completion.

C. Operation and Maintenance Data:

1. Submit one paper copy of preliminary draft or proposed formats and outlines of contents before start of Work. Consultant will review draft and return the one copy with comments.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.

3. Submit one copy of completed documents 30 days prior to scheduled date of substantial completion.. This copy will be reviewed and returned, with Consultant comments. Revise content of all document sets as required prior to final submission.

4. Submit three digital copy in PDF file format on CD or DVD discs, and three paper sets of revised final documents in final form prior to date of Substantial Completion.

5. Either the draft copy or the final copy of the O&M manuals must be on the project site during any of the operator training scheduled for the project.

D. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.

2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

4. Submit three digital copies in PDF file format on CD or DVD discs, and [three] paper sets of final documents prior to date of Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

B. Maintenance of documents and samples.

1. Store in Contractor's Field Office apart from Documents used for Construction.

2. Provide Files, Shelving and Cabinets necessary to safely and securely store Documents and Samples.

3. Maintain Documents in a clean, dry, legible, and good order.

4. Do not use Record Documents for Construction Purposes.

5. Make Documents available at all time for Consultant's inspection

C. Ensure entries are complete and accurate, enabling future reference by Owner.

D. Store record documents separate from documents used for construction.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

G. Record Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension and detail.

5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.

2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. In addition to requirements called for in other sections of this manual, provide the following:

B. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.

4. Complete nomenclature and model number of replaceable parts.

C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

D. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

E. Include color coded wiring diagrams as installed.

F. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

G. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

H. Provide servicing and lubrication schedule, and list of lubricants required.

I. Include manufacturer's printed operation and maintenance instructions.

J. Include sequence of operation by controls manufacturer.

K. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

L. Provide control diagrams by controls manufacturer as installed.

M. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

N. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

O. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

P. Include test and balancing reports.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Digital O&M Manuals: In addition to binders described below, prepare manuals as PDF documents organized similar to the printed manuals. Copy to one or more properly labeled CD or DVD discs.

1. Searchable PDF files are preferred when possible. Table of Contents and any divider pages in these PDF files must be searchable.

2. Digital copies of O&M Manuals must be organized by section.

F. Paper & 3 Ring Binder O&M Manuals: Binders to be BINDERTEK Heavy-Duty Round 3-Ring Archival Binder, 3" Spine of equivalent, as approved by the Owner. Minimum ring size 1”. When multiple binders are used, correlate data into related consistent groupings. Do not overfill binders.

G. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

H. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Consultant, Consultants, Contractor and subcontractors, with names of responsible parties.

I. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

J. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

K. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

L. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

M. Arrangement of Contents: Organize each volume in parts as follows:

1. Project Directory.

2. Table of Contents, of all volumes, and of this volume.

3. Operation and Maintenance Data: Arranged by system, then by product category.

   a. Source data.

   b. Operation and maintenance data.

   c. Field quality control data.

   d. Original warranties and bonds.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and when required have been are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Binders to be Wilson Jones #344 Series of equivalent, as approved by the Owner. Minimum ring size 1”. Do not overfill binders.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.07 EVIDENCE OF PAYMENTS & RELEASE OF LIENS

A. Contractor shall submit the following:

1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G-706 or equivilant form.

2. Contractor's Affidavit of Release of Liens, AIA Document G-706A or equivilant form, including the following:

a. Consent of Contractor's Surety to Final Payment, AIA Document G-707, or equivilant form.

b. Contractor's Release or Waiver of Liens.

c. Separate releases or waivers of lien for Subcontractors, Suppliers, and others with lien rights against Owner's Property, together with list of those parties.

3. Duly sign and execute all Submittals, before delivery to Consultant.

3.08 CONTRACTOR'S CLOSEOUT SUBMITTALS TO CONSULTANT

A. Wage Certification: Section 00 7343 and 01 2000.

B. Building Official's Certificate of Mechanical & Electrical Inspections.

C. Building Official's Certificate of Occupancy.

3.09 SPARE PART & MAINTENANCE MATERIAL SUBMITTALS TO OWNER

A. All spare parts and extra material are to be delivered to the owner prior to the date of substantial completion. Provide written confirmation of delivery, noting quantity and description as well as storage location. Obtain written acceptance from Owner for receipt of stored items.

B. Specific Requirements: See Specifications Sections.

C. Products: Identical to those included in Project Work.

D. Storage Location: Where directed by Owner.

E. Required Submittals: See Specification Sections.

3.10 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to Consultant, including the following:

1. Original Contract Sum.

2. Additions and deductions resulting from:

a. Previous Change Orders.

b. Adjustments to Cash Allowances

c. Other adjustments.

d. Deductions for uncompleted Work.

e. Deductions for Reinspection Payments.

3. Total Contract Sum, as adjusted.

4. Previous Payments.

5. Sum remaining due.

B. Consultant will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

3.11 FINAL APPLICATION FOR PAYMENT

A. Follow procedures specified in Section 01 2000.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:

1. All software-operated systems
2. HVAC systems and equipment
3. Plumbing equipment
4. Electrical systems and equipment
5. Conveying systems
6. Landscape irrigation
7. Items specified in individual product Sections

1.02 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals

B. Other Specification Sections: Additional requirements for demonstration and training

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:

1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority
2. Submit one copy to the Commissioning Authority, not to be returned
3. Make commissioning submittals on time schedule specified by Commissioning Authority
4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format

B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.

1. Submit to Commissioning Authority for review and inclusion in overall training plan.
2. Submit not less than four weeks prior to start of training.
3. Revise and resubmit until acceptable.
4. Provide an overall schedule showing all training sessions.
5. Include at least the following for each training session:

a. Identification, date, time, and duration.

b. Description of products and/or systems to be covered.

c. Name of firm and person conducting training; include qualifications.

d. Intended audience, such as job description.

e. Objectives of training and suggested methods of ensuring adequate training.

f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.

g. Media to be used, such a slides, hand-outs, etc.

h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.

1. Include applicable portion of O&M manuals.

2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.

3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:

1. Identification of each training session, date, time, and duration.

2. Sign-in sheet showing names and job titles of attendees.

3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

4. Include Commissioning Authority's formal acceptance of training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.

1. Format: DVD Disc.

2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.

2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.

C. Demonstration may be combined with Owner personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.

1. Perform demonstrations not less than two weeks prior to Substantial Completion.

2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.

B. Conduct training on-site unless otherwise indicated.

C. Owner will provide classroom and seating at no cost to Contractor.

D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.

E. Provide training in minimum two hour segments.

F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.

G. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:

1. The location of the O&M manuals and procedures for use and preservation; backup copies.

2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.

3. Typical uses of the O&M manuals.

I. Product- and System-Specific Training:

1. Review the applicable O&M manuals.

2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.

3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.

4. Provide hands-on training on all operational modes possible and preventive maintenance.

5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.

6. Discuss common troubleshooting problems and solutions.

7. Discuss any peculiarities of equipment installation or operation.

8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.

9. Review recommended tools and spare parts inventory suggestions of manufacturers.

10. Review spare parts and tools required to be furnished by Contractor.

11. Review spare parts suppliers and sources and procurement procedures.

J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flashings.

B. Transition Fittings.

C. Dielectric Fittings.

1.02 RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures.

B. Section 01 78 00 – Closeout Submittals.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products.

C. Shop drawings and product data.

D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. TRANSITION FITTINGS
   1. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
   2. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
   3. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

B. DIELECTRIC FITTINGS
   1. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
   2. Insulating Material: Suitable for system fluid, pressure, and temperature.
   3. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
   4. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
   5. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

C. FLASHING
   1. Metal Flashing: 26-gauge-thick galvanized steel.
   2. Metal Counterflashing: 22-gauge-thick galvanized steel.
   3. Lead Flashing:
      a. Waterproofing: 5 lb/sq ft sheet lead.
      b. Soundproofing: 1 lb/sq ft sheet lead.
   4. Flexible Flashing: 47-mil-thick sheet butyl; compatible with roofing.
   5. Caps: Steel, 22-gauge minimum; 16 gauge at fire-resistant elements.

PART 3 EXECUTION

3.01 EXAMINATION

NOT USED

3.02 INSTALLATION

A. PIPING SYSTEMS - COMMON REQUIREMENTS
   1. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
   2. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
   3. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
   4. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
   5. Install piping to permit valve servicing.
   6. Install piping at indicated slopes, condensate piping shall be installed with a minimum ¼" per foot of slope.
   7. Install piping free of sags and bends.
   8. Install fittings for changes in direction and branch connections.
   9. Install piping to allow application of insulation.
   10. Select system components with pressure rating equal to or greater than system operating pressure.
   11. Install escutcheons for penetrations of walls, ceilings, and floors.
   12. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
      a. Cut sleeves to length for mounting flush with both surfaces.
         1) Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
      b. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
   13. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

B. EQUIPMENT INSTALLATION - COMMON REQUIREMENTS
   1. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
   2. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
   3. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
   4. Install equipment to allow right of way for piping installed at required slope.

C. INSTALLATION – FLASHING
   1. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
   2. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms for sound control.

END OF SECTION

SECTION 23 05 29
HANGERS AND SUPPORTS FOR
HVAC PIPING, DUCTS, AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hangers and supports for mechanical piping, ductwork, and equipment.

1.02 REFERENCE STANDARDS

A. American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME).
   1. ANSI/ASME B31.1, Power Piping.

B. American Society for Testing and Materials (ASTM).
   1. ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
   2. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
   3. ASTM A563, Specification for Carbon and Alloy Steel Nuts.

C. Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS).
   1. MSS SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.
   2. ANSI/MSS SP-69, Pipe Hangers and Supports - Selection and Application.
   3. MSS SP-89, Pipe Hangers and Supports - Fabrication and Installation Practices.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products.

C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hangers and Supports
   1. Refrigerant Piping:
      a. Conform to MSS SP58.
      b. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron or carbon steel, adjustable swivel, split ring.
      c. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
      d. Vertical Support: Steel riser clamp.
      e. Copper Pipe Support: Copper-plated carbon-steel ring.
   2. Ducts:
      a. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
      b. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
      c. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
      d. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
      e. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
      f. Trapeze and Riser Supports:
         1) Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
   3. Equipment:
      a. Formed Steel Channel

1) Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts. Sized by Structural Engineer.
2) Product Description: Galvanized 12-gauge-thick steel. With holes 1-1/2 inches on center.

PART 3 EXECUTION

3.01 EXAMINATION

NOT USED

3.02 INSTALLATION

A. INSTALLATION - PIPE HANGERS AND SUPPORTS
1. Install in accordance with MSS SP 58.
2. Support horizontal piping per mechanical code or MSS SP 69.
3. Place hangers within 12 inches of each horizontal elbow.
4. Use hangers with 1-1/2-inch-minimum vertical adjustment.
5. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
6. Provide copper plated hangers and supports for copper piping.
7. Design hangers for pipe movement without disengagement of supported pipe.
8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
9. Provide clearance in hangers and from structure and other equipment for installation of insulation.

B. INSTALLATION – DUCT HANGERS AND SUPPORTS
1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
2. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
3. Hangers Exposed to View: Threaded rod and angle or channel supports.
4. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
   a. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjusting, and balancing of air systems.

1.02 REFERENCE STANDARDS

A. Associated Air Balance Council:
   1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.

C. Natural Environmental Balancing Bureau:
   1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Test Reports: Indicate data on AABC MN-1 National Standards for Total System Balance forms or NEBB Report forms.

C. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

D. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required. Include detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guaranty or copy of NEBB Certificate of Conformance, or Professional Engineering License.

E. Submit draft copies of report for review prior to final acceptance of Project.

F. Furnish reports as a PDF, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced Drawings with air outlets and equipment identified to correspond with datasheets, and indicating thermostat locations.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with AABC MN-1 National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

B. Prior to commencing work, calibrate each instrument to be used.

1.05 QUALIFICATIONS

A. Test and Balance Engineer's Qualifications: A Professional Engineer registered in the State of Oregon, and having at least 3-years of successful testing, adjusting, and balancing experience on projects with testing and balancing requirements similar to those required for this Project.

B. Agency Qualifications: Shall meet at least one of the following.
   1. The independent testing, adjusting, and balancing agency certified by National Environmental Balancing Bureau (NEBB) or the Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this Project, and having at least one Professional Engineer registered in the State in which the services are to be performed, certified by NEBB or AABC as a Test and Balance Engineer.
   2. An agency which will utilize a Test and Balance Engineer from the staff to actively participate in and oversee work on site during the course of TAB efforts.

PART 2 PRODUCTS

SECTION NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify systems are complete and operable before commencing work. Verify the following:
   1. Systems are started and operating in safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed, and duct end caps are in place.
   10. Air outlets are installed and connected.
   11. Duct system leakage is minimized.

3.02 PREPARATION

A. Furnish instruments required for testing, adjusting, and balancing operations.

3.03 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10% of design.

B. Air Outlets and Inlets: Adjust total to within plus 10% and minus 5% of design to space. Adjust outlets and inlets in space to within plus or minus 10% of design.

3.04 ADJUSTING

A. Verify recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.

D. Report defects and deficiencies noted during performance of services, preventing system balance.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.05 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in main ducts by pitot tube traverse of entire cross-sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.

E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.

F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50% loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. At modulating damper locations, take measurements and balance at extreme conditions.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to obtain required relationship between each to maintain approximately 0.05 inch positive static pressure near building entries.

3.06 PROJECT CLOSEOUT

A. Some system balancing and adjusting will be for comfort. Accordingly, Contractor shall allow for readjusting air quantities or other settings after building completion and occupancy, for user comfort rather than conformance to indicated design values.

3.07 EQUIPMENT REQUIRING TESTING, ADJUSTING, AND BALANCING:

A. Forced-Air Furnaces.

B. Fans.

END OF SECTION

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SECTION 23 07 00
HVAC INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping Insulation.

B. Ductwork insulation and jackets.

C. Duct Liner.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products, indicating k-value, and thickness for each service.

C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

1.03 QUALITY ASSURANCE

A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding 50 in accordance with ASTM E84.

B. Energy Efficiency: Insulate piping and ductwork in accordance with the Oregon Energy Code.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation and related products when ambient temperatures and conditions are not meeting manufacturer’s requirements.

PART 2 PRODUCTS

2.01 PIPE INSULATION

A. Man Made Mineral Fiber: ASTM C547; rigid molded, non-combustible.
   1. k (ksi) factor: 0.24 at 75 degrees F.
   2. Maximum service temperature: 850 degrees F.
   3. Vapor Retarder Jacket: White Kraft paper with glass fiber yarn and bonded to aluminized film, secured with self-sealing longitudinal laps and butt strips, or with outward clinch expanding staples and vapor retarder mastic.

B. Closed cell elastomeric: ASTM C534; flexible, cellular elastomeric, molded or sheet.
   1. k (ksi) Value: 0.27 at 75 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Connection: Waterproof vapor retarder adhesive.

2.02 DUCTWORK INSULATION

A. Flexible Glass Fiber: ASTM C553; flexible, non-combustible blanket.
   1. k (ksi) Value: 0.29 at 75 degrees F.
   2. Vapor Retarder Jacket: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, secured with pressure-sensitive tape.

B. Rigid Glass Fiber: ASTM C612; rigid, non-combustible blanket.
   1. k (ksi) Value: 0.29 at 75 degrees F.
   2. Density: 3.0 lb/cu ft.
   3. Vapor Retarder Jacket: Kraft paper with glass fiber yarn and bonded to aluminized film, secured with pressure-sensitive tape.

C. Cellular Foam: ASTM C518 or ASTM C177; flexible, cellular elastomeric, molded or sheet.
   1. k (ksi) factor: 0.25 at 75 degrees F.
   2. Maximum service temperature: 220 degrees F.

2.03 DUCT LINER:

A. Fibrous-Glass Duct Liner: ASTM C1071; flexible, noncombustible blanket.
   1. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant

coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
2. k (ksi) Value: 0.27 at 75 degrees F.
3. Adhesive: Waterproof fire-retardant type.
4. Liner Fasteners: Galvanized steel, self-adhesive pad or welded with press-on head.

B. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify piping, equipment, and ductwork are tested and ready for installation.

3.02 INSTALLATION

A. Piping Insulation:
1. General: Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
2. Locate insulation, and cover seams in least visible locations.
3. Neatly finish insulation at supports, protrusions, and interruptions.
4. Insulate complete system of pipes conveying fluids below ambient temperature.
5. Install fiberglass insulated pipes conveying fluids below ambient temperature with vapor barrier jackets. Finish with glass cloth and vapor barrier adhesive.
6. For man-made mineral fiber insulated pipes conveying fluids above ambient temperature, install standard jackets. Bevel and seal ends of insulation at equipment, flanges, and unions.
7. Install insert between support shield and piping on piping 2 inches in diameter or larger. Fabricate of cork or other high-density insulating material suitable for temperature, not less than 6 inches long.
8. For pipe exposed in mechanical equipment rooms or in finished spaces, finish with PVC jacket and fitting covers.
9. For exterior applications, install vapor barrier jacket. Insulate pipe, fittings, joints, and valves, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.
10. Insulate refrigerant piping with 1” insulation.

B. External Ductwork Insulation:
1. General: Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
2. For insulated ductwork conveying air below ambient temperature, install vapor barrier jacket. Finish with tape. Seal vapor barrier penetrations with vapor barrier adhesive.
3. For insulated ductwork conveying air above ambient temperature, install with or without standard vapor barrier jacket. Where service access is required, bevel and seal ends of insulation.
4. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
5. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging.
6. For exterior applications, install insulation with vapor barrier jacket. Cover with outdoor jacket.
7. Insulate exhaust and relief ductwork from the air discharge terminal up to the motorized or backdraft damper.

C. Duct Liner:
1. Duct Lining shall be applied in strict accordance with the latest edition of SMACNA’s “HVAC Duct Construction Standard Metal & Flexible” and NAIMA’s “Fibrous Glass Duct Liner Standard”.
2. Length of mechanical fasteners shall be selected in accordance with the manufacturer’s recommendation as listed on each product. Mechanical fasteners shall be installed perpendicular to the duct surface, and in no instance shall the pin compress the liner more than 1/8″ relative to the nominal thickness of the insulation.

3. All exposed edges of the duct liner shall be coated with the factory applied edge coating or an adhesive which conforms to ASTM C 916.
4. When duct lining is applied with an adhesive, the adhesive shall be applied to the sheet metal with a 90% minimum coverage. All exposed duct liner edges not coated by the manufacturer shall be coated with the same adhesive. All rips and tears shall be repaired using this same adhesive.
5. Transverse joints shall be firmly butted with no gaps and coated with adhesive. Longitudinal corner joints shall be overlapped and compressed.
6. When air velocities are 4,000 to 6,000 FPM, metal nosing shall be applied to all upstream transverse edges to additionally secure the insulation.
7. Insulate supply, return, and outside air ductwork with a minimum of R-8 Insulation.
8. Insulate exhaust and relief ductwork from the air discharge terminal up to the motorized or backdraft damper.
9. Install acoustical duct liner in all rectangular supply and return air ductwork for the first 10 feet (minimum) of connections to air handling equipment.

END OF SECTION

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SECTION 23 11 23
FACILITY NATURAL GAS PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Natural gas piping above grade.

B. Unions and flanges.

C. Strainers.

D. Natural gas pressure regulators.

E. Natural gas pressure relief valves.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products.

C. Piping Specialties: Submit manufacturers catalog information including capacity, rough-in requirements, and service sizes for the following:
   1. Strainers.
   2. Natural gas pressure regulators.
   3. Natural gas pressure relief valves.

D. Manufacturer's Installation Instructions.

1.03 QUALITY ASSURANCE

A. Perform natural gas work in accordance with NFPA 54.

B. Perform work in accordance with applicable code and local gas company requirements.

C. Perform work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

D. Furnish shutoff valves complying with ASME B16.33 or ANSI Z21.15

PART 2 PRODUCTS

2.01 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M forged steel welding type.
   2. Joints: Threaded for pipe 2 inches and smaller; welded for pipe 2-1/2 inches and larger.

B. Corrugated Stainless Steel Tubing: Only to be used with 5’ of the connection to equipment. ASTM A240, type 304 stainless steel with a minimum nominal wall thickness of 0.01".
   1. System shall comply with the ANSI LC-1 standard, *“Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing”*, and carrying listings by CSA International, Certification Number 2728525, ICC Evaluation Services, Report Number PMG-1019, and IAPMO Uniform-ES, Evaluation Report 3250.
   2. Protective Coating: Factory-applied corrosion–resistant polyethylene jacket. Jacket shall be UV-Resistant polyethylene meeting the requirements of ASTM E84 of (25) for flame spread and (50) for smoke density.
   3. Fittings: Mechanical tube fittings manufactured from ASTM B16 type 360 brass whose design incorporates a double wall flare for gas-tight seal with mechanical capture of the jacket for enhanced tubing protection. Include ends with threads according to ASME B1.20.1 for connection to threaded pipe or fittings.

2.02 UNIONS AND FLANGES

A. Unions for Pipe 2 Inches and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, water impervious isolation barrier.

2.03 STRAINERS

A. 2 Inches and Smaller: Screwed brass or iron body for 175-psig working pressure, Y-pattern with 1/32-inch stainless steel perforated screen.

2.04 NATURAL GAS PRESSURE REGULATORS

A. Product Description: Spring loaded, general purpose, self-operating service regulator including internal relief type diaphragm assembly and vent valve. Diaphragm case can be rotated 360 degrees in relation to body.
   1. Temperatures: Minus 20 degrees F to 150 degrees F.
   2. Body: Cast iron.
   3. Spring Case, Lower Diaphragm Casing, Union Ring, Seat Ring, and Disk Holder: Aluminum.
   4. Disk, Diaphragm, and O-Ring: Nitrile.
   5. Maximum Inlet Pressure: 150 psig.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions are suitable for installation.

3.02 PREPERATION

A. Ream pipe and tube ends. Remove burrs, Bevel plain and ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with ASME B31.9, ASTM F708, and MSS SP 89.

B. Place hangers within 12 inches of each horizontal elbow.

C. Install hangers to allow 1-1/2-inch-minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

D. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

E. Provide clearance in hangers and from structure and other equipment for access to valves and fittings.

3.04 INSTALLATION – PIPING SYSTEMS ABOVE GRADE

A. Install natural gas piping in accordance with NFPA 54.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Sleeve pipe passing through partitions, walls, and floors.

G. Install firestopping at fire-rated construction perimeters and openings containing penetrating sleeves and piping.

H. Provide access where valves and fittings are not exposed.

I. Provide support for utility meters in accordance with requirements of utility company.

J. Install vent piping from gas pressure reducing valves to outdoors and terminate in weatherproof hood, or provide and install vent-limiting device.

K. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting.

L. For other than steel pipe, exposed piping shall be identified by a yellow label marked “GAS” in black letters. The marking shall be spaced at intervals not exceeding 5 feet. The marking shall not be required on pipe located in the same room as the appliance served.

M. Install valves with stems upright or horizontal, not inverted.

N. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

O. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components with factory-applied paint or protective coating.

P. Install gas-pressure regulator with tee fitting between regulator and upstream shutoff valve. Cap or plug one opening of tee fitting.

Q. Install gas-pressure regulator with tee fitting not less than 10 pipe diameters downstream of regulator. Cap or plug one opening of tee fitting.

3.05 FIELD QUALITY CONTROL

A. Pressure test natural gas piping in accordance with NFPA 54 and local codes.

B. When pressure tests do not meet specified requirements, remove defective work, replace and retest.

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SECTION 23 31 13
LOW-PRESSURE METAL DUCTS

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:
   1. Materials and installation of low-pressure metallic ductwork, joints and accessories

B. Sheet vapor barrier under concrete slabs on grade.

1.02 REFERENCE STANDARDS

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

B. American Society for Testing and Materials International, (ASTM).
   1. ASTM A 480/A480M, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip
   2. ASTM A635/A635M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements.
   3. ASTM A 653/A653M, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
   1. SMACNA HVAC Duct Construction Standards - Metal and Flexible.
   2. SMACNA HVAC Air Duct Leakage Test Manual.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit SDS Safety Data for the following:
   1. Sealants.
   2. Tape.
   3. Proprietary joints.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect on site stored or installed absorptive material from moisture damage.

B. Seal ends of ducts with plastic membrane until the time of installation to protect against dirt and debris.

PART 2 PRODUCTS

2.01 DUCTWORK

A. Duct Materials:
   1. Galvanized Steel Ducts: ASTM A653/A653M galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90/A90M.
   2. Fasteners: Rivets, bolts, or sheet metal screws.
   3. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

B. Ductwork Fabrication:
   1. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
   2. Fabricate and support round ducts with longitudinal seams in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible (Round Duct Construction Standards), and as indicated on Drawings. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
   3. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide turning vanes.
   4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment, and 45 degrees convergence downstream.

5. Fabricate continuously welded round and oval duct fittings two gauges heavier than duct gauges indicated in SMACNA Standard. Minimum 4-inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
6. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoff, use 90-degree conical tee connections.

C. Insulated Flexible Ducts:
1. Manufacturers:
   a. Flexmaster.
   b. Hercules.
   c. Hart & Cooley
   d. Flexible Technologies
   e. JP Lamborn
2. Product Description: Two ply-vinyl film supported by helical-wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
   a. Thermal resistance: R4.2.
   b. Max velocity: 4,000 FPM.
   c. Temp. range: -10°F-160°F
   d. Pressure rating: -1.0" to 10" WC

D. Spiral Round Ducts:
1. Product Description: UL 181, Class 1, round spiral lock seam duct constructed of galvanized steel.
2. Construction:
   a. 3"-14" duct diameter – min. 28 gauge.
   b. 15"-24" duct diameter – min. 26 gauge.
3. Fittings:
   a. 3"-14" fitting diameter – min 28 gauge.
   b. 15"-18" fitting diameter – min 26 gauge.
   c. 20"-24" fitting diameter – min. 24 gauge.

E. Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of minus 30°F to plus 200°F

F. Tape: polyvinyl treated, open weave fiberglass tape, 2" wide.

PART 3 EXECUTION

3.01 EXAMINATION

1. Verify equipment connection sizes before fabricating transitions.

3.02 INSTALLATION

A. Metal Ducts: Install in accordance with SMACNA Duct Construction Standards - Metal and Flexible.
B. Connect flexible ducts to metal ducts with drawbands.
C. Use crimp joints with or without bead for joining round duct sizes 8 inches and smaller with crimp in direction of airflow.
D. Install flexible connections immediately adjacent to fans and motorized equipment. Install flexible connections specified between fan inlet and discharge ductwork. Prevent flexible connectors being in tension while running.
E. Install backdraft dampers on discharge of exhaust fans and as indicated on Drawings.
F. Cut openings in ductwork to accommodate thermometers and controllers. Cut pitot tube openings for testing of systems, complete with metal can with spring device or screw to eliminate against air leakage.
G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
H. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Dampers.
      a. Low-pressure manual dampers.
      b. Motorized dampers.
      c. Gravity back draft dampers.

B. Turning vanes.

C. Flexible duct connections.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products.

C. Manufacturer's Installation Instructions:

1.03 CLOSEOUT SUBMITTALS

A. Operation and maintenance information.

1.04 QUALITY ASSURANCE

A. Dampers tested, rated, and labeled in accordance with current UL requirements.

PART 2 PRODUCTS

2.01 DAMPERS

A. Low pressure manual dampers: Single or multiple blade type, constructed in accordance with SMACNA standards.

B. Control Dampers: Provide dampers with opposed blades for modulating control. Construct blades of 16-gauge steel; provide heavy-duty molded self-lubricating nylon bearings, 1/2-inch-diameter steel axles spaced on 9-inch centers. Construct frame of 2-inch x 1/2-inch x 1/8-inch steel channel for face areas 25 square feet and under; 4-inch x 1-1/4-inch x 16-gauge channel for face areas over 25 square feet. Provide galvanized steel finish.
   1. Actuator: modulating, NEMA 250 type 2 enclosure, directly mounted to the shaft, 90 second full stroke with 15 second spring return, 0-10vdc or 4-20mA input, rated for 65,000 cycles.

C. Gravity Back-Draft Dampers: Provide dampers with parallel blades, counterbalanced and factory-set to prevent back-draft. Construct blades of 16-gauge aluminum; provide 1/2-inch-diameter ball bearings, 1/2-inch-diameter steel axles spaced on 9-inch centers. Construct frame of 2-inch x 1/2-inch x 1/8-inch steel channel for face areas 25 square feet and under; 4-inch x 1-1/4-inch x 16-gauge channel for face areas over 25 square feet. Provide galvanized steel finish.

2.02 TURNING VANES

A. Manufactured Turning Vanes for metal ducts.
   1. Double-wall air foil design.

B. Comply with SMACNA Standards

C. Manufacturers:
   1. Ductmate Industries, Inc.
   2. Duro Dyne Inc.
   3. METALAIRE, Inc.
   4. SEMCO Incorporated.
   5. Sheet Metal Connectors Inc. (SMC)

2.03 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Flexaust (The) Co.
4. Ventfabrics, Inc.
5. Flexible Metal Hose, Inc.

B. General: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of Neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibration of connected equipment

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify ducts and equipment are ready for accessories.

3.02 INSTALLATION

A. Install backdraft dampers on ducts nearest to the outside and where indicated on the drawings.

B. Install flexible duct connections on the inlets and outlets of all vibration generating equipment.

END OF SECTION

SECTION 23 54 16
SPLIT-SYSTEM FURNACES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Fuel-Fired Furnaces.
2. Evaporator Coil.
3. Condensing Units.
4. Air-Side Economizer.
5. Thermostats.

1.02 SUBMITTALS

A. Submittal procedures shall be in accordance with Section 01 33 00 - Submittal Procedures.

B. Include the following: rated capacity, efficiencies clearance requirements, weight, dimensions, field connection information, and wiring diagram.

C. Manufacturer’s installation instructions, including rigging and assembly.

D. Refrigerant pipe sizing.

1.03 CLOSEOUT SUBMITTALS

A. Provide operation and maintenance data: Submit manufacturer’s descriptive literature, service instructions, installation and operations instructions, maintenance and repair data, and parts list.

1.04 EXTRA MATERIALS

A. Spare filters: in addition to filters installed immediately prior to acceptance by Owner, supply 1 complete set of filters for each filter unit or filter bank in accordance with section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

1.05 FUEL-FIRED FURNACES

A. Manufacturers: (Furnace, Evaporator, and Condenser shall match) See Equipment Schedule.

1. Lennox.
2. Trane.
3. York.

B. Self-contained, packaged, factory-assembled, prewired unit consisting of cabinet, supply fan, heating element, controls, air filter and accessories; wired for single power connection with control transformer.

1. Electric Refrigeration: Refrigerant cooling coil and outdoor package containing compressor, condenser coil, and condenser fan.

C. Accessories:

1. Concentric roof vent kit.
2. Condensate neutralizer kit.

3. Return air smoke detector.

D. Cabinet: Steel with baked enamel finish, easily removed and secured access panels with safety interlock switches for furnaces installed indoors, insulation.

E. Supply Fan: Centrifugal type rubber-mounted with direct- or belt-drive, adjustable variable-pitch motor pulley.

F. Heat Exchanger: stainless steel tube type 430 with stainless steel fins.

1. Secondary: stainless steel tube with stainless steel fins.

G. Stainless steel welded construction.

H. Gas Burner:

1. 96% Efficiency.
2. 2-stages of heat.
3. Atmospheric type with adjustable combustion air supply.
4. Gas valve provides 100% safety gas shutoff; 24-volt combining pressure regulation, safety ignition system, manual On-Off valve, pilot filtration, automatic electric valves.
5. Electronic ignition, with electric spark or hot surface igniter.
6. Corrosion-resistant combustion air blower with permanently lubricated motor.

I. Gas Burner Safety Controls:

1. Ignition and flame-sensing safety controls to prove adequate combustion air supply and stop gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box and prevents unsafe operation.
3. Blocked Vent Shutoff System: Temperature sensor installed on draft hood and prevents operation; manual reset.
4. Limit Control: Fixed stop at maximum permissible setting, deenergizes burner on excessive outlet air temperature; automatic resets.

J. Air Filters: 2-inch-thick, glass fiber, disposable type arranged for easy replacement. Size filters for 500 fpm maximum at scheduled supply air volume. Provide duct transitions to and from filter rack as required.

1.06 EVAPORATOR COIL

A. Manufacturer:

1. Shall match the furnace and condenser.

B. Features:

1. Copper tube with mechanically affixed aluminum fin assembly.
2. Galvanized sheetmetal drain pan.
3. Restricted distributor, thermostatic expansion valve, refrigerant piping connections,
4. Steel cabinet with enamel finish and insulation.

1.07 CONDENSING UNIT

A. Manufacturer:

1. Shall match the furnace and evaporator coil.

B. Compressor: Hermetic, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Furnish time delay control to prevent short cycling.

C. Refrigeration Accessories: Filter drier, high-pressure switch (manual reset), low-pressure switch (automatic reset), service valves and gauge ports and thermometer well (in liquid line). Furnish thermostatic expansion valves. Furnish refrigerant piping, factory cleaned, dried, pressurized and sealed, with insulated suction line.

D. Air Cooled Condenser: ARI 520; copper tube with mechanically affixed aluminum fin assembly, with direct-drive axial propeller fan resiliently mounted, galvanized fan guard.

E. Refrigeration Operating Controls:

1. Low Ambient Kit: Furnish refrigerant pressure or temperature switch to cycle condenser fan motor on when condenser refrigerant pressure is above 285 psig, and off when pressure drops below 140 psig for operation to 0 degrees F.

1.08 AIR-SIDE ECONOMIZER

A. Dampers: opposed-blade dampers, full-sized to match the ductwork, tested to comply with low-leak requirements from ASHRAE 90.1, 2019.

B. Actuators: Belimo (or equal) with limit stops, independent operation of each damper, installed outside the airstream.

C. Controls:

1. Demand Controlled Ventilation. Standard Occupied operation with the minimum CO2 setpoint of 800 ppm (adjustable). As CO2 increases in the occupied space, the Outside Air (OA) damper modulates open the Return Damper modulates closed, until the CO2 level begins to drop, at which time the OA damper begins to close, and the Return damper begins to open.
2. Economizer Operation: on a call for cooling when the outside air temperature is below 60 degrees F (adjustable), the outside air damper and relief air damper shall open to 100% the mixed air damper shall close to 0%.
3. Outside air temperature sensor installed in the OA duct.
4. Controller shall be capable of communicating with the furnace controller, thermostat, and existing JCI campus control system.

1.09 COMMNUICATING THERMOSTATS

A. Manufacturers:

1. Honeywell.
2. Lennox.
3. Trane.
4. York.

B. Electric solid-state microcomputer-based room thermostat meeting all requirements of the state energy code. Additional features shall include, but are not limited to, the following:

1. Automatic switching from heating to cooling with a 5 degree F. deadband.
2. Preferential rate control to minimize overshoot and deviation from setpoint.
3. Set up for four separate temperatures for each day.
4. Instant override of setpoint for continuous or until the next scheduled setpoint.
5. Short cycle protection.

6. Programming based on weekdays, and Saturday and Sunday.
7. Selection features including degree F display, 12- or 24-hour clock, remote sensor, fan on-auto.
8. Battery replacement without program loss.
9. Thermostat display:
    a. Time of day.
    b. Actual room temperature.
    c. Programmed temperature.
    d. Programmed time.
    e. Duration of timed override.
    f. Day of week.
    g. System mode indication: Heating, cooling, auto, off, fan auto, fan on.
10. Capable of administrative lockout.
11. Control System Compatibility: Capable of integrating with the existing JCI Campus control system.

PART 3 EXECUTION

1.010 INSTALLATION

A. Install in accordance with manufacturer's instructions, regulations of authorities having jurisdiction and OMSC.

B. Install fuel-fired furnaces in accordance with NFPA 54.

C. Install vent connections in accordance with NFPA 211 and NFPA 54.

D. Install control wiring between thermostat, indoor unit, and outdoor unit.

E. Install evaporator unit in section of lined ductwork fastened to furnace. Connect return air and evaporator unit duct to system ductwork with flexible duct connection. Refer to Section, AIR DUCT ACCESSORIES.

F. Locking Access Port Caps: Install locking-type tamper-resistant caps on all refrigerant access ports located outdoors.

END OF SECTION

SECTION 23 81 27
DUCTLESS SPLIT SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes split-system air-conditioning units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting.

1.02 SUBMITTALS

A. Product Data: Submit data indicating:
   1. Cooling capacities with operating outdoor air temperature range.
   2. Dimensions.
   3. Weights.
   4. Rough-in connections and connection requirements.
   5. Electrical requirements with electrical characteristics and connection requirements.
   6. Controls.
   7. Accessories.

B. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.

1.03 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls installed remotely from units.

B. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

1.04 QUALITY ASSURANCE

A. Performance Requirements: Energy efficiency not less than prescribed by the ASHRAE 90.1, 2019.

B. Sound Rating: Measure in accordance with ARI 270.

C. Insulation and adhesives: Meet requirements of NFPA 90A.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following. Note: All manufacturers listed may not be capable of supplying all products covered by this section.
   1. Daikin
   2. Lennox
   3. Mitsubishi / Trane

2.02 WALL-MOUNTED, EVAPORATOR-FAN UNIT

A. Cabinet: Steel Frame with removable panels on front and ends in white or cream color.
B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
C. Fan: Direct drive, centrifugal fan.
D. Filters: Permanent, cleanable.
E. Condensate: Integral drain pan with drain connection.

2.03 CONDENSING UNIT

A. General: Factory assembled and tested air cooled condensing units, consisting of casing, compressors, condensers, coils, condenser fans and motors, and unit controls.
B. Unit Casings: Exposed casing surfaces constructed of galvanized steel with manufacturer's standard baked enamel finish. Designed for outdoor installation and complete with weather protection for components and controls, and complete with removable panels for required access to compressors, controls, condenser fans, motors, and drives.

C. Compressor: Single refrigeration circuit with rotary compressors, resiliently mounted, with positive lubrication, and internal motor overload protection.
D. Condenser Coil: Constructed of copper tubing mechanically bonded to aluminum fins, factory leak and pressure tested.
E. Controls: Furnish operating and safety controls including high and low pressure cutouts. Control transformer. Furnish magnetic contactors for compressor and condenser fan motors.
F. Condenser Fans and Drives: Direct drive propeller fans statically and dynamically balanced. Wired to operate with compressor. Permanently lubricated ball bearing type motors with built-in thermal overload protection. Furnish high efficiency fan motors.
G. Condensing Unit Accessories: Furnish the following accessories:
    1. Controls to provide low ambient cooling to 0 degrees F.
    2. Time delay relay.
    3. Anti-short cycle timer.
    4. Condenser Coil Guard: Condenser fan openings furnished with PVC coated steel wire safety guards.
    5. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
    6. Locking-type tamper resistant caps for all refrigerant circuit access ports.

H. Refrigeration specialties: Furnish the following for each circuit:
    1. Charge of compressor oil.
    2. Holding charge of refrigerant.
    3. Liquid line sight glass and moisture indicator.
    4. Shut-off valves on suction and liquid piping.
    5. Liquid line solenoid valve.
    6. Charging valve.
    7. Oil level sight glass.
    8. Crankcase heater.
    9. Pressure relief device.

2.04 CONTROLS

A. Wired Thermostat: Wired, 7 day programmable electronic space thermostat with single stage two stage cooling.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify concrete pad for condensing unit is ready for unit installation.

3.02 INSTALLATION – FAN COIL

A. Install condensate piping with trap and route from drain pan to mop sink in the adjacent room.
B. Install components furnished loose for field mounting.

3.03 INSTALLATION - CONDENSING UNIT

A. Install units on concrete foundations. Secure units to pads with expansion bolts or similar.
B. Install refrigerant piping from unit to condensing unit. Install refrigerant specialties furnished with unit.
C. Evacuate refrigerant piping and install initial charge of refrigerant.
D. Install electrical devices furnished loose for field mounting.
E. Install control wiring between air handling unit, condensing unit, and field installed accessories.
F. Install connection to electrical power wiring in accordance with Division 16.

3.04 MANUFACTURER'S FIELD SERVICES

A. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

3.05 CLEANING

A. Vacuum clean coils and inside of unit cabinet.
B. Install new filters in units at Substantial Completion.

3.06 DEMONSTRATION

A. Demonstrate air handling unit operation and maintenance.

B. Demonstrate starting, maintenance, and operation of condensing unit.
C. Furnish services of manufacturer's technical representative for 2 hours to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days' notice to Architect/Engineer of training date.

END OF SECTION

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SECTION 26 00 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Basic Electrical Requirements specifically applicable to Division 26 Sections.

1.2 SCOPE OF WORK

A. The specifications describe the quality and character of the materials and methods of installation.

B. The drawings and these specifications are complementary to each other in that all apparatus, materials and equipment outlined in the Drawings and/or specified herein shall be considered essential to the contract.

C. The drawings include plans of the building, with diagrammatic layouts showing approximate locations of equipment and devices. Before installing, study adjacent architectural features, and make installation in the most logical manner in accordance with Code and Regulatory Requirements.

D. The electrical symbols, notes, instructions and schedules on the drawings are included as part of these specifications.

1.3 WORK SCHEDULE AND SEQUENCE

A. Install work in stages to accommodate the Owner’s operational requirements. Coordinate schedule and hours of operation with the Owner prior to start of construction.

B. Coordinate installation sequence with detailed coordination shop drawings provided under Division 1.

1.4 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code

B. National Electrical Safety Code

1.5 SUBMITTALS

A. Conform to Division 1 requirements.

B. Include a transmittal form clearly indicating the Project, the name of the Contractor and the contents of the submittal.

C. Include Contractor’s stamp and signature indicating that the submittal has been reviewed and conforms to Contract Documents. Submittals without Contractor’s stamp will be returned without review.

D. Identify deviations from Contract Documents, including variations and limitations. Review of a submittal does not constitute acceptance of deviations from the Contract Documents, unless such deviation is clearly indicated as such on the submittal, and specifically accepted as such.

E. Submit shop drawings and product data, grouped to include complete systems, products and accessories in a single package.
1. Reference catalog cuts and brochures of products to proper paragraph in specifications. Furnish numerical index by specification article number, listing product name, catalog number and reference to page number of submittal brochure.
2. Arrange the submittals in the same sequence as the specifications and reference in the upper right-hand corner, the particular specification provision for which each submittal is intended.
3. Cross reference individual catalog numbers of substitute products to number of specified materials.
4. Submit manufacturer's certification that equipment meets or exceeds the minimum requirements as specified.
5. Where materials, equipment and installations are specified to conform with societies or agencies such as ANSI, NECA, etc., submit certification of such compliance.
6. The submittal shall be complete and with catalog data and information properly marked to show, among other things, material capacity and performance to meet capacities or performance as specified or indicated
7. Mark dimensions and values in units to match those specified.

F. Review of the submittal is only for general conformance with design concept of project and general compliance with information given in the contract documents. The Contractor is responsible for confirmation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination work of all trades.

G. For items which are not manufactured and which have to be specifically fabricated, submit shop drawings and details.

H. Ordering of equipment prior to approval of submittals is done entirely at the risk of the Contractor.

1.6 COORDINATION SUBMITTALS

A. Develop detailed coordination shop drawings in conjunction with other trades, where required by complex and/or congested spaces, to minimize conflict, to allow for correct sequence of installation, and to provide all required clearances. See Division 1 for expanded requirements.

1.7 PROJECT RECORD DRAWINGS

A. Conform to Division 1 requirements.

B. Keep an accurate record of the work under this Contract, as it progresses, to be available for inspection at all times. See individual Division 26 Sections for specific requirements.

C. Upon completion of the work, transfer all changes and information onto a new set of reproducible drawings in an orderly and legible manner.

1.8 QUALITY ASSURANCE

A. For actual fabrication, installation and testing of the work, use only trained and experienced workers completely familiar with the equipment and materials, and the manufacturer's installation requirements.

B. Include the services of experienced superintendents for each sub-section who shall be constantly in charge of the work, together with the qualified journeymen, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate and test the work involved, including equipment and materials furnished by others.

C. Perform the work under this section shall be in cooperation with the work of other trades to prevent conflict or interference and to aid in timely completion of the overall project.

1.9 DELIVERY, STORAGE AND HANDLING

A. Storage and handling of equipment and/or systems for project, whether it be onsite or offsite, shall be addressed by the Contractor's IAQ Management Plan. Plan must meet or exceed the recommended control measures of the "Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3)."

1.10 REGULATORY REQUIREMENTS

A. Conform to International Building Code, International Fire Code, and NFPA 101 Life Safety Code

B. Electrical: Conform to NFPA 70.

1.11 FIELD CONDITIONS

A. Visit the project site and become familiar with field conditions including accessibility and physical obstructions. Bid submission indicates familiarity with, and acceptance of, field conditions.

B. Separate Sections cover site, architectural and mechanical Work. Study the complete set of contract documents to become familiar with the entire Project including site, architectural and structural features and systems as related to Work in this Division. Pay special attention to Divisions featuring equipment requiring electrical interface including Owner-furnished equipment, elevator equipment, and mechanical systems (plumbing, hvac, fire sprinkler, controls).

C. Study and become familiar with any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. Exercise due and particular caution to determine that all parts of work are made quickly and easily accessible.

D. If any conflicts occur which necessitate departures from the Drawings, submit details of departures and reasons therefore for written approval. Do not install the affected equipment or related impacted wiring until approval is received.

E. Should there be omissions or discrepancies in the plans and specifications, or discrepancies from actual site conditions, bring them to the attention of the Engineer ten (10) working days in advance of the date of bid opening so that corrections or clarifications can be made.

F. Install Work in locations shown on Drawings, unless prevented by Project conditions. Coordinate work with that of other trades. Verify that adjacent and related construction conforms to contract documents and to coordination shop drawings.

G. If Project conditions, including changes initiated by other trades or discovery of conditions unknown at time of bid, require rearrangement of work, mark such changes on as-built drawings. If Project conditions require unspecified materials and methods, submit Request For Information (RFI) to the Architect with drawings showing the proposed alternative materials or methods. Obtain permission of the Architect before proceeding.

H. All RFIs must include a proposed solution. RFIs submitted without proposed solutions will be returned without review.

1.12 COORDINATION

A. Provide and coordinate all information, drawings or layouts of equipment or work under this section which affect the work of the other trades.

B. In case changes in the indicated locations or arrangements are necessary due to developed conditions in the construction, or rearrangement of furnishings, or equipment, these changes shall be made without extra cost to the Owner, provided the change is ordered before work directly connected is installed, and no extra materials are required.

1.13 EXISTING UTILITIES

A. The location of utilities shown on the plans are the best known information available at time of design. Contact the appropriate agencies and confirm the information and make arrangements for connection thereto, prior to excavation and installation of any piping or systems.

B. Perform exploratory excavation and/or use locate service as needed to confirm locations of existing underground utilities.

1.14 PROJECT SITE VISITS

A. Periodic visits to the project site by the Architect/Engineer are for the express purpose of verifying compliance with the contract documents. Such site visits shall not be construed as construction supervision, i.e., the Architect/Engineer assumes no responsibility for providing a safe place for the performance of the work by the Contractor or the Contractor's employees or the safety of the supplies of the Contractor. Neither shall such site visits relieve the Contractor of the responsibility for the discovery of his own errors and the correction of them, nor of the responsibility of properly performing the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. See Drawings and individual Sections of Division 26.

2.2 SUBSTITUTIONS

A. Conform to Division 1 requirements. Conformance to construction documents is the responsibility of the substitutor, regardless of approval.

B. Layout on drawings, including space allotted for clearances, access, etc., is based on performance and physical attributes of equipment specified and/or scheduled on plans. Coordinate with other systems, subsystems and trades as required when using substituted materials or equipment.

C. If the use of substitute materials or equipment requires alternate arrangement of equipment, fixtures, devices, wiring or accessories, prepare drawings showing proposed changes. Obtain permission of the Architect before proceeding.

D. If the use of substitute materials or equipment results in different performance than that provided by the specified materials or equipment, adjust Work as required to provide parity performance, at no additional cost to the Government. Obtain permission of the Engineer before proceeding.

E. If the use of substitute materials or equipment results in an increase in the cost, including changes to the Work of other trades, pay for any said increase in cost.

F. See Drawings and individual Sections of Division 26 for further specific information required for substitutions.

2.3 VALUE ENGINEERING

A. Conform to SUBSTITUTIONS above.

B. In addition, obtain a Professional 3rd Party review and opinion on the implementation of VE proposals.

2.4 REFERENCE TO SCHEDULES AND DRAWINGS

A. Refer to schedules on drawings for equipment identification, features, ratings, configuration, performance and design requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. See Drawings and individual Sections of Division 26. In addition the following general requirements shall apply:
   1. Obtain Manufacturer's printed installation instruction to aid in properly executing work of installing equipment whenever such instructions are available. Submit copies of such instructions to the Architect prior to time of installation.

2. Install equipment in a neat and workmanlike manner. Align, level and adjust for satisfactory appearance and operation. Install so that connection and disconnection of wiring and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, maintenance and repair.

END OF SECTION 26 05 00

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Metal-clad cable, Type MC.
3. Armored cable, Type AC.
4. Fire-alarm wire and cable.
5. Connectors and splices.

B. Related Requirements:

1. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.
2. Section 271313 "Communications Copper Backbone Cabling" for twisted pair cabling used for data circuits.
3. Section 271513 "Communications Copper Horizontal Cabling" for twisted pair cabling used for data circuits.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Copper building wire.
2. Metal-clad cable, Type MC.
3. Armored cable, Type AC.
4. Fire-alarm wire and cable.
5. Connectors and splices.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 or ASTM B496 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2. Comply with UL 83.
2. Type XHHW-2. Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Circuits:

1. Single circuit.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Insulated.

F. Conductor Insulation:

1. Type TFN/THHN/THWN-2. Comply with UL 83.
2. Type XHHW-2. Comply with UL 44.

G. Armor: Steel or Aluminum, interlocked.

H. Jacket: PVC applied over armor.

2.3 ARMORED CABLE, TYPE AC

A. Description: A factory assembly of insulated current-carrying conductors with or without an equipment grounding conductor in an overall metallic sheath.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 4.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Circuits:

1. Single circuit.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Insulated.

F. Conductor Insulation: Type THHN/THWN-2. Comply with UL 83.

G. Armor: Steel or Aluminum, interlocked.

2.4 FIRE-ALARM WIRE AND CABLE

A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600 V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.

1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

2.5 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper or Bronze.
2. Type: One or Two hole with standard or long barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper, stranded.

B. Branch Circuits:

1. Copper, stranded.

C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Armored cable, Type AC or Metal-clad cable, Type MC.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION, GENERAL

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points in accordance with Section 260533.13 "Conduits for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 INSTALLATION OF FIRE-ALARM WIRE AND CABLE

A. Comply with NFPA 72.

B. Wiring Method: Install wiring in raceway.

1. Fire-alarm circuits and equipment control wiring associated with fire-alarm system must be installed in a dedicated pathway system.

   a. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.

2. Signaling Line Circuits: Power-limited fire-alarm cables [**may**] [**must not**] be installed in the same cable or pathway as signaling line circuits.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

F. Wiring to Remote Alarm Transmitting Device: 1 inch (25 mm) conduit between the fire-alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch (150 mm) of slack.

D. Comply with requirements in Section 284621.11 "Addressable Fire-Alarm Systems" for connecting, terminating, and identifying wires and cables.

3.6 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078400 "Firestopping."

3.9 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements:

3. Perform each of the following visual and electrical tests:

    a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    b. Test bolted connections for high resistance using one of the following:

        1) A low-resistance ohmmeter.
        2) Calibrated torque wrench.
        3) Thermographic survey.

    c. Inspect compression-applied connectors for correct cable match and indentation.
    d. Inspect for correct identification.
    e. Inspect cable jacket and condition.
    f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
    g. Continuity test on each conductor and cable.
    h. Uniform resistance of parallel conductors.

4. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

    a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

5. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Category 5e balanced twisted pair cable.
2. Category 6 balanced twisted pair cable.
3. Balanced twisted pair cable hardware.
4. RS-232 cable.
5. RS-485 cable.
6. Control cable.
7. Control-circuit conductors.
8. Fire-alarm wire and cable.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Category 5e balanced twisted pair cable.
2. Category 6 balanced twisted pair cable.
3. Balanced twisted pair cable hardware.
4. RS-232 cable.
5. RS-485 cable.
6. Control cable.
7. Control-circuit conductors.
8. Fire-alarm wire and cable.

1.3 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.

1. Flame Travel Distance: 60 inch (1520 mm) or less.

2. Peak Optical Smoke Density: 0.5 or less.
3. Average Optical Smoke Density: 0.15 or less.

C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.

D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

2.2 CATEGORY 5e BALANCED TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.

B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.

C. Conductors: 100 ohm, No. 24 AWG solid copper.

D. Shielding/Screening: Unshielded twisted pairs (UTP).

E. Cable Rating: Riser.

F. Jacket: White thermoplastic.

2.3 CATEGORY 6 BALANCED TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.

C. Conductors: 100 ohm, No. 23 AWG solid copper.

D. Shielding/Screening: Unshielded twisted pairs (UTP).

E. Cable Rating: Riser.

F. Jacket: Gray thermoplastic.

2.4 BALANCED TWISTED PAIR CABLE HARDWARE

A. Description: Hardware designed to connect, splice, and terminate balanced twisted pair copper communications cable.

B. General Requirements for Balanced Twisted Pair Cable Hardware:

1. Comply with the performance requirements of Category 5e and Category 6.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables must be terminated with connecting hardware of same category or higher.

C. Source Limitations: Obtain balanced twisted pair cable hardware from single source from single manufacturer.

D. Connecting Blocks: 110-style IDC for Category 5e and 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.

E. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.

1. Features:

a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. Replaceable connectors.
d. 24 or 48 ports.

2. Construction: 16-gauge steel and mountable on 19 inch (483 mm) equipment racks.
3. Number of Jacks per Field: One for each four-pair conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.

G. Patch Cords: Factory-made, four-pair cables in 36 inch (900 mm)lengths; terminated with an eight-position modular plug at each end.

1. Patch cords must have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords must have latch guards to protect against snagging.
2. Patch cords must have color-coded boots for circuit identification.

H. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.
3. Marked to indicate transmission performance.

I. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100 ohm unshielded or shielded balanced twisted pair cable.
2. Designed to snap-in to a patch panel or faceplate.
3. Standards:

a. Category 5e, unshielded balanced twisted pair cable must comply with IEC 60603-7-2.
b. Category 6, unshielded balanced twisted pair cable must comply with IEC 60603-7-4.

4. Marked to indicate transmission performance.

J. Faceplate:

1. Six port, vertical single-gang faceplates designed to mount to single-gang wall boxes.
2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 260533.16 "Boxes and Covers for Electrical Systems."
3. For use with snap-in jacks accommodating any combination of balanced twisted pair, optical fiber, and coaxial work area cords.

K. Legend:

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

2.5 RS-232 CABLE

A. PVC-Jacketed, TIA 232-F:

1. Three or Nine, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Polypropylene insulation.
3. Aluminum foil-polyester tape shield with 100 percent shield coverage.
4. PVC jacket.
5. Conductors are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. NFPA 70 Type: Type CM.
7. Flame Resistance: Comply with UL 1581.

2.6 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CMG.

1. Paired, one pair or two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

2.7 CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. One or Multi-pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1685.

2.8 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway .

B. Class 2 Control Circuits: Stranded copper, power-limited cable, in raceway.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, power-limited cable, in raceway.

2.9 FIRE-ALARM WIRE AND CABLE

A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600 V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.

1. Control-Voltage Circuits: No. 16 AWG, minimum, in pathway.
2. Low-Voltage Circuits: No. 12 AWG, minimum, in pathway.

2.10 SOURCE QUALITY CONTROL

A. Factory test twisted pair cables according to TIA-568-C.2.

B. Cable will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Test cables on receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

3.2 INSTALLATION OF RACEWAYS AND BOXES

A. Comply with requirements in Section 260533.13 "Conduits for Electrical Systems" for raceway selection and installation requirements for conduits as supplemented or modified in this Section.

B. Comply with requirements in Section 260533.16 "Boxes and Covers for Electrical Systems" for raceway selection and installation requirements for boxes as supplemented or modified in this Section.

1. Outlet boxes must be no smaller than 2 inch (50 mm) wide, 3 inch (75 mm) high, and 2-1/2 inch (64 mm) deep.

2. Outlet boxes for cables must be no smaller than 4 inch (102 mm) square by 1-1/2 inch (38 mm) deep with extension ring sized to bring edge of ring to within 1/8 inch (3.1 mm) of the finished wall surface.

C. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.

D. Install manufactured conduit sweeps and long-radius elbows if possible.

E. Raceway Installation in Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard if entering the room from overhead.
4. Extend conduits 3 inch (75 mm) above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96 inch (2440 mm) dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA-568-C Series of standards.
2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
3. Terminate all conductors; cable must not contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced and must be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
6. Secure and support cables at intervals not exceeding 30 inch (760 mm) and not more than 6 inch (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
11. Support: Do not allow cables to lie on removable ceiling tiles.
12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
13. Provide strain relief.

14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
15. Ground wire must be copper, and grounding methods must comply with IEEE C2. Demonstrate ground resistance.

C. Balanced Twisted Pair Cable Installation:

1. Comply with TIA-568-C.2.

2. Install wiring in raceways.
3. Install termination hardware as specified in Section 271513 "Communications Copper Horizontal Cabling" unless otherwise indicated.
4. Do not untwist balanced twisted pair cables more than 1/2 inch (12 mm) at the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.

E. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between cables in nonmetallic raceways and unshielded power conductors and electrical equipment must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inch (127 mm).
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inch (305 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inch (600 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inch (64 mm).
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inch (150 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inch (305 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures must be as follows:

   a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inch (75 mm).
   c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inch (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inch (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inch (127 mm).

3.4 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits; No 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.5 FIRESTOPPING

A. Comply with requirements in Section 078400 "Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping" Chapter.

3.6 GROUNDING

A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.

B. For control-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.7 IDENTIFICATION

A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers must use label stocks, laminating adhesives, and inks complying with UL 969.

C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.

    a. Test instruments must meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

C. End-to-end cabling will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 260523

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding clamps.
3. Grounding and bonding bushings.
4. Grounding and bonding hubs.
5. Grounding and bonding connectors.
6. Intersystem bonding bridge grounding connector.
7. Grounding and bonding busbars.
8. Grounding (earthing) electrodes.
9. Grounding electrode enclosures.

B. Related Requirements:

1. Section 270528 "Pathways for Communications Systems" specifies additional requirements for grounding and bonding of communications raceways, boxes, and cable trays.
2. Section 271100 "Communications Equipment Room Fittings" specifies additional requirements for grounding and bonding of communications equipment.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Plans showing dimensioned locations of grounding features described in "Field Quality Control for Grounding and Bonding of Electrical Power" Article, including the following:

1. Grounding electrode access enclosures.
2. Grounding electrodes.

C. Field quality-control reports.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Plans showing locations of grounding features described in "Field Quality Control for Grounding and Bonding of Electrical Power" Article, including the following:

   a. Grounding electrode access enclosures.
   b. Grounding electrodes.

2. Instructions for periodic testing and inspection of grounding features at test wells based on NFPA 70B.

a. Tests must determine if ground-resistance or impedance values remain within specified maximums, and instructions must recommend corrective action if values do not.
b. Include recommended testing intervals.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment Grounding Conductor:

1. General Characteristics: 600 V, THHN/THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. ASTM - Bare Copper Grounding and Bonding Conductor:

1. Referenced Standards: Complying with one or more of the following:

a. Soft or Annealed Copper Wire: ASTM B3.
b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.
d. 19-Wire Combination Unilay-Stranded Copper Conductor: ASTM B787/B787M.

C. UL KDSH - Protector Grounding Conductor:

1. Description: Conductors intended to be used for grounding primary protector or metallic members of cable sheath in accordance with Chapters 7 and 8 of NFPA 70.
2. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. Listing Criteria:

a. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

4. Options:

a. Color: green.

2.2 GROUNDING AND BONDING CLAMPS

A. Description: Clamps suitable for attachment of grounding and bonding conductors to grounding electrodes, pipes, tubing, and rebar. Grounding and bonding clamps specified in this article are also suitable for use with communications applications.

B. Source Limitations: Obtain products from single manufacturer.

C. Performance Criteria:

1. Regulatory Requirements:

   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

   a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
   b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

D. UL KDER and KDSH - U-Bolt-Type Pipe and Rod Grounding and Bonding Clamp:

1. General Characteristics:

   a. Clamp Material: Brass or tinned brass.
   b. Listed for outdoor use.

E. UL KDER and KDSH - Strap-Type Pipe and Rod Grounding and Bonding Clamp:

1. General Characteristics:

   a. Clamp Material: Copper or Tinned copper.
   b. Listed for outdoor use.

F. UL KDER - Beam Grounding and Bonding Clamp:

1. General Characteristics: Mechanical-type, terminal, ground wire access from four directions; with dual, tin-plated or silicon bronze bolts.

G. UL 96; UL 467; UL 468A; IEEE 837 – Irreversible Compression Connectors:

1. General Characteristics: Hydraulically compressed connection kits of types recommended by kit manufacturer for materials being joined and for installation conditions. Suitable for direct burial in earth or concrete.

2.3 GROUNDING AND BONDING BUSHINGS

A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures, and have one or more bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.

B. Source Limitations: Obtain products from single manufacturer.

C. Performance Criteria:

1. Regulatory Requirements:

   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

D. UL KDER - Bonding Bushing:

1. General Characteristics: Threaded bushing with insulated throat.

E. UL KDER - Grounding Bushing:

1. General Characteristics: Threaded bushing with insulated throat and mechanical-type wire terminal.

2.4 GROUNDING AND BONDING HUBS

A. Description: Hubs with certified grounding or bonding locknut.

B. Source Limitations: Obtain products from single manufacturer.

C. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

D. UL KDER - Grounding and Bonding Hub:

1. General Characteristics: Insulated, gasketed, watertight hub with mechanical-type wire terminal.

2.5 GROUNDING AND BONDING CONNECTORS

A. Source Limitations: Obtain products from single manufacturer.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

C. UL KDER - Pressure-Type Grounding and Bonding Busbar Cable Connector:

1. General Characteristics: Copper or copper alloy, for compression bonding of one or more conductor directly to copper busbar. Listed for direct burial.

D. UL KDER - Lay-In Lug Mechanical-Type Grounding and Bonding Busbar Terminal:

1. General Characteristics: Mechanical-type, copper rated for direct burial terminal with set screw.

E. UL KDER - Crimped Lug Pressure-Type Grounding and Bonding Busbar Terminal:

1. General Characteristics: Cast silicon bronze, solderless compression-type wire terminals; with long barrel and two holes spaced on 5/8 or 1 inch (16 or 25 mm) centers for two-bolt connection to busbar.

F. UL KDER - Crimped Pressure-Type Grounding and Bonding Cable Connector:

1. General Characteristics: Crimp-and-compress connectors that bond to conductor when connector is compressed around conductor.

a. Copper or Tinned copper, C and H shaped.

2.6 INTERSYSTEM BONDING BRIDGE GROUNDING CONNECTORS

A. Description: Devices that provide means for connecting communications systems grounding and bonding conductors at service equipment or at disconnecting means for buildings or structures.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

C. UL KDSH - One-Piece Intersystem Bonding Bridge Grounding Connector:

1. General Characteristics: Zinc-alloy one-piece construction; six terminating points; gangable.

D. UL KDSH - Two-Piece Intersystem Bonding Bridge Grounding Connector:

1. General Characteristics: Zinc-alloy body and polycarbonate cover; four terminating points.

2.7 GROUNDING AND BONDING BUSBARS

A. Description: Miscellaneous grounding and bonding devices that serve as common connection for multiple grounding and bonding conductors.

B. Source Limitations: Obtain products from single manufacturer.

C. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

D. UL KDER - Equipment Room Grounding and Bonding Busbar:

1. General Characteristics:

a. Bus: Rectangular bar of annealed copper.
b. Mounting Stand-Off Insulators: Lexan or PVC.

1) Comply with UL 891 for use in 600 V switchboards, impulse tested at 5000 V.

2. Options:

a. Dimensions: 1/4 by 4 inch (6.3 by 100 mm) in cross section; length as indicated on Drawings.
b. Predrilled Hole Pattern: Complying with BICSI N3 and TIA-607 Suitable for installing specified grounding and bonding connectors.
c. Mounting Hardware: Stand-off brackets that provide 4 inch (100 mm) clearance to access rear of bus. Brackets and bolts must be stainless steel.

E. UL KDER - Rack and Cabinet Bonding Busbar:

1. General Characteristics:

a. Bus: Rectangular bar of hard-drawn solid copper.
b. Horizontal Mounting Dimensions: Designed for mounting in 19 inch (483 mm) wide equipment racks or cabinets.
c. Vertical Mounting Dimensions: Designed for mounting in 72 inch (1827 mm) high equipment racks or cabinets.
d. Predrilled Hole Pattern: Accepts connectors for grounding and bonding conductor sizes 14 AWG to 2/0 AWG.
e. Mounting Hardware: Stainless steel or copper-plated, for attachment to rack.

2.8 GROUNDING (EARTHING) ELECTRODES

A. Source Limitations: Obtain products from single manufacturer.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

C. UL KDER - Rod Electrode:

1. General Characteristics: Copper-clad steel; 5/8 inch by 8 ft (16 mm by 2.4 m).

2.9 GROUNDING ELECTRODE ENCLOSURES

A. Description: Enclosures designed to protect grounding electrodes from damage while providing access for inspection and testing of the grounding system.

B. Grounding Electrode Access Well Enclosure:

1. Source Limitations: Obtain products from single manufacturer.
2. Product Characteristics:

a. Well Material: Concrete.
b. Cover Material: Cast iron.
c. Cover Strength: Driveway use.

3. Required Product Options:

a. Round:

1) Nominal Diameter: 8 inch (200 mm).
2) Nominal Height: 12 inch (300 mm).
3) Slotted sides for installation after grounding connections made.

PART 3 - EXECUTION

3.1 SELECTION OF GROUNDING AND BONDING PRODUCTS

A. Grounding and Bonding Conductors:

1. Provide solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
2. Custom-Length Insulated Equipment Bonding Jumpers: 6 AWG, 19-strand, Type THHN.
3. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch (6 mm) in diameter.
4. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.

6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Underground Grounding Conductors: Install barecopper conductor, 3/0 AWG minimum.

B. Grounding and Bonding Connectors:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Irreversible compression connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Irreversible compression connectors.

C. Grounding and Bonding Busbars: Provide in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated on Drawings.

3.2 SELECTION OF GROUNDING AND BONDING PRODUCTS FOR COMMUNICATIONS

A. Comply with Section 270528 "Pathways for Communications Systems" and Section 271100 "Communications Equipment Room Fittings."

3.3 INSTALLATION OF GROUNDING AND BONDING

A. Comply with manufacturer's published instructions.

B. Special Techniques:

1. Grounding and Bonding Conductors:

a. Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
b. Underground Grounding Conductors:

1) Bury at least 30 inch (750 mm) below grade.

2. Grounding and Bonding Connectors: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
b. Make connections with clean, bare metal at points of contact.
c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
f. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1) Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate adjacent parts.

2) Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3) Use exothermic-welded connectors for outdoor locations; if disconnect-type connection is required, use bolted clamp.

g. Grounding and Bonding for Piping:

1) Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use bolted clamp connector or bolt lug-type connector to pipe flange by using one of lug bolts of flange. Where dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2) Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with bolted connector.
3) Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

h. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3. Grounding and Bonding Busbars:

a. Install busbar horizontally, on insulated spacers 2 inch (50 mm) minimum from wall, 6 inch (150 mm) above finished floor unless otherwise indicated.
b. Where busbars are indicated on both sides of doorways, route bonding conductor up to top of door frame, across top of doorway, and down; connect to continuation of horizontal busbar.

4. Electrodes:

a. Ground Rods: Drive rods until tops are 2 inch (50 mm) below finished floor or final grade unless otherwise indicated.

1) Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2) Use exothermic welds for below-grade connections.

b. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least same distance from other grounding electrodes, and connect to service grounding electrode conductor.
c. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and must be at least 12 inch (300 mm) deep, with cover.

1) Install at least one test well for each service unless otherwise indicated. Install at ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

d. Concrete-Encased Electrode (Ufer Ground):

1) Fabricate in accordance with NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 ft (6.0 m) long. If reinforcing is in multiple pieces, connect together by usual steel tie wires or exothermic welding to create required length.

5. Grounding at Service:

a. Equipment grounding conductors and grounding electrode conductors must be connected to ground busbar. Install main bonding jumper between neutral and ground buses.

6. Equipment Grounding and Bonding:

a. Install insulated equipment grounding conductors with feeders and branch circuits.

b. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.4 FIELD QUALITY CONTROL FOR GROUNDING AND BONDING

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench in accordance with manufacturer's published instructions.
3. Test completed grounding system at each location where maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before conductors are connected.

a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
b. Perform tests by fall-of-potential method in accordance with IEEE Std 81.
c. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to record of tests and observations. Include number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Nonconforming Work:

1. Grounding system will be considered defective if it does not pass tests and inspections.

2. Remove and replace defective components and retest.

C. Collect, assemble, and submit test and inspection reports.

1. Report measured ground resistances that exceed the following values:

a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 15 Ω.

3.5 PROTECTION

A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Support, anchorage, and attachment components.
2. Fabricated metal equipment support assemblies.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Slotted support systems, hardware, and accessories.
b. Clamps.
c. Hangers.
d. Sockets.
e. Eye nuts.
f. Fasteners.
g. Anchors.
h. Saddles.
i. Brackets.

2. Include rated capacities and furnished specialties and accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified structural professional engineer to design hanger and support system.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch (10 mm) diameter holes at a maximum of 8 inch (200 mm) on center in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel.
3. Channel Width: Selected for applicable load criteria.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
5. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
6. Toggle Bolts: All steel springhead type.
7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 SELECTION

A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA NEIS 101

2. NECA NEIS 102.
3. NECA NEIS 105.
4. NECA NEIS 111.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for raceways specified in Section 260533.13 "Conduits for Electrical Systems."

D. Comply with requirements for boxes specified in Section 260533.16 "Boxes and Covers for Electrical Systems."

E. Provide seismic controls with hangers and supports in accordance with requirements specified in "Section 260548.16 "Seismic Controls for Electrical Systems."

F. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERMC as required by NFPA 70. Minimum rod size must be 1/4 inch (6 mm) in diameter.

G. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

H. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch (38 mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT IMC and ERMC may be supported by openings through structure members, in accordance with NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inch (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inch (100 mm) thick.
6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M. Submit welding certificates.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 4 inch (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000 psi (20.7 MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup:

1. Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

a. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

2. Comply with requirements in Section 099113 "Exterior Painting" Section 099123 "Interior Painting" and Section 099600 "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533.13 - CONDUITS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type EMT-S duct raceways and elbows.
2. Type ERMC-S duct raceways, elbows, couplings, and nipples.
3. Type FMT duct raceways.
4. Type IMC duct raceways.
5. Type LFMC duct raceways.
6. Type PVC duct raceways and fittings.
7. Fittings for conduit, tubing, and cable.
8. Electrically conductive corrosion-resistant compounds for threaded conduit.
9. Solvent cements.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

C. Related Requirements:

1. Section 260519 "Low-Voltage for Electrical Power Conductors and Cables" for nonmetallic underground conduit with conductors (Type NUCC).
2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior duct banks and underground utility construction.

1.2 DEFINITIONS

A. Conduit: A structure containing one or more duct raceways.

B. Duct Raceway: A single enclosed raceway for conductors or cable.

C. Duct Bank: An arrangement of conduit providing one or more continuous duct raceways between two points.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Type EMT-S duct raceways and elbows.
2. Type ERMC-S duct raceways, elbows, couplings, and nipples.
3. Type FMC-S duct raceways.
4. Type IMC duct raceways.
5. Type LFMC duct raceways.
6. Type PVC duct raceways and fittings.
7. Fittings for conduit, tubing, and cable.
8. Electrically conductive corrosion-resistant compounds for threaded conduit.

9. Solvent cements.

B. Sustainable design submittals.

1. Solvent cements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions:

1. Type EMT-S duct raceways and elbows.
2. Type ERMC-S duct raceways, elbows, couplings, and nipples.
3. Type FMC-S duct raceways.
4. Type IMC duct raceways.
5. Type LFMC duct raceways.
6. Type PVC duct raceways and fittings.
7. Fittings for conduit, tubing, and cable.
8. Electrically conductive corrosion-resistant compounds for threaded conduit.
9. Solvent cements.

PART 2 - PRODUCTS

2.1 TYPE EMT-S DUCT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FJMX; including UL 797.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL FJMX - Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Material: Steel.
2. Options:

a. Exterior Coating: Zinc.
b. Interior Coating: Zinc.
c. Minimum Trade Size: Metric designator 21 (trade size 3/4).
d. Colors: As indicated on Drawings.

2.2 TYPE ERMC-S DUCT RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DYIX; including UL 6.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DYIX - Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Zinc.
2. Options:

a. Interior Coating: Zinc.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).
c. Colors: As indicated on Drawings.

2.3 TYPE FMC-S DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DXUZ; including UL 1.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DXUZ - Steel Flexible Metal Conduit (FMC-S):

1. Material: Steel.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Colors: As indicated on Drawings.

2.4 TYPE IMC DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria: UL CCN DYBY; including UL 1242.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DYBY - Steel Intermediate Metal Conduit (IMC):
1. Options:

a. Exterior Coating: Zinc.
b. Interior Coating: Zinc.
c. Minimum Trade Size: Metric designator 21 (trade size 3/4).
d. Colors: As indicated on Drawings.

2.5 TYPE LFMC DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DXHR; including UL 360.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DXHR - Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Material: Steel.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Colors: As indicated on Drawings.

2.6 TYPE PVC DUCT RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DZYR; including UL 651.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DZYR - Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Dimensional Specifications: Schedule 40.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
b. Markings: For use with maximum 90 deg C wire.

2.7 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DWTT - Fittings for Type ERMC, Type IMC Duct Raceways:

1. Listing Criteria: UL CCN DWTT; including UL 514B.
2. Options:

a. Material: Steel.
b. Coupling Method: Compression coupling OR Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.
c. Expansion and Deflection Fittings: UL 651 with flexible bonding jumper.

D. UL FKAV - Fittings for Type EMT Duct Raceways:

1. Listing Criteria: UL CCN FKAV; including UL 514B.
2. Options:

a. Material: Steel.
b. Coupling Method: Compression coupling OR Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.
c. Expansion and Deflection Fittings: UL 651 with flexible bonding jumper.

E. UL ILNR - Fittings for Type FMC Duct Raceways:

1. Listing Criteria: UL CCN ILNR; including UL 514B.

F. UL DXAS - Fittings for Type LFMC Duct Raceways:

1. Listing Criteria: UL CCN DXAS; including UL 514B.

2.8 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FOIZ; including UL Subject 2419.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL FOIZ - Electrically Conductive Corrosion-Resistant Compound for Threaded Conduit:

2.9 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DWTT; including UL 514B.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

2. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL DWTT - Solvent Cements for Type PVC Duct Raceways and Fittings:

PART 3 - EXECUTION

3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC, IMC.

2. Exposed and Subject to Physical Damage: ERMC, IMC, Corrosion-resistant EMT.

    a. Locations less than 2.5 m (8 ft) above finished floor.

3. Exposed and Not Subject to Physical Damage: ERMC, IMC, Corrosion-resistant EMT.
4. Concealed Aboveground: ERMC, IMC, EMT.
5. Direct Buried: PVC-40.
6. Concrete Encased Not in Trench: PVC-40.
7. Concrete Encased in Trench: PVC-40.
8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Exposed and Subject to Severe Physical Damage: ERMC, IMC. Locations include the following:

    a. Loading docks.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
    d. Gymnasiums.

2. Exposed and Subject to Physical Damage: ERMC, IMC, EMT. Locations include the following:

    a. Locations less than 2.5 m (8 ft) above finished floor.
    b. Stub-ups to above suspended ceilings.

3. Exposed and Not Subject to Physical Damage: ERMC, IMC, EMT.
4. Concealed in Ceilings and Interior Walls and Partitions: ERMC, IMC, EMT.
5. Damp or Wet Locations: ERMC, IMC, Corrosion-resistant EMT.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

D. Duct Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC and IMC: Provide threaded-type fittings unless otherwise indicated.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
2. Type ERMC-S: Article 344 of NFPA 70 and NECA NEIS 101.
3. Type FMC-S: Article 348 of NFPA 70 and NECA NEIS 101.
4. Type IMC: Article 342 of NFPA 70 and NECA NEIS 101.
5. Type LFMC: Article 350 of NFPA 70 and NECA NEIS 101.
6. Type PVC: Article 356 of NFPA 70 and NECA NEIS 111.
7. Expansion Fittings: NEMA FB 2.40.
8. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. General Requirements for Installation of Duct Raceways:

a. Complete duct raceway installation before starting conductor installation.
b. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft (0.6 m) above finished floor.
c. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch (300 mm) of changes in direction.
d. Make bends in duct raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
e. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
f. Support conduit within 12 inch (300 mm) of enclosures to which attached.
g. Install duct sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed duct raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install duct sealing fittings in accordance with NFPA 70.
h. Install devices to seal duct raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of duct raceways at the following points:

1) Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2) Where an underground service duct raceway enters a building or structure.
3) Conduit extending from interior to exterior of building.
4) Where otherwise required by NFPA 70.

i. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
j. Keep duct raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal duct raceway runs above water and steam piping.
k. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
l. Install pull wires in empty duct raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground duct raceways designated as spare above grade alongside duct raceways in use.
m. Install duct raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.

1) Termination fittings with shoulders do not require two locknuts.

n. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

2. Types ERMC and IMC:

   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of duct raceway and fittings before making up joints. Follow compound manufacturer's published instructions.

3. Types FMC, LFMC:

   a. Provide a maximum of 36 inch (915 mm) of flexible conduit forequipment subject to vibration, noise transmission, or movement; and for transformers and motors.

4. Types PVC:

   a. Comply with manufacturer's published instructions for solvent welding and fittings.

5. Duct Raceways Embedded in Slabs:

   a. Run duct raceways larger than metric designator 27 (trade size 1) below concrete slab.
   b. Arrange duct raceways to cross building expansion joints with expansion fittings at right angles to the joint.
   c. Arrange duct raceways to ensure that each is surrounded by minimum of 1 inch (25 mm) of concrete without voids.
   d. Do not embed threadless fittings in concrete unless locations have been specifically approved by Architect.
   e. Change from ENT to ERMC or IMC before rising above floor.

6. Stub-ups to Above Recessed Ceilings:

   a. Provide EMT, IMC, or ERMC for duct raceways.
   b. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

7. Duct Raceway Terminations at Locations Subject to Moisture or Vibration:

   a. Provide insulating bushings to protect conductors, including conductors smaller than 4 AWG. Install insulated throat metal grounding bushings on service conduits.

8. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

   a. EMT: Provide setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
   b. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

9. Expansion-Joint Fittings:

   a. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F (17 deg C) and that have straight-run length that exceeds 25 ft (7.6 m). Install in runs of aboveground ERMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F (55 deg C) and that have straight-run length that exceeds 100 ft (30 m).
   b. Install type and quantity of fittings that accommodate temperature change listed for the following locations:

1) Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
2) Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
3) Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
4) Attics: 135 deg F (75 deg C) temperature change.

c. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
d. Install expansion fittings at locations where conduits cross building or structure expansion joints.
e. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's published instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

10. Duct Raceways Penetrating Rooms or Walls with Acoustical Requirements: Seal duct raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.
11. Identification: Provide labels for conduit assemblies, duct raceways, and associated electrical equipment.

a. Provide warning signs.

D. Interfaces with Other Work:

1. Coordinate with Section 078400 "Firestopping" for installation of firestopping at penetrations of fire-rated floor and wall assemblies.
2. Coordinate with Section 260529 "Hangers and Supports for Electrical Systems" for installation of conduit hangers and supports.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533.13

SECTION 260533.16 - BOXES AND COVERS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Junction boxes and pull boxes.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Junction boxes and pull boxes.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions:

1. Junction boxes and pull boxes.

PART 2 - PRODUCTS

2.1 JUNCTION BOXES AND PULL BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. Listing Criteria: UL CCN BGUZ; including UL 50 and UL 50E.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.
2. Sustainable Design Submittals: Prepare and submit the following documentation for adhesive solvents:

3. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. UL BGUZ - Outdoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Options:

    a. Degree of Protection: Type 3R.

PART 3 - EXECUTION

3.1 PREPARATION

A. Shop Drawings: Prepare and submit the following:

1. Shop Drawings for Floor Boxes: Show that floor boxes are located to avoid interferences and are structurally allowable. Indicate floor thickness [**at location**]where boxes are embedded in concrete floors and underfloor clearances where boxes are installed in raised floors.

3.2 SELECTION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

    a. Type 3R unless otherwise indicated.

3.3 INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Outlet, Device, Pull, and Junction Boxes: Article 314 of NFPA 70.
2. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Provide boxes in wiring and raceway systems wherever required for pulling of wires or making connections.
2. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
3. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

4. Identification: Provide labels for boxes and associated electrical equipment.

a. Identify field-installed conductors, interconnecting wiring, and components.
b. Provide warning signs.
c. Label each box with engraved metal or laminated-plastic nameplate.

3.4 PROTECTION

A. After installation, protect boxes from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 260533.16

SECTION 260536 - CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal cable trays.
2. Cable tray accessories.

B. Products Installed, but Not Furnished, under This Section:

1. Section 260526 "Grounding and Bonding for Electrical Systems" specifies grounding and bonding products installed under this Section.
2. Section 260553 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Metal cable trays.
2. Cable tray accessories.

B. Shop Drawings:

1. Cable tray fabrication drawings, diagrams, and supporting documents.

C. Field quality-control reports.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' published instructions.

B. Field Reports:

1. Factory test reports.
2. Manufacturer's field reports for field quality-control support.

PART 2 - PRODUCTS

2.1 METAL CABLE TRAYS

A. Description: This product category covers metal cable trays and metal cable tray systems intended for field assembly and for use in accordance with Article 392 of NFPA 70.

B. Performance Criteria:

1. Regulatory Requirements:

   a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Listing Criteria: UL CCN CYNW; including NEMA VE 1 and suitability for use as equipment grounding conductors in accordance with Sections 392.60(A) and 392.60(B) of NFPA 70.

C. UL CNYW - Ladder Cable Tray:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Tripp Lite (Basis of design)
   b. Chatsworth Products Inc., Universal Cable Runway
   c. Cooper B-line; brand of Eaton, Electrical Sector.
   d. Cope; Atkore International.

2. Source Limitations: Obtain products from single manufacturer.
3. General Characteristics:

   a. Configuration: Two longitudinal side rails with transverse rungs swaged or welded to side rails, complying with NEMA VE 1.
   b. Width: 12 inches (300 mm) and 18 inches (450 mm) unless otherwise indicated on Drawings.
   c. Straight Section Lengths: 10 feet (3.0 m), except where shorter lengths are required to facilitate tray assembly.
   d. Rung Spacing: 12 inches (300 mm) o.c..
   e. No portion of the rungs must protrude below the bottom plane of side rails.
   f. Splicing Assemblies: Bolted type using serrated flange locknuts.
   g. Splice-Plate Capacity: Splices located within support span must not diminish rated loading capacity of cable tray.

4. Materials and Finishes (Steel):

   a. Straight Section and Fitting Side Rails and Rungs: Steel complies with the minimum mechanical properties of ASTM A1008/A1008M, Grade 33, Type 2.
   b. Steel Tray Splice Plates: ASTM A1011/A1011M, HSLAS, Grade 50, Class 1.
   c. Fasteners: Steel complies with the minimum mechanical properties of ASTM A510/A510M, Grade 1008.
   d. Finish:
      1) Powder-coat enamel paint, with stainless steel, Type 316, ASTM F593 and ASTM F594 hardware.

         a) Powder-Coat Enamel: Cable tray manufacturer's recommended primer and corrosion-inhibiting treatment, with factory-applied powder-coat paint.

2.2 CABLE TRAY ACCESSORIES

A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.

B. Barrier Strips: Same materials and finishes as for cable tray.

C. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

2.3 SOURCE QUALITY CONTROL

A. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

1. Include data indicating dimensions and finishes for each type of cable tray indicated.

B. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

C. Factory Tests:

1. Factory Tests and Inspections: Perform the following tests and inspections on cable trays, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction before delivering to site. Affix label with name and date of qualified electrical testing laboratory's certification of system compliance.

a. Test and inspect cable trays in accordance with NEMA VE 1.

2. Nonconforming Work:

a. Equipment that does not pass tests and inspections will be considered defective.

3. Factory Test Reports: Prepare and submit factory test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

A. Shop Drawings: Prepare and submit the following for each cable tray system:

1. Cable Tray Fabrication Drawings, Diagrams, and Supporting Documents:

a. Show fabrication and installation details of cable trays, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.
b. Include load calculations to show that dead and live loads do not exceed manufacturer's rating for tray and its support elements.
c. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:

1) Vertical and horizontal offsets and transitions.
2) Clearances for access above and to sides of cable trays.
3) Vertical elevation of cable trays above the floor or bottom of ceiling structure.

3.2 INSTALLATION OF CABLE TRAYS

A. Install cable tray and support systems in accordance with NEMA VE 2.

B. Install cable tray as a complete system, including fasteners, hold-down clips, support systems, barrier strips, adjustable horizontal and vertical splice plates, elbows, reducers, tees, crosses, cable dropouts, adapters, covers, and bonding.

C. Install cable tray, so that the tray is accessible for cable installation and all splices are accessible for inspection and adjustment.

D. Remove burrs and sharp edges from cable trays.

E. Fasten cable tray supports to building structure and install seismic restraints.

F. Design fasteners and supports to carry cable tray, cables, and a concentrated load of 200 lb (90 kg). Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems." Comply with seismic-restraint details in accordance with Section 260548.16 "Seismic Controls for Electrical Systems."

G. Place supports, so that spans do not exceed maximum spans on schedules, and provide clearances shown on Drawings. Install intermediate supports when cable weight exceeds the load-carrying capacity of tray rungs.

H. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.

I. Support assembly to prevent twisting from eccentric loading.

J. Do not install more than one cable tray splice between supports.

K. Make connections to equipment with flanged fittings fastened to cable trays and to equipment. Support cable trays independent of fittings. Do not carry weight of cable trays on equipment enclosure.

L. Install expansion connectors where cable trays cross building expansion joints and in cable tray runs that exceed recommended dimensions. Space connectors and set gaps in accordance with applicable standard.

M. Make changes in direction and elevation using manufacturer's recommended fittings.

N. Make cable tray connections using manufacturer's recommended fittings.

O. Install cable trays with enough workspace to permit access for installing cables.

P. Install barriers to separate cables of different systems, such as power, communications, and data processing, or of different insulation levels, such as 600, 5000, and 15 000 V.

Q. Install warning signs in visible locations on or near cable trays after cable tray installation.

3.3 CABLE TRAY GROUNDING

A. Ground cable trays in accordance with NFPA 70 unless additional grounding is specified.

B. Cable trays with electrical power conductors must be bonded together with splice plates listed for grounding purposes or with listed bonding jumpers.

C. Cable trays with single-conductor power conductors must be bonded together with a grounding conductor run in the tray along with the power conductors and bonded to the tray at 72 inch (1800 mm) intervals. The grounding conductor must be sized in accordance with Article 250 and Article 392 of NFPA 70.

D. When using epoxy- or powder-coat painted cable trays as a grounding conductor, completely remove coating at all splice contact points or ground connector attachment. After completing splice-to-grounding-bolt attachment, repair the coated surfaces with coating materials recommended by cable tray manufacturer.

E. Bond cable trays to power source for cables contained within with bonding conductors sized in accordance with Article 250 of NFPA 70.

3.4 INSTALLATION OF CABLES

A. Install cables only when each cable tray run has been completed and inspected.

B. Fasten cables on horizontal runs with cable clamps or cable ties. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.

C. Fasten cables on vertical runs to cable trays every 18 inch (450 mm).

D. Fasten and support cables that pass from one cable tray to another or drop from cable trays to equipment enclosures. Fasten cables to the cable tray at the point of exit and support cables independent of the enclosure. The cable length between cable trays or between cable tray and enclosure must be no more than 72 inch (1800 mm).

3.5 FABRICATION OF CONNECTION POINTS

A. Remove paint from all connection points before making connections. Repair paint after the connections are completed.

B. Connect raceways to cable trays in accordance with requirements in NEMA VE 2 and NEMA FG 1.

3.6 INSTALLATION OF CABLE TRAY MARKINGS AND SIGNS

A. Ladder Cable Trays: Provide warning signs to prevent use as personnel ladder.

1. Lettering: 1-1/2 inch (40 mm) high.
2. Legend: "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing cable trays and after electrical circuitry has been energized, survey for compliance with requirements.
2. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable trays, vibrations, and thermal expansion and contraction conditions, which may cause or have caused damage.
3. Verify that there are no intruding items, such as pipes, hangers, or other equipment, in the cable tray.
4. Remove dust deposits, industrial process materials, trash of any description, and any blockage of tray ventilation.
5. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and retorque in suspect areas.
6. Check for improperly sized or installed bonding jumpers.
7. Check for missing, incorrect, or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
8. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that all takeoff raceways are bonded to cable trays. Test entire cable tray system for continuity. Maximum allowable resistance is 1 Ω.

B. Nonconforming Work:

1. Cable tray will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.8 PROTECTION

A. Protect installed cable trays and cables.

1. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials and must remain in place until the risk of damage is over.
2. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
3. Repair damage to paint finishes with matching touchup coating recommended by cable tray manufacturer.

END OF SECTION 260536

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type PVC raceways and fittings.
2. Fittings for conduit, tubing, and cable.
3. Solvent cements.
4. Duct accessories.
5. Handholes and boxes for exterior underground wiring.
6. Duct sealing.

B. Related Requirements:

1. Section 260553 "Identification for Electrical Systems" specifies underground-line warning tape and concrete cable routing markers (warning planks).

1.2 DEFINITIONS

A. Duct: A single raceway or multiple raceways, installed singly or as components of a duct bank.

B. Duct Bank: Two or more ducts installed in parallel, direct buried or with additional casing materials such as concrete.

C. Handhole: An underground chamber containing electrical cables, sized such that personnel are not required to enter in order to access the cables.

D. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For concrete and steel used in precast concrete handholes, also include product certificates as required by ASTM C858.

B. Shop Drawings:

1. Precast or Factory-Fabricated Concrete Structures:

a. Include plans, elevations, sections, and details, including attachments to other Work.
b. Include duct entry provisions, including locations and duct sizes, and methods and materials for waterproofing duct entry locations.
c. Include reinforcement details.
d. Include joint details.

2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:

   a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
   b. Include duct entry provisions, including locations and duct sizes, and methods and materials for waterproofing duct entry locations.
   c. Include cover design.

C. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

B. Field Reports:

1. Factory Test Reports: For handholes and boxes.
2. Manufacturer's field reports for field quality-control support.

PART 2 - PRODUCTS

2.1 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL CCN DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Dimensional Specifications: Schedule 40.
2. Options:

   a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
   b. Markings: For use with maximum 90 deg C wire.

2.2 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2.3 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL CCN DWTT.

2.4 DUCT ACCESSORIES

A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

    a. ASTM C858 for design and manufacturing processes.
    b. SCTE 77.

B. Precast Concrete Handholes and Boxes:

1. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover must form top of enclosure and must have load rating consistent with that of handhole or box.
2. Configuration: Units must be designed for flush burial and have integral closed bottom unless otherwise indicated.
3. Frame and Cover:

    a. Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
    b. Cover Finish: Nonskid finish must have minimum coefficient of friction of 0.50.
    c. Cover Legend: Molded lettering, as indicated for each service.

4. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.

    a. Extension must provide increased depth of 12 inch (300 mm).
    b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.

5. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at installation location with ground-water level at grade.
6. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus additional 12 inch (300 mm) vertically and horizontally to accommodate alignment variations.

    a. Center window location.
    b. Knockout panels must be located no less than 6 inch (150 mm) from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.

c. Knockout panel opening must have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct.
d. Knockout panels must be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
e. Knockout panels must be 1-1/2 to 2 inch (38 to 50 mm) thick.

7. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

a. Type and size: Match fittings to duct to be terminated.
b. Fittings must align with elevations of approaching duct and be located near interior corners of handholes to facilitate racking of cable.
c. Provide minimum of one cast end-bell or duct-terminating fitting of each size provided in each wall.

8. Handholes 12 inch wide by 24 inch long (300 mm wide by 600 mm long) and larger must have inserts for cable racks and pulling-in irons installed before concrete is poured.

C. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover:

1. Description: Molded of sand, concrete, and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or combination.
2. Configuration: Units must be designed for flush burial and have integral closed bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and installed location.

a. Cover Finish: Nonskid finish must have minimum coefficient of friction of 0.50.
b. Cover Legend: Molded lettering, as indicated for each service.

4. Conduit Entrance Provisions: Conduit-terminating fittings must mate with entering ducts for secure, fixed installation in enclosure wall.
5. Duct Entrance Provisions: Duct-terminating fittings must mate with entering duct for secure, fixed installation in enclosure wall.
6. Handholes 12 inch wide by 24 inch long (300 mm wide by 600 mm long) and larger must have factory-installed inserts for cable racks and pulling-in irons.
7. Options:

2.6 DUCT SEALING

A. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 deg F (2 deg C). Compound must be capable of withstanding temperature of 300 deg F (150 deg C) without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals. Duct sealing compound must be removable without damaging ducts or cables.

2.7 SOURCE QUALITY CONTROL

A. Factory Tests for Handholes and Boxes:

1. Factory Tests and Inspections: Perform the following tests and inspections on handholes and boxes, by, or under supervision of, qualified electrical testing laboratory recognized

by authorities having jurisdiction, before delivering to site. Affix label with name and date of manufacturer's or qualified testing laboratory's certification of system compliance.

a. Precast Concrete Utility Structures: Test and inspect in accordance with ASTM C1037.
b. Polymer Concrete and Nonconcrete Handhole and Pull-Box Prototypes: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests must be for specified tier ratings of products supplied. Testing machine pressure gages must have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

2. Nonconforming Work:

a. Equipment that does not pass tests and inspections will be considered defective.

3. Factory Test Reports: Prepare and submit factory test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in field. Notify Architect if there is conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.

C. Clear and grub vegetation to be removed, and protect vegetation to remain in accordance with Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication in accordance with Section 311000 "Site Clearing."

3.2 SELECTION OF UNDERGROUND DUCTS

A. Duct for Electrical Feeders 600 V and Less: PVC-40, direct buried unless otherwise indicated.

B. Duct for Electrical Branch Circuits: PVC-40, direct buried unless otherwise indicated.

C. Underground Ducts Crossing Paved Paths Walks and Driveways: PVC-40 direct buried.

3.3 SELECTION OF UNDERGROUND ENCLOSURES

A. Handholes and Boxes:

1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 or Polymer concrete, SCTE 77, Tier 15 structural load rating.

2. Units in Sidewalk and Similar Applications with Safety Factor for Nondeliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 or Polymer concrete units, SCTE 77, Tier 8 structural load rating.
3. Cover design load must not exceed load rating of handhole or box.

3.4 EARTHWORK

A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."

C. Cut and patch existing pavement in path of underground duct, duct bank, and underground structures in accordance with "Cutting and Patching" Article in Section 017300 "Execution."

3.5 INSTALLATION OF DUCTS AND DUCT BANKS

A. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA TCB 2 for installation of underground ducts and duct banks.
2. Consult Architect for resolution of conflicting requirements.

B. Special Techniques:

1. Slope: Pitch duct minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope duct from high point between two manholes to drain in both directions.
2. Expansion and Deflection Fittings: Install expansion and deflection fitting in each duct in area of disturbed earth adjacent to handhole.
3. Install expansion fitting near center of straight line duct with calculated expansion of more than 3/4 inch (19 mm).
4. Curves and Bends:

    a. Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with minimum radius of 12.5 ft (4 m) horizontally and 3.0 ft vertically, at other locations unless otherwise indicated.
    b. Duct must have maximum of 180 degrees of bends between pull points.

5. Joints: Use solvent-cemented joints in nonmetallic duct and fittings and make watertight in accordance with manufacturer's published instructions. Stagger couplings so those of adjacent duct do not lie in same plane. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with minimum 3 inch (75 mm) of concrete for minimum of 12 inch (300 mm) on each side of coupling.

    a. Install insulated grounding bushings on steel raceway terminations that are less than 12 inch (300 mm) below grade or floor level and do not terminate in hubs.

6. End Bell Entrances to Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inch (250 mm) o.c. for 5 inch (125 mm) duct, and vary proportionately for other duct sizes.

    a. Begin change from regular spacing to end-bell spacing 10 ft (3 m) from end bell, without reducing duct slope and without forming trap in line.
    b. Grout end bells into structure walls from both sides to provide watertight entrances.

7. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15 psig (1.03 MPa) hydrostatic pressure.
8. Pulling Cord: Install 200 lbf (1000 N) test nylon cord in empty ducts.
9. Direct-Buried Duct and Duct Bank:

    a. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inch (150 mm) in nominal diameter.
    b. Width: Excavate trench 3 inch (75 mm) wider than duct on each side.
    c. Depth: Install top of duct at least 36 inch (900 mm) below finished grade unless otherwise indicated.
    d. Set elevation of top of duct bank below frost line.
    e. Place minimum 3 inch (75 mm) of sand as bed for duct. Place sand to minimum of 6 inch (150 mm) above top level of duct.
    f. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
    g. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 ft (6 m) of duct. Place spacers within 24 inch (600 mm) of duct ends. Stagger spacers approximately 6 inch (150 mm) between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
    h. Install duct with minimum of 3 inch (75 mm) between ducts for like services and 6 inch (150 mm) between power and communications duct.
    i. Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
    j. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inch (100 mm) over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

10. Underground-Line Warning Tape: Bury nonconducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inch (300 mm) above concrete-encased duct and duct banks and approximately 12 inch (300 mm) below grade. Align tape parallel to and within 3 inch (75 mm) of centerline of duct bank. Provide additional warning tape for each 12 inch (300 mm) increment of duct-bank width over nominal 18 inch (450 mm). Space additional tapes 12 inch (300 mm) apart, horizontally across width of ducts.

3.6 INSTALLATION OF CONCRETE HANDHOLES, AND BOXES

A. Reference Standards:

1. Precast Concrete Handholes: Comply with ASTM C891 unless otherwise indicated.
2. Consult Architect for resolution of conflicting requirements.

B. Special Techniques:

1. Precast Concrete Handholes:

a. Install units level and plumb and with orientation and depth coordinated with connecting duct to minimize bends and deflections required for proper entrances.
b. Unless otherwise indicated, support units on level bed of crushed stone or gravel graded from 1 inch (25 mm) sieve to No. 4 (4.75 mm) sieve and compacted to same density as adjacent undisturbed earth.
c. Field-cut openings for conduits in accordance with enclosure manufacturer's published instructions. Cut wall of enclosure with tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

2. Elevations:

a. Install handholes with bottom below frost line, <**Insert depth of frost line below grade at Project site**> below grade.
b. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
c. Where indicated, cast handhole cover frame integrally with handhole structure.

3. Field-Installed Bolting Anchors in Concrete Handholes: Do not drill deeper than 3-7/8 inch (97 mm) for manholes and 2 inch (50 mm) for handholes, for anchor bolts installed in field. Use minimum of two anchors for each cable stanchion.

3.7 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Special Techniques:

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
2. Unless otherwise indicated, support units on level bed of crushed stone or gravel, graded from 1/2 inch (12.5 mm) sieve to No. 4 (4.75 mm) sieve and compacted to same density as adjacent undisturbed earth.
3. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
4. Install handholes and boxes with bottom below frost line, <**Insert depth of frost line below grade at Project site**> below grade.
5. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

6. Field cut openings for duct in accordance with enclosure manufacturer's published instructions. Cut wall of enclosure with tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.
7. For enclosures subject to occasional, nondeliberate, heavy-vehicle loading, form and pour concrete ring encircling, and in contact with enclosure entry, and with top surface screeded to top of box cover frame. Bottom of ring must rest on compacted earth.

    a. Concrete: 3000 psi (20 kPa), 28-day strength, complying with Section 033000 "Cast-in-Place Concrete," with troweled finish.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide minimum 12 inch (300 mm) long mandrel equal to duct size minus 1/4 inch (6 mm). If obstructions are indicated, remove obstructions and retest.

B. Nonconforming Work:

1. Underground ducts, raceways, and structures will be considered defective if they do not pass tests and inspections.
2. Correct deficiencies and retest as specified above to demonstrate compliance.

C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.9 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of manholes, including sump, and building interiors affected by Work.

1. Sweep floor, removing dirt and debris.
2. Remove foreign material.

END OF SECTION 260543

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Round sleeves.
2. Rectangular sleeves.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.
6. Pourable sealants.
7. Foam sealants.

B. Related Requirements:

1. Section 078400 "Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 ROUND SLEEVES

A. Steel Wall Sleeves:

1. General Characteristics: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

B. Round, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics: Galvanized-steel sheet; thickness not less than 0.0239 inch (0.6 mm); round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 RECTANGULAR SLEEVES

A. Rectangular, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics:

a. Material: Galvanized sheet steel.

b. Minimum Metal Thickness:

1) For sleeve cross-section rectangle perimeter less than 50 inch (1270 mm) and with no side larger than 16 inch (400 mm), thickness must be 0.052 inch (1.3 mm).
2) For sleeve cross-section rectangle perimeter not less than 50 inch (1270 mm) or with one or more sides larger than 16 inch (400 mm), thickness must be 0.138 inch (3.5 mm).

2.3 SLEEVE-SEAL SYSTEMS

A. General Characteristics: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.

B. Options:

1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. General Characteristics: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit must have plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. General Characteristics: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
2. Design Mix: 5000 psi (34.5 MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.6 POURABLE SEALANTS

A. Performance Criteria:

1. General Characteristics: Single-component, neutral-curing elastomeric sealants of grade indicated below.

a. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2.7 FOAM SEALANTS

A. Performance Criteria:

1. General Characteristics: Multicomponent, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam. Foam expansion must not damage cables or crack penetrated structure.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for wall assemblies.

B. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

C. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve-seal systems. Size sleeves to allow for 1 inch (25 mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

D. Underground, Exterior-Wall and Floor Penetrations:

1. Install steel pipe sleeves with integral waterstops. Size sleeves to allow for 1 inch (25 mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Install sleeve during construction of floor or wall.
2. Install steel pipe sleeves. Size sleeves to allow for 1 inch (25 mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Grout sleeve into wall or floor opening.

3.2 INSTALLATION OF RECTANGULAR SLEEVES AND SLEEVE SEALS

A. Install sleeves in existing walls without compromising structural integrity of walls. Do not cut structural elements without reinforcing the wall to maintain the designed weight bearing and wall stiffness.

B. Install conduits and cable with no crossings within the sleeve.

C. Fill opening around conduits and cables with expanding foam without leaving voids.

D. Provide metal sheet covering at both wall surfaces and finish to match surrounding surfaces. Metal sheet must be same material as sleeve.

3.3 INSTALLATION OF SLEEVE-SEAL SYSTEMS

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION 260544

SECTION 260548.16 - SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Restraints - rigid type.
2. Restraints - cable type.
3. Restraint accessories.
4. Post-installed concrete anchors.
5. Concrete inserts.

B. Related Requirements:

1. Section 260529 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Restraints - rigid type.
2. Restraints - cable type.
3. Restraint accessories.
4. Post-installed concrete anchors.
5. Concrete inserts.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic- and Wind-Load-Restraint Device Load Ratings: Devices to be tested and rated in accordance with applicable code requirements and authorities having jurisdiction. Devices to be listed by a nationally recognized third party that requires periodic follow-up inspections and has a listing directory available to the public. Provide third-party listing by one or more of the following: an agency acceptable to authorities having jurisdiction.

B. Consequential Damage: Provide additional seismic and wind-load restraints for suspended components or anchorage of floor-, roof-, or wall-mounted components so that failure of a non-essential or essential component does not cause failure of any other essential building component.

C. Fire/Smoke Resistance: Seismic- and wind-load-restraint devices that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed

index of 50 when tested and labeled by qualified testing laboratory in accordance with ASTM E84 or UL 723.

D. Component Supports:

1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of qualified testing laboratory.

2.2 RESTRAINTS - RIGID TYPE

A. Description: Shop- or field-fabricated bracing assembly made of ANSI/AISI S110-07-S1 slotted steel channels, ANSI/ASTM A53/A53M steel pipe, or other rigid steel brace member. Includes accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.3 RESTRAINTS - CABLE TYPE

A. Seismic- and Wind-Load-Restraint Cables: ASTM A1023/A1023M galvanized or ASTM A603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for seismic-restraining cable service; with fittings attached by means of poured socket, swaged socket or mechanical (Flemish eye) loop.

B. Restraint cable assembly and cable fittings must comply with ASCE/SEI 19. Cable fittings and complete cable assembly must maintain the minimum cable breaking force. U-shaped cable clips and wedge-type end fittings do not comply and are unacceptable.

2.4 RESTRAINT ACCESSORIES

A. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Non-metallic stiffeners are unacceptable.

B. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.

C. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

D. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

E. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.5 POST-INSTALLED CONCRETE ANCHORS

A. Mechanical Anchor Bolts:

1. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength for anchor and as tested according to ASTM E488/E488M.

B. Adhesive Anchor Bolts:

1. Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.

C. Provide post-installed concrete anchors that have been prequalified for use in seismic and wind-load applications.

1. Prequalify post-installed anchors in concrete in accordance with ACI 355.2 or other approved qualification testing procedures.
2. Prequalify post-installed anchors in masonry in accordance with approved qualification procedures.

D. Expansion-type anchor bolts are not permitted for equipment in excess of 10 hp (7.46 kW) that is not vibration isolated.

1. Undercut expansion anchors are permitted.

2.6 CONCRETE INSERTS

A. Provide preset concrete inserts that are seismically prequalified in accordance with ICC-ES AC446 testing.

B. Comply with MSS SP-58.

2.7 SOURCE QUALITY CONTROL

A. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

1. Include rated load capacity for each seismic- and wind-load-restraint device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic- and wind-load-restraint component used.
3. Annotate types and sizes of seismic restraints and accessories, complete with listing markings or report numbers and load rating in tension and compression as evaluated by an agency acceptable to authorities having jurisdiction.
4. Annotate to indicate application of each product submitted and compliance with requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive seismic and wind-load control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for reinforcement and cast-in-place anchors to verify actual locations before installation.

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

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger-Rod Stiffeners: Install where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods caused by seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry static, wind load, and seismic loads within specified loading limits.

3.3 INSTALLATION OF SEISMIC-RESTRAINT AND WIND-LOAD CONTROL DEVICES

A. Provide seismic-restraint and wind-load control devices for systems and equipment where indicated in Equipment Schedules or Seismic and Wind-Load Controls Schedule, where indicated on Drawings, where the Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.

1. Install equipment and devices to withstand the effects of earthquake motions and high wind events.

B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

C. Installation of seismic and wind-load restraints must not cause any stresses, misalignment, or change of position of equipment or conduits.

D. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).

2. Install seismic-restraint and wind-load-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

E. Raceway, Cable, Wireway, Cable Tray, and Busway Support and Hanger Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
2. Install seismic-restraint and wind-load-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

F. Equipment and Hanger Restraints:

1. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
2. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

G. Install cables so they do not bend across edges of adjacent equipment or building structure.

H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

J. Post-Installed Concrete Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors must be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

END OF SECTION 260548.16

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Labels.
2. Extruded insulating tubing.
3. Bands.
4. Tapes.
5. Signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Identification Schedule: For each piece of electrical equipment and electrical system components to be index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 LABELS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN PGDQ2 for components; including UL 969.

B. UL PGDQ2 - Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

C. UL PGDQ2 - Self-Adhesive Wraparound Labels: Preprinted or Write-on, 3 mil (0.08 mm) thick, polyester or vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Self-Lamination: Clear; UV-, weather-, and chemical-resistant; self-laminating, with protective shield over legend. Size labels such that clear shield overlaps entire printed legend.
2. Marker for Labels:

a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
b. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

D. UL PGDQ2 - Self-Adhesive Labels: Polyester or Vinyl, thermal, transfer-printed, 3 mil (0.08 mm) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Minimum Nominal Size:

a. 1-1/2 by 6 inch (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inch (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

2.2 EXTRUDED INSULATING TUBING

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN YDPU2 for components; including UL 224.

B. UL YDPU2 - Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F (93 deg C).

2.3 BANDS

A. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.

B. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inch (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.

2.4 TAPES

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil (0.08 mm) thick by 1 to 2 inch (25 to 50 mm) wide; compounded for outdoor use.

C. Underground-Line Warning Tape:

1. Tape:

a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical and communications utility lines.
b. Printing on tape must be permanent and may not be damaged by burial operations.
c. Tape material and ink must be chemically inert and not be subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

2. Color and Printing:

   a. Comply with APWA Uniform Color Code using NEMA Z535.1 safety colors.
   b. Inscriptions for Red Tapes: "CAUTION BURIED ELECTRIC LINE BELOW".
   c. Inscriptions for Orange Tapes: "CAUTION BURIED COMMUNICATION LINE BELOW".

3. Detectable Line-Warning Tape:

   a. Detectable three-layer laminate, consisting of printed pigmented polyolefin film, solid aluminum-foil core, and clear protective film that allows inspection of continuity of conductive core; bright colored, continuous-printed on one side with inscription of utility, compounded for direct-burial service.
   b. Width: 3 inch (75 mm).
   c. Overall Thickness: 5 mil (0.125 mm).
   d. Foil Core Thickness: 0.35 mil (8.9 m).
   e. Weight: 28 lb/1000 sq. ft (13.7 kg/100 sq. m).
   f. Tensile in accordance with ASTM D882: 70 lbf (311.3 N) and 4600 psi (31.7 MPa).

2.5 SIGNS

A. Baked-Enamel Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4 inch (6.4 mm) grommets in corners for mounting.
3. Nominal Size: 7 by 10 inch (180 by 250 mm).

2.6 CABLE TIES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN ZODZ; including UL 1565 or UL 62275.

B. UL ZODZ - General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black, except where used for color-coding.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft (2.3 m) above finished floor.

B. Pipe and Conduit Labeling: Comply with ASME A13.1 and IEEE C2.

C. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.

1. Color must be factory applied or field applied for sizes larger than 6 AWG when permitted by authorities having jurisdiction.
2. Colors for 208Y/120 V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Color for Neutral (Grounded Conductor): White.
4. Color for Equipment Ground: Green.

D. Color-Coding Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.

E. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:

1. "POWER."

F. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

G. Locations of Underground Lines: Underground-line warning tape for power and lighting.

H. Vaults, Handholes, and Pull and Junction Boxes, 1000 V or Less: For conductors in vaults, pull and junction boxes, and handholes, use vinyl wraparound labels, self-adhesive wraparound labels, snap-around labels, snap-around color-coding bands or self-adhesive vinyl tape to identify phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.
2. Identify system voltage with black letters on orange field.

I. Accessible Raceways and Metal-Clad Cables, 1000 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels or vinyl tape applied in bands.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.
2. Identify system voltage with black letters on orange field.

J. Cover Plates: Label individual cover plates with self-adhesive labels. Place label at top of cover plate. Label cover plate with the following information, in the order listed:

1. Panelboard designation.
2. Colon or dash.
3. Branch circuit number.

K. Equipment Identification Labels:

1. Black letters on white field.
2. Indoor Equipment: Baked-enamel signs.
3. Outdoor Equipment: Baked-enamel signs.
4. Equipment to Be Labeled:

   a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of baked enamel sign.
   b. Enclosures and electrical cabinets.

3.3 SELECTION OF SIGNS AND HAZARD MARKINGS

A. Comply with 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs.

B. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

C. Electrical Hazard Warnings:

1. Arc-Flash Hazard Warning: Self-adhesive labels. Comply with NFPA 70E requirements for arc-flash hazard warning labels.
2. OSHA Workspace Clearance Warning Legend: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."

3.4 SELECTION OF IDENTIFICATION PRODUCTS FOR COMMUNICATIONS, CONTROL, AUXILIARY, AND LIFE SAFETY SYSTEMS

A. Comply with Section 270528 "Pathways for Communications Systems" and Section 271100 "Communications Equipment Room Fittings."

3.5 INSTALLATION

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes typical for electrical equipment environments specified in Section 260011 "Facility Performance Requirements for Electrical."

C. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

D. Fasteners for Labels and Signs: Self-tapping, stainless steel screws or stainless steel machine screws with nuts and flat and lock washers.

E. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

F. Verify identity of item before installing identification products.

G. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

H. Apply identification devices to surfaces that require finish after completing finish work.

I. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.

K. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.

L. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.

M. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.

N. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.

O. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.

P. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

Q. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape not less than 12 inch (300 mm) directly above cables or raceways buried 18 inch (450 mm) or more below grade. Use multiple tapes where width of multiple lines installed in common trench exceeds 16 inch (400 mm) overall.
2. Limit use of underground-line warning tape to direct-buried cables.
3. Install underground-line warning tape for direct-buried cables and cables in raceways.

R. Baked-Enamel Signs: Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.

END OF SECTION 260553

SECTION 26 05 75 – ELECTRICAL CONNECTIONS TO EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Electrical connections to Owner-furnished equipment, and equipment specified under other Divisions and Sections.

1.2 REFERENCES

A. NFPA 70 - National Electrical Code

B. NEMA WD 1 - General Purpose Wiring Devices

C. NEMA WD 6 - Wiring Device Configurations

1.3 SUBMITTALS

A. Conform to Division 1 requirements.

B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 REGULATORY REQUIREMENTS

A. Electrical: Conform to NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 CORDS AND CAPS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

C. Cord Construction: NFPA 70; Type SJO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate work with systems and other trades under provisions of Division 1.

B. Obtain and review shop drawings, product data, and manufacturer's instructions for Owner-Furnished equipment, and equipment furnished under other Divisions and Sections.

C. Determine connection locations and requirements prior to roughing in.

D. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.

E. Sequence electrical connections to coordinate with start-up schedule for equipment.

3.2 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

B. Verify that equipment supplied matches submittal data.

3.3 CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.

D. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.

E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

F. Install disconnect switches, controllers, control stations, and control devices as indicated.

G. Modify equipment control wiring with terminal block jumpers as indicated.

H. Provide interconnecting conduit and wiring between devices and equipment where indicated or required.

END OF SECTION 26 05 75

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power panelboards.
2. Disconnecting and overcurrent protective devices.

1.2 DEFINITIONS

A. GFEP: Ground-fault equipment protection.

B. MCCB: Molded-case circuit breaker.

C. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Power panelboards.
2. Disconnecting and overcurrent protective devices.
3. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
4. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of listing, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for series rating of installed devices.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device. Include Internet link for electronic access to downloadable PDF of coordination curves.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Panelboard Schedules: For installation in panelboards.

B. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:

1. Recommended procedures for installing panelboards.
2. Recommended torque settings for bolted connections on panelboards.
3. Recommended temperature range for energizing panelboards.

C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Furnish to Owner spare parts, for repairing panelboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:

1. Keys: Two spares for each type of panelboard cabinet lock.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation in accordance with NEMA PB 1.

1.8 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed panelboards perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Fabricate and test panelboards in accordance with IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

F. Enclosures: Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Outdoor Locations: UL 50E, Type 3R.

2. Height: 7 ft (2.13 m) maximum.
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims must cover live parts and may have no exposed hardware.
4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims must cover live parts and may have no exposed hardware.
5. Finishes:

a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
b. Back Boxes: Same finish as panels and trim.

G. Incoming Mains:

1. Location: Convertible between top and bottom.
2. Main Breaker: Main lug interiors up to 400 A must be field convertible to main breaker.

H. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

a. Plating must run entire length of bus.
b. Bus must be fully rated for entire length.

2. Interiors must be factory assembled into unit. Replacing switching and protective devices may not disturb adjacent units or require removing main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure.
5. Do not mount neutral bus in gutter.

I. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations must allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
4. Main and Neutral Lugs: Mechanical type, with lug on neutral bar for each pole in panelboard.
5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with lug on bar for each pole in panelboard.

J. Quality-Control Label: Panelboards or load centers must be labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers must have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

K. Future Devices: Panelboards or load centers must have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

1. Percentage of Future Space Capacity: 10 percent.

L. Panelboard Short-Circuit Current Rating:

1. Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for 100 percent interrupting capacity.

2.2 POWER PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.
4. General Electric.

B. Listing Criteria: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inch (914 mm) high, provide two latches, keyed alike.

D. Mains: Circuit breaker.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.
4. General Electric.

B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

   a. Inverse time-current element for low-level overloads.
   b. Instantaneous magnetic trip element for short circuits.
   c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers:

   a. RMS sensing.
   b. Field-replaceable rating plug or electronic trip.
   c. Digital display of settings, trip targets, and indicated metering displays.
   d. Multi-button keypad to access programmable functions and monitored data.
   e. Ten-event, trip-history log. Each trip event must be recorded with type, phase, and magnitude of fault that caused trip.
   f. Integral test jack for connection to portable test set or laptop computer.
   g. Field-Adjustable Settings:

      1) Instantaneous trip.
      2) Long- and short-time pickup levels.
      3) Long and short time adjustments.
      4) Ground-fault pickup level, time delay, and I squared T response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. MCCB Features and Accessories:

   a. Standard frame sizes, trip ratings, and number of poles.
   b. Breaker handle indicates tripped status.
   c. UL listed for reverse connection without restrictive line or load ratings.
   d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
   e. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
   f. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 A must have interchangeable rating plugs or electronic adjustable trip units.
   g. Multipole units enclosed in single housing with single handle.

C. Strip Heater: Factory-installed electric strip heater of sufficient wattage to maintain enclosure temperature above expected dew point.

1. Strip Heater Control: Thermostat.
2. Strip Heater Power Source: Transformer, factory installed in enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards in accordance with NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA PB 1.1.
2. Consult Architect for resolution of conflicting requirements.

C. Special Techniques:

1. Equipment Mounting:

a. Mount surface-mounted panelboards to steel slotted supports 5/8 inch (16 mm) in depth. Orient steel slotted supports vertically.
b. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."

2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
3. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
4. Mount top of trim 7.5 ft (2.3 m) above finished floor unless otherwise indicated.
5. Mount panelboard cabinet plumb and rigid without distortion of box.
6. Install overcurrent protective devices and controllers not already factory installed.

a. Set field-adjustable, circuit-breaker trip ranges.

b. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver in accordance with manufacturer's published instructions.

7. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, and connections to separate ground bars.
8. Install filler plates in unused spaces.
9. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

D. Interfaces with Other Work:

1. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."

B. Panelboard Nameplates: Label each panelboard with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each branch circuit device in power panelboards with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

E. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles must be located on interior of panelboard door.

F. Breaker Labels: Faceplate must list current rating, UL and IEC certification standards, and AIC rating.

G. Circuit Directory:

1. Provide directory card inside panelboard door, mounted in transparent card holder.

a. Circuit directory must identify specific purpose with detail sufficient to distinguish it from other circuits.

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers. Do not perform optional tests. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
c. Instruments and Equipment:

1) Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Nonconforming Work:

1. Panelboards will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Collect, assemble, and submit test and inspection reports, including certified report that identifies panelboards included and that describes scanning results, with comparisons of two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.6 PROTECTION

A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature in accordance with manufacturer's published instructions.

END OF SECTION 262416

SECTION 262713 - ELECTRICITY METERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work to accommodate utility company revenue meters.

1.2 COORDINATION

A. Electrical Service Connections:

1. Coordinate with utility companies and utility-furnished components.

a. Comply with requirements of utility providing electrical power services.
b. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For metering infrastructure components.

1.4 CLOSEOUT SUBMITTALS

A. Warranty documentation.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Comply with UL 916.

2.2 UTILITY METERING INFRASTRUCTURE

A. Current-Transformer Cabinets: Comply with requirements of electrical-power utility company.

B. Meter Sockets:

1. Comply with requirements of electrical-power utility company.
2. Steady-state and short-circuit current ratings must meet indicated circuit ratings.

C. Arc-Flash Warning Labels:

1. Comply with requirements for "Arc-Flash Warning Labels" in Section 260573.19 "Arc-Flash Studies." Apply 3-1/2-by-5 inch (76-by-127 mm) thermal transfer label of high-adhesion polyester for each work location included in the analysis.
2. Comply with requirements for "Self-Adhesive Equipment Labels" and "Signs" in Section 260553 "Identification for Electrical Systems." Apply 3-1/2-by-5 inch (76-by-127 mm) thermal transfer label of high-adhesion polyester for each work location included in the analysis. Labels must be machine printed, with no field-applied markings.

a. Label must have orange header with wording, "WARNING, ARC-FLASH HAZARD," and must include the following information taken directly from arc-flash hazard analysis:

1) Location designation.
2) Nominal voltage.
3) Flash protection boundary.
4) Hazard risk category.
5) Incident energy.
6) Working distance.
7) Engineering report number, revision number, and issue date.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Install arc-flash labels as required by NFPA 70.

3.2 IDENTIFICATION

A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Equipment Identification Labels: Self-adhesive labels with clear protective overlay. For residential meters, provide additional card holder suitable for printed, weather-resistant card with occupant's name.

3.3 PROTECTION

A. After installation, protect metering equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262713

SECTION 27 00 00 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Basic Electrical Requirements specifically applicable to Division 27 Sections.

1.2 SCOPE OF WORK

A. The specifications describe the quality and character of the materials and methods of installation.

B. The drawings and these specifications are complementary to each other in that all apparatus, materials and equipment outlined in the Drawings and/or specified herein shall be considered essential to the contract.

C. The drawings include plans of the building, with diagrammatic layouts showing approximate locations of equipment and devices. Before installing, study adjacent architectural features, and make installation in the most logical manner in accordance with Code and Regulatory Requirements.

D. The symbols, notes, instructions and schedules on the drawings are included as part of these specifications.

1.3 WORK SCHEDULE AND SEQUENCE

A. Install work in stages to accommodate the Owner’s operational requirements. Coordinate schedule and hours of operation with the Owner prior to start of construction.

B. Coordinate installation sequence with detailed coordination shop drawings provided under Division 1.

1.4 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code

B. National Electrical Safety Code

1.5 SUBMITTALS

A. Conform to Division 1 requirements.

B. Include a transmittal form clearly indicating the Project, the name of the Contractor and the contents of the submittal.

C. Include Contractor’s stamp and signature indicating that the submittal has been reviewed and conforms to Contract Documents. Submittals without Contractor’s stamp will be returned without review.

D. Identify deviations from Contract Documents, including variations and limitations. Review of a submittal does not constitute acceptance of deviations from the Contract Documents, unless such deviation is clearly indicated as such on the submittal, and specifically accepted as such.

E. Submit shop drawings and product data, grouped to include complete systems, products and accessories in a single package.
1. Reference catalog cuts and brochures of products to proper paragraph in specifications. Furnish numerical index by specification article number, listing product name, catalog number and reference to page number of submittal brochure.
2. Arrange the submittals in the same sequence as the specifications and reference in the upper right-hand corner, the particular specification provision for which each submittal is intended.
3. Cross reference individual catalog numbers of substitute products to number of specified materials.
4. Submit manufacturer's certification that equipment meets or exceeds the minimum requirements as specified.
5. Where materials, equipment and installations are specified to conform with societies or agencies such as ANSI, NECA, etc., submit certification of such compliance.
6. The submittal shall be complete and with catalog data and information properly marked to show, among other things, material capacity and performance to meet capacities or performance as specified or indicated
7. Mark dimensions and values in units to match those specified.

F. Review of the submittal is only for general conformance with design concept of project and general compliance with information given in the contract documents. The Contractor is responsible for confirmation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination work of all trades.

G. For items which are not manufactured and which have to be specifically fabricated, submit shop drawings and details.

H. Ordering of equipment prior to approval of submittals is done entirely at the risk of the Contractor.

1.6 COORDINATION SUBMITTALS

A. Develop detailed coordination shop drawings in conjunction with other trades, where required by complex and/or congested spaces, to minimize conflict, to allow for correct sequence of installation, and to provide all required clearances. See Division 1 for expanded requirements.

1.7 PROJECT RECORD DRAWINGS

A. Conform to Division 1 requirements.

B. Keep an accurate record of the work under this Contract, as it progresses, to be available for inspection at all times. See individual Division 27 Sections for specific requirements.

C. Upon completion of the work, transfer all changes and information onto a new set of reproducible drawings in an orderly and legible manner.

1.8 QUALITY ASSURANCE

A. For actual fabrication, installation and testing of the work, use only trained and experienced workers completely familiar with the equipment and materials, and the manufacturer's installation requirements.

B. Include the services of experienced superintendents for each sub-section who shall be constantly in charge of the work, together with the qualified journeymen, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate and test the work involved, including equipment and materials furnished by others.

C. Perform the work under this section shall be in cooperation with the work of other trades to prevent conflict or interference and to aid in timely completion of the overall project.

1.9 DELIVERY, STORAGE AND HANDLING

A. Storage and handling of equipment and/or systems for project, whether it be onsite or offsite, shall be addressed by the Contractor's IAQ Management Plan. Plan must meet or exceed the recommended control measures of the "Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3)."

1.10 REGULATORY REQUIREMENTS

A. Conform to International Building Code, International Fire Code, and NFPA 101 Life Safety Code

B. Electrical: Conform to NFPA 70.

1.11 FIELD CONDITIONS

A. Visit the project site and become familiar with field conditions including accessibility and physical obstructions. Bid submission indicates familiarity with, and acceptance of, field conditions.

B. Separate Sections cover site, architectural and mechanical Work. Study the complete set of contract documents to become familiar with the entire Project including site, architectural and structural features and systems as related to Work in this Division. Pay special attention to Divisions featuring equipment requiring electrical interface including Owner-furnished equipment, elevator equipment, and mechanical systems (plumbing, hvac, fire sprinkler, controls).

C. Study and become familiar with any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. Exercise due and particular caution to determine that all parts of work are made quickly and easily accessible.

D. If any conflicts occur which necessitate departures from the Drawings, submit details of departures and reasons therefore for written approval. Do not install the affected equipment or related impacted wiring until approval is received.

E. Should there be omissions or discrepancies in the plans and specifications, or discrepancies from actual site conditions, bring them to the attention of the Architect ten (10) working days in advance of the date of bid opening so that corrections or clarifications can be made.

F. Install Work in locations shown on Drawings, unless prevented by Project conditions. Coordinate work with that of other trades. Verify that adjacent and related construction conforms to contract documents and to coordination shop drawings.

G. If Project conditions, including changes initiated by other trades or discovery of conditions unknown at time of bid, require unspecified materials and methods or rearrangement of Work, prepare drawings showing proposed changes to meet Project conditions. Obtain permission of the Architect before proceeding.

H. All RFIs must include a proposed solution. RFIs submitted without proposed solutions will be returned without review.

1.12 COORDINATION

A. Provide and coordinate all information, drawings or layouts of equipment or work under this section which affect the work of the other trades.

B. In case changes in the indicated locations or arrangements are necessary due to developed conditions in the construction, or rearrangement of furnishings, or equipment, these changes shall be made without extra cost to the Owner, provided the change is ordered before work directly connected is installed, and no extra materials are required.

1.13 EXISTING UTILITIES

A. The location of utilities shown on the plans are the best known information available at time of design. Contact the appropriate agencies and confirm the information and make arrangements for connection thereto, prior to excavation and installation of any piping or systems.

B. Perform exploratory excavation and/or use locate service as needed to confirm locations of existing underground utilities.

1.14 PROJECT SITE VISITS

A. Periodic visits to the project site by the Architect/Engineer are for the express purpose of verifying compliance with the contract documents. Such site visits shall not be construed as construction supervision, i.e., the Architect/Engineer assumes no responsibility for providing a safe place for the performance of the work by the Contractor or the Contractor's employees or the safety of the supplies of the Contractor. Neither shall such site visits relieve the Contractor of the responsibility for the discovery of his own errors and the correction of them, nor of the responsibility of properly performing the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. See Drawings and individual Sections of Division 27.

2.2 SUBSTITUTIONS

A. Conform to Division 1 requirements. Conformance to construction documents is the responsibility of the substitutor, regardless of approval.

B. Layout on drawings, including space allotted for clearances, access, etc., is based on performance and physical attributes of equipment specified and/or scheduled on plans. Coordinate with other systems, subsystems and trades as required when using substituted materials or equipment.

C. If the use of substitute materials or equipment requires alternate arrangement of equipment, fixtures, devices, wiring or accessories, prepare drawings showing proposed changes. Obtain permission of the Architect before proceeding.

D. If the use of substitute materials or equipment results in different performance than that provided by the specified materials or equipment, adjust Work as required to provide parity performance, at no additional cost to the Owner. Obtain permission of the Architect before proceeding.

E. If the use of substitute materials or equipment results in an increase in the cost, including changes to the Work of other trades, pay for any said increase in cost.

F. See Drawings and individual Sections of Division 27 for further specific information required for substitutions.

2.3 VALUE ENGINEERING

A. Conform to SUBSTITUTIONS above.

B. In addition, obtain a Professional 3rd Party review and opinion on the implementation of VE proposals.

PART 3 - EXECUTION

3.1 INSTALLATION

A. See Drawings and individual Sections of Division 27. In addition the following general requirements shall apply:
   1. Obtain Manufacturer's printed installation instruction to aid in properly executing work of installing equipment whenever such instructions are available. Submit copies of such instructions to the Architect prior to time of installation.

B. Install equipment in a neat and workmanlike manner. Align, level and adjust for satisfactory appearance and operation. Install so that connection and disconnection of wiring and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, maintenance and repair.

END OF SECTION 27 05 00

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type OFR and Type CR communications raceways and fittings.
2. Cable supports and positioning devices.

B. Related Requirements:

1. Section 078400 "Firestopping" specifies firestopping for communications pathways installed by this Section.
2. Section 260526 "Grounding and Bonding for Electrical Systems" specifies grounding and bonding conductors and connectors for communications pathways installed by this Section.
3. Section 260529 "Hangers and Supports for Electrical Systems" specifies hangers and supports for communications pathways installed by this Section.
4. Section 260533.13 "Conduits for Electrical Systems" specifies the following installed by this Section:

    a. Type EMT-S duct raceways and elbows.
    b. Type ERMC-S duct raceways, elbows, couplings, and nipples.
    c. Type FMC-S duct raceways.
    d. Type FMT duct raceways.
    e. Type IMC duct raceways.
    f. Type LFMC duct raceways.
    g. Type PVC duct raceways and fittings.
    h. Fittings for conduit, tubing, and cable.
    i. Electrically conductive corrosion-resistant compounds for threaded conduit.
    j. Solvent cements.

5. Section 260533.16 "Boxes and Covers for Electrical Systems" specifies the following installed by this Section:

    a. Metallic outlet boxes, device boxes, rings, and covers.
    b. Junction boxes and pull boxes.
    c. Cover plates for device boxes.

6. Section 260536 "Cable Trays for Electrical Systems" specifies cable trays for communications pathways installed by this Section.
7. Section 260543 "Underground Ducts and Raceways for Electrical Systems" specifies the following installed by this Section:

    a. Duct accessories.
    b. Handholes and boxes for exterior underground wiring.
    c. Duct sealing.

8. Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling" specifies sleeves and sleeve seals for communications pathways installed by this Section.
9. Section 260553 "Identification for Electrical Systems" specifies labels and warning signs for communications pathways installed by this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

a. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.

1) If listed manufacturer differs from selling manufacture, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
2) Listing criteria identified in approval letter must match specified listing criteria. Approval of only equipment's enclosure is not considered approval of equipment for intended application.
3) Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for similar products are not acceptable.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' published instructions submittals.

PART 2 - PRODUCTS

2.1 TYPE OFR AND TYPE CR COMMUNICATIONS RACEWAYS AND FITTINGS

A. Description: This product group covers raceways and fittings for installation of conductive and nonconductive optical-fiber cable, communications cable, power-limited fire-alarm cable, signaling cable, and coaxial cable in accordance with NFPA 70.

B. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:

a. Optical-Fiber Cable Raceway: UL CCN QAZM; including UL 2024.
b. Communications Cable Raceway: UL CCN QBAA; including UL 2024.

C. UL QAZM - Type OFR-GP General-Purpose Optical-Fiber Raceway:

1. Source Limitations: Obtain products from single manufacturer.

2. Product Characteristics:

a. Texture: Ribbed.
b. Splicing: Glue or Fusion.

3. Required Product Options:

a. Couplings and Fittings:

1) Same manufacturer as raceway, suitable for the raceway types and diameters being joined.

b. Colors:

1) For Optical Fiber: Orange.

D. UL QAZM - Type OFR-R Riser Optical-Fiber Raceway:

1. Source Limitations: Obtain products from single manufacturer.
2. Product Characteristics:

a. Meets UL 2024 test requirements for "RISER" marking.
b. Texture: Ribbed.
c. Splicing: Glue or Fusion.

3. Required Product Options:

a. Couplings and Fittings:

1) Same manufacturer as raceway, suitable for the raceway types and diameters being joined.

b. Colors:

1) For Optical Fiber: Orange.

2.2 CABLE SUPPORTS AND POSITIONING DEVICES

A. Description: This category covers straps, hooks, and similar types of hardware for installation and use in communications cabling systems in accordance with NFPA 70 and manufacturer's installation instructions

B. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

C. UL DWMU - J-Hook or G-Hook Cable Support:

1. Source Limitations: Obtain products from single manufacturer.
2. Product Listing Criteria: UL CCN DWMU; including UL 2239 or UL 1565.
3. Product Characteristics:

a. Material: Galvanized or Stainless steel.

PART 3 - EXECUTION

3.1 SELECTION OF PATHWAYS FOR COMMUNICATIONS SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.

B. Type OFR and Type CR Communications Raceways: Comply with Table 800.154(b) of NFPA 70.

C. Minimum Pathway Size:

1. For Copper Cables: Metric designator 21 (trade size 3/4).
2. For Optical-Fiber Cables: Metric designator 25 (trade size 1).

D. Maximum Pathway Length Between Cable Access Points: 75 ft (23 m).

E. Temperature Limitations:

1. Type PVC, Type HDPE, Type EPEC, Type OFR, and Type CR: Do not install where ambient temperature exceeds 122 deg F (50 deg C). Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.

F. Outdoor Pathways:

1. Exposed and Subject to Severe Physical Damage: ERMC or IMC.
2. Exposed and Subject to Physical Damage: ERMC, IMC or Corrosion-resistant EMT.

a. Locations less than 2.5 m (8 ft) above finished floor.

3. Exposed and Not Subject to Physical Damage: ERMC, IMC or Corrosion-resistant EMT LFMC.
4. Concealed Aboveground: ERMC, IMC, EMT or LFMC.
5. Direct Buried: PVC-40.
6. Concrete Encased Not in Trench: PVC-40.
7. Concrete Encased in Trench: PVC-40.

G. Indoor Pathways:

1. Exposed and Subject to Severe Physical Damage: ERMC or IMC. Locations include the following:

a. Loading docks.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
c. Mechanical rooms.
d. Gymnasiums.

2. Exposed and Subject to Physical Damage: ERMC IMC or EMT. Locations include the following:

a. Locations less than 2.5 m (8 ft) above finished floor.
b. Stub-ups to above suspended ceilings.

3. Exposed and Not Subject to Physical Damage: ERMC, IMC, EMT, LFMC or Cable tray.
4. Concealed above Suspended Ceilings: OFR, CR and Hooks.
5. Concealed in Interior Walls and Partitions: EMT.
6. Damp or Wet Locations: ERMC, Corrosion-resistant EMT, LFMC.
7. Innerducts inside Metal Raceway: OFR, CR.
8. Supported by Solid Cable Tray: OFR CR.

H. Duct Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC and IMC: Provide threaded-type fittings unless otherwise indicated.

I. Cable Supports and Positioning Devices:

1. Size hooks to allow minimum of 25 percent future capacity without exceeding design capacity limits.
2. Support hooks directly from building structure. Do not use ceiling grid support rods or wires.
3. Hook spacing must allow no more than 6 inch (150 mm) of slack. Lowest point of cables must be no closer than 6 inch (150 mm) to ceiling tiles, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
4. Space hooks no more than 5 ft (1.5 m) on center.
5. Provide hook at each change in direction.

J. Boxes and Enclosures:

1. Outdoors, Aboveground: UL 50E Type 3R.
2. Indoors: UL 50E Type 1.

K. Identification of Underground Pathways, Handholes, and Structures:

1. Use "COMMUNICATIONS" for legend on warning planks, underground warning tape, and covers.

3.2 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft (2.3 m) above finished floor.

B. Pipe and Conduit Labeling: Comply with ASME A13.1 and IEEE C2.

C. Color Coding Scheme for Communications Cable and Terminations: Comply with BICSI N1 and TIA-598.

D. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:

1. "COMMUNICATIONS."
2. "FIRE ALARM."
3. "SECURITY."

E. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

F. Locations of Underground Lines: Underground-line warning tape for communication, control wiring, and optical-fiber cable.

G. Communications Handholes, and Pull and Junction Boxes: For conductors in pull and junction boxes, and handholes, use vinyl wraparound labels, self-adhesive wraparound labels or snap-around labels to identify cable.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.

H. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.

I. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with conductor designation.

J. Equipment and Cabling Identification for Administrative Records and Labeling: Comply with TIA-606 requirements for Class 3 network administration.

K. Equipment Identification Labels:

1. Black letters on white field.
2. Indoor Equipment: Self-adhesive label.
3. Equipment To Be Labeled:

a. Racks, Frames, and Enclosures: Identify front and rear of each enclosure with self-adhesive labels containing equipment designation.
b. Patch Panels: Label individual rows and outlets, starting at left and working down, with self-adhesive labels.

L. Backbone Cables: Label each cable with a vinyl-wraparound label or snap-around label indicating the location of the far or other end of the backbone cable. Patch panel or punch down block where cable is terminated should be labeled identically.

M. Horizontal Cables: Label each cable with a vinyl-wraparound label or snap-around label.

N. Cover Plates: Label individual cover plates with self-adhesive labels. Place label at top of cover plate. Identify cover plate in accordance with TIA-606.

3.3 INSTALLATION OF PATHWAYS FOR COMMUNICATIONS SYSTEMS

A. Comply with manufacturers' published instructions, including limitations on distance, bends, and bend radius.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Type OFR Optical-Fiber Raceways: Article 800 of NFPA 70 and BICSI N1.
2. Type CR Communications Raceways: Article 800 of NFPA 70 and BICSI N1.
3. Cable Supports and Positioning Devices: Article 800 of NFPA 70 and BICSI N1.
4. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Complete communications raceway installation before starting conductor installation.
2. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.
3. Provide hangers and supports for pathways, boxes, and enclosures.
4. Firestop pathway penetrations of fire-rated assemblies.
5. Identification:

a. Provide colors and labels for pathways, boxes, enclosures, and associated communications equipment.
b. Provide safety warning signs.
c. Bury underground warning tape approximately 12 inch (300 mm) above direct-buried conduits, but minimum of 6 inch (150 mm) below grade. Align tape along centerline of conduit.

D. Interfaces with Other Work:

1. Coordinate installation of new communications pathways with existing conditions.

2. Grounding and Bonding: Bond metallic communications boxes and enclosures to metallic pathways. Coordinate with Section 271100 "Communications Equipment Room Fittings" for grounding and bonding of communications pathways to communications equipment room fittings.

3.4 PROTECTION

A. Protect coatings and finishes of pathways, boxes, and enclosures from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528

SECTION 271100 - COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Communications-circuit accessories.

B. Products Installed, but Not Furnished, under This Section:

1. Section 061000 "Rough Carpentry" furnishes equipment backing panels installed by this Section.
2. Section 260526 "Grounding and Bonding for Electrical Systems" furnishes the following installed by this Section:

    a. Grounding and bonding conductors.
    b. Grounding and bonding clamps.
    c. Grounding and bonding bushings.
    d. Grounding and bonding hubs.
    e. Grounding and bonding connectors.
    f. Intersystem bonding bridge grounding connector.
    g. Grounding and bonding busbars.

3. Section 260529 "Hangers and Supports for Electrical Systems" furnishes hangers, supports, and concrete bases for communications equipment installed by this Section.
4. Section 260533.16 "Boxes and Covers for Electrical Systems" furnishes the following installed by this Section:

    a. Metallic outlet boxes, device boxes, rings, and covers.
    b. Junction boxes and pull boxes.
    c. Cover plates for device boxes.

5. Section 260553 "Identification for Electrical Systems" furnishes labels and warning signs for communications pathways installed by this Section.
6. Section 262716 "Electrical Cabinets and Enclosures" furnishes the following installed by this Section:

    a. Cabinets and cutout boxes.
    b. Termination boxes.
    c. Miscellaneous enclosures.
    d. Rack or frame systems.
    e. Enclosure-mounted relocatable power taps.

C. Related Requirements:

1. Section 270528 "Pathways for Communications Systems" for installation of cable pathways serving communications equipment room fittings installed under this Section.

1.2 DEFINITIONS

A. Abbreviations for Communications Spaces:

1. EF: Entrance facility; generally serves campus or building. EF may include an ER.
2. ER: Equipment room; generally serves campus or building.
3. TE: Telecommunications enclosure; generally serves a single tenant or floor.
4. TR: Telecommunications room; generally serves a single tenant or floor.

B. Abbreviations for Communications Facilities:

1. HC: Horizontal cross-connect; also called "floor distributor" (FD).
2. IC: Intermediate cross-connect; also called "building distributor" (BD).
3. MC: Main cross-connect; also called "campus distributor" (CD).

C. Abbreviations for Grounding and Bonding:

1. PBB: Primary bonding busbar; located in main distribution frame room, ideally near electrical service entrance.
2. RBB: Rack bonding busbar; located in equipment cabinets and racks.
3. TBC: Telecommunications bonding conductor, for connecting PBB to intersystem bonding termination device or busbar at electrical service entrance.
4. TEBC: Telecommunications equipment bonding conductor, for connecting RBBs to PBB.
5. UBC: Unit bonding conductor, for connecting individual communications equipment to RBBs.

PART 2 - PRODUCTS

2.1 COMMUNICATIONS-CIRCUIT ACCESSORIES

A. Description: This category covers devices intended for connecting communications circuits in accordance with Article 800 of NFPA 70.

B. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:

a. For Communications Circuits: UL CCN DUXR; including UL 1863 and UL 467.
b. For Audio/Video, Data, and Signaling Circuits: UL CCN DUXR; including UL 1977 and UL 467.

C. UL DUXR - 66-Style or 110-Style Cross-Connect Frame:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Belden Canada ULC.
b. CommScope, Inc.
c. Optical Cable Corporation (OCC).
d. Ortronics, Inc.

e. Panduit Corp.
f. Siemon Co. (The).

2. Source Limitations: Obtain products from single manufacturer.
3. Description: This product type includes the frame only. Block inserts and related termination equipment are specified in communications cabling Sections.

D. UL DUXR - Patch Panel:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CommScope, Inc.
b. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
c. Legrand AV Inc.; Legrand North America, LLC.
d. Leviton Manufacturing Co., Inc.
e. Ortronics, Inc.
f. Panduit Corp.
g. Pass & Seymour; Legrand North America, LLC.
h. Siemon Co. (The).

2. Source Limitations: Obtain products from single manufacturer.
3. Product Characteristics:

a. Mounting: Equipment rack.
b. Style: Modular.
c. EMI Compatibility: Unshielded.
d. Configuration: Standard; flat.
e. Include provisions for labeling ports.

4. Required Product Options:

a. Distribution Port Quantity: 48.
b. Cable Type: Cat. 6a.

PART 3 - EXECUTION

3.1 PREPARATION

3.2 SELECTION OF GROUNDING AND BONDING PRODUCTS FOR COMMUNICATIONS

A. Grounding and Bonding Conductors:

1. Communications Busbar Connections:

a. TBC: Not smaller than 3/0 AWG and no smaller than largest TBB.
b. TBB: Not smaller than 2 kcmil per linear ft of conductor length, but not larger than 750 kcmil, unless otherwise indicated on Drawings.
c. BBC: Not smaller than largest TBB to which it is connected unless otherwise indicated on Drawings.

d. TEBC: Not smaller than 2 AWG unless otherwise indicated on Drawings. Provide bolted connectors.
e. UBC: Not smaller than 6 AWG unless otherwise indicated on Drawings. Provide bolted connectors.

2. Cable Tray Connections:

a. Cable Tray Equipment Grounding Conductor: 6 AWG.
b. Cable Tray Bonding Jumper: If not supplied by cable manufacturer, provide bonding jumper not smaller than 6 AWG and not longer than 12 inch (300 mm). If jumper is wire, it must be terminated with lug having one hole and standard barrel for one crimp. If jumper is flexible braid, it must be terminated with one-hole ferrule. Attach with bonding screw or connector provided by cable tray manufacturer.

B. Grounding and Bonding Busbars:

1. PBB:

a. Dimensions: 1/4 inch thick by 4 inch high (6.3 mm thick by 100 mm high).
b. Stand-Off Distance: 2 inch (50 mm).

2. RBB:

a. Dimensions: 1/4 inch thick by 4 inch high (6.3 mm thick by 100 mm high).
b. Stand-Off Distance: 2 inch (50 mm).

3.3 SELECTION OF COLORS AND IDENTIFICATION MARKINGS

A. Comply with 29 CFR 1910.144 for color identification of hazards, and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft (2.3 m) above finished floor.

B. Pipe and Conduit Labeling: Comply with ASME A13.1 and IEEE C2.

C. Color Coding Scheme for Communications Cable and Terminations: Comply with BICSI N1 and TIA-598.

D. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:

1. "COMMUNICATIONS."
2. "FIRE ALARM."
3. "SECURITY."

E. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

F. Locations of Underground Lines: Underground-line warning tape for communication, control wiring, and optical-fiber cable.

G. Communications Handholes, and Pull and Junction Boxes: For conductors in pull and junction boxes, and handholes, use vinyl wraparound labels or snap-around labels to identify phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.

H. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.

I. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with conductor designation.

J. Equipment and Cabling Identification for Administrative Records and Labeling: Comply with TIA-606 requirements for Class 3 network administration.

K. Equipment Identification Labels:

1. Black letters on white field.
2. Indoor Equipment: Baked-enamel signs.
3. Equipment to Be Labeled:

a. Racks, Frames, and Enclosures: Identify front and rear of each enclosure with self-adhesive labels.
b. Patch Panels: Label individual rows and outlets, starting at to left and working down, with self-adhesive labels.
c. Communications cabinets.
d. Fire-alarm equipment.
e. Security equipment.

L. Backbone Cables: Label each cable with a vinyl-wraparound label or snap-around label indicating the location of the far or other end of the backbone cable. Patch panel or punch down block where cable is terminated should be labeled identically.

M. Horizontal Cables: Label each cable with a vinyl-wraparound label or snap-around label.

N. Cover Plates: Label individual cover plates with self-adhesive labels. Place label at top of cover plate. Identify cover plate in accordance with TIA-606.

3.4 SELECTION OF SIGNS AND HAZARD MARKINGS

A. Comply with 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs.

B. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

C. Operating Instruction Signs: Self-adhesive labels.

D. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on red background with minimum 3/8 inch (10 mm) high letters for emergency instructions at equipment used for mass notification.

E. Label TBC, TBBs, and BBCs at attachment points with legend: "WARNING! COMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

3.5 FIELD-FABRICATION OF FITTINGS FOR EQUIPMENT ROOM

A. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Designated Critical Operations Areas: Comply with Article 708 of NFPA 70.
2. Communications Systems: Comply with Ch. 8 of NFPA 70 and with BICSI N1.
3. Grounding and Bonding: Comply with Article 250 of NFPA 70 and with BICSI N3.
4. Consult Architect for resolution of conflicting requirements.

3.6 FIELD-FABRICATION OF FITTINGS FOR TELECOMMUNICATIONS ROOMS

A. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Designated Critical Operations Areas: Comply with Article 708 of NFPA 70.
2. Communications Systems: Comply with Ch. 8 of NFPA 70 and with BICSI N1.
3. Grounding and Bonding: Comply with Article 250 of NFPA 70 and with BICSI N3.
4. Consult Architect for resolution of conflicting requirements.

B. Provide the following specified products in intermediate distribution frame room or space:

1. One PBB.
2. One 19 inch open equipment rack with RBB and enclosure-mounted relocatable power tap.
3. One 110-style cross-connect frame.
4. One patch panel.

3.7 INSTALLATION OF BONDING FOR COMMUNICATIONS

A. Grounding of Communications: Bond PBB to grounding electrode conductors at electrical power service entrance, using intersystem bonding termination device.

B. Comply with manufacturer's published instructions.

C. Reference Standards:

1. Bonding of Communications: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with BICSI N3.
2. Consult Architect for resolution of conflicting requirements.

D. Special Techniques:

1. Bonding of Busbars:

   a. Install busbars horizontally, on insulated spacers 12 inch (300 mm) above finished floor unless otherwise indicated.

2. Bonding Conductors:

   a. Stacking of conductors under a single bolt is not permitted when connecting to busbars.
   b. Assemble wire connector to conductor, complying with manufacturer's published instructions and as follows:

      1) Use crimping tool and die specific to connector.
      2) Pretwist conductor.
      3) Apply antioxidant compound to bolted and compression connections.

   c. Install in straightest and shortest route between origination and termination point, and no longer than required. Bend radius must not be smaller than 10 times diameter of conductor. No single bend may exceed 90 degrees.
   d. Install without splices.
   e. Support conductors at not more than 36 inch (900 mm) intervals.
   f. Outside telecommunications room, install conductors in metric designator 21 (trade size 3/4) PVC-40 conduit until conduit enters telecommunications room.

      1) If bonding conductor must be installed in EMT-S or other ferrous metallic raceway, bond conductor to raceway using grounding bushing and bond both ends of raceway to PBB.

3. Provide TBC and terminate ends to PBB and intersystem bonding termination device at electrical service entrance in accordance with Section 250.94, "Bonding for Communication Systems," of NFPA 70.
4. Communications Enclosures: Bond metallic enclosures of telecommunications equipment with UBCs to PBB.
5. Equipment Racks: Bond metallic components of enclosures to RBB using UBCs. Provide vertically mounted RBB if not provided by enclosure or rack manufacturer. Bond RBB to PBB with TEBC. Power connection must comply with NFPA 70; equipment grounding conductor in power cord of cord- and plug-connected equipment must be considered supplemental to bonding requirements in this Section.
6. Shielded Cable: Bond shield of shielded cable to SBB in communications rooms and spaces. Comply with TIA-568.1 and TIA-568.2 when grounding shielded balanced twisted-pair cables.
7. Primary Protector: Bond to PBB with insulated bonding conductor.
8. Cable Tray: Provide continuous electrical path by installing bonding clips and jumpers. Bond to PBB.

3.8 FIELD QUALITY CONTROL FOR BONDING OF COMMUNICATIONS

A. Tests and Inspections:

1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench according to manufacturer's published instructions.

2. Test bonding connections of system using AC earth ground-resistance tester, taking two-point bonding measurements in telecommunications equipment room containing PBB, using process recommended by BICSI N1. Conduct tests with facility in operation.

    a. Measure resistance between PBB and electrical service intersystem termination point. Maximum acceptable value is 100 mΩ.

        1) If measured resistance from electrical service equipment to ground exceeds 15, notify Architect and include recommendations to reduce resistance to ground.

    b. Measure resistance between SBBs and PBB. Maximum acceptable value is 100 mΩ.

3. Test for ground loop currents using digital clamp-on ammeter, with full scale not more than 10 A, displaying current in increments of 0.01 A at accuracy of plus or minus 2.0 percent.

    a. With grounding infrastructure completed and communications system electronics operating, measure current in bonding conductors connected to PBB. Maximum acceptable AC current level is 1 A.

B. Nonconforming Work:

1. Communications bonding will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Collect, assemble, and submit test and inspection reports.

3.9 PROTECTION

A. After installation, protect communications equipment room fittings from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 271100

SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type OFNR optical fiber cable.
2. Optical fiber cable hardware.

1.2 DEFINITIONS

A. Conductive Cable: Cable containing non-current-carrying electrically-conductive members such as metallic strength members and metallic vapor barriers.

B. Cross-Connect: A facility enabling termination of cable elements and their interconnection or cross-connection.

C. Type OFNR: Nonconductive cable for use as riser in vertical shafts or from floor to floor.

1.3 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Type OFNR optical fiber cable.
2. Optical fiber cable hardware.

B. Shop Drawings:

1. System Labeling Schedules:

a. Electronic copy of labeling schedules, in software and format selected by Owner.
b. Electronic copy of labeling schedules that are part of cabling and asset identification system of software.

2. Cabling administration drawings and printouts.
3. Wiring diagrams showing typical schematic arrangement, including the following:

a. Telecommunications rooms plans and elevations.
b. Telecommunications pathways.
c. Telecommunications system access points.
d. Telecommunications grounding system.
e. Cross-connects.

f. Patch panels.
g. Patch cords.

4. Cross-Connect and Patch-Panel Drawings: Detail mounting assemblies and show elevations and physical relationship between installed components.

C. Certificates: For each type of product.

D. Field Quality-Control Reports: Optical fiber cable testing plan.

1.5 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Contracts:

1. Software service agreement.

B. Maintenance Data: For optical fiber cable, splices, and connectors.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish to Owner extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Include the following:

1. Patch-Panel Units: One of each type.
2. Plugs: 10 of each type.
3. Jacks: 10 of each type.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet-work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Test cables upon receipt at Project site.

1. Test optical fiber cable to determine continuity of strand end to end. Use optical fiber flashlight or optical loss test set.
2. Test optical fiber cable while on reels. Use optical time domain reflectometer to verify cable length and locate cable defects, splices, and connector, including loss value of each. Retain test data and include record in maintenance data.

PART 2 - PRODUCTS

2.1 TYPE OFNR OPTICAL FIBER CABLE

A. Type OFNR Optical Fiber Cable: This category covers jacketed optical fiber cable for use as risers in vertical runs in shaft or between floors within buildings in accordance with Article 770 of NFPA 70 containing no electrically conductive materials.

B. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN QAYK; including UL 1651.
3. General Characteristics:

a. Performance: TIA-568.3.
b. Inside Plant Mechanical Properties: ICEA S-83-596.
c. Inside-Outside Plant Mechanical Properties: ICEA S-104-696.
d. Jacket:

1) Cable cordage jacket, fiber, unit, and group color in accordance with TIA-598.
2) Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inch (1 m).

C. Type OFNR, Designation OS1, Inside-Outside Plant, Single-Mode Optical Fiber Cable:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Source Limitations: Obtain products from single manufacturer.
3. Additional Characteristics:

a. Construction: TIA-492CAAA; 9 µm core diameter, 125 µm cladding diameter.
b. Minimum Overfilled Modal Bandwidth-Length Product: 500 MHz-km at 850 nm wavelength; 500 MHz-km at 1300 nm wavelength.

4. Options:

a. Configuration:

1) 12-fiber, single loose tube, optical fiber cable.

b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
c. Jacket Color: Yellow.

D. Type OFNR, Designation OS2, Inside-Outside Plant, Single-Mode Optical Fiber Cable:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Source Limitations: Obtain products from single manufacturer.
3. Additional Characteristics:

a. Construction: TIA-492CAAB; 9 µm core diameter, 125 µm cladding diameter, with low water peak.

b. Minimum Overfilled Modal Bandwidth-Length Product: 500 MHz-km at 850 nm wavelength; 500 MHz-km at 1300 nm wavelength.

4. Options:

a. Configuration:

1) 12-fiber, single loose tube, optical fiber cable.

b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.

c. Jacket Color: Yellow.

2.2 OPTICAL FIBER CABLE HARDWARE

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Performance Criteria:

1. Fiber Optic Connector Intermateability Standard (FOCIS) specifications of TIA-604 series.
2. TIA-568.3.

C. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

D. Patch Cords: Factory-made, dual-fiber cables in 36 inch (900 mm) lengths.

E. Connector Type: [**Type SC complying with TIA-604-3,**] [**Type ST complying with TIA-604-2,**] [**Type LC complying with TIA-604-10,**] [**Type MT-RJ complying with TIA-604-12,**] [**Type MPO complying with TIA-604-5,**] connectors.

F. Plugs and Plug Assemblies:

1. Male; color-coded modular telecommunications connector designed for termination of single optical fiber cable.
2. Insertion loss not more than [**0.25**] [**0.75**] dB.
3. Marked to indicate transmission performance.

G. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of single optical fiber cable.
2. Insertion loss not more than [**0.25**] [**0.75**] dB.
3. Marked to indicate transmission performance.
4. Designed to snap-in to patch panel or faceplate.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests and Inspections:

1. Test and inspect optical fiber cables, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with TIA-526-14 and TIA-568.3 before delivering to site. Affix label with name and date of manufacturer's or qualified electrical testing laboratory's certification of system compliance.

B. Nonconforming Work:

1. Cables that do not pass tests and inspections will be considered defective.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate backbone cabling with protectors and demarcation point provided by communications service provider.

3.2 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Optical fiber backbone cabling system must provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters may not be used as part of backbone cabling.

C. Comply with BICSI N1, NECA NEIS 1, and NECA NEIS 301.

D. Backbone cabling system must comply with transmission standards in TIA-568.1.

E. Telecommunications Pathways and Spaces: Comply with TIA-569.

F. Wiring Methods:

1. In Raceway: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and attics, where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

a. Install cable in Innerduct, including cable in raceway.
b. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."

2. In Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

G. Optical Fiber Cabling Installation:

1. Comply with TIA-568.1 and TIA-568.3.
2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
3. Terminate all cables; no cable may contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inch (760 mm) and not more than 6 inch (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps may not be used for heating.
9. In communications equipment room, provide 10 ft (3 m) long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

H. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable may not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

I. Group connecting hardware for cables into separate logical fields.

3.3 FIRESTOPPING

A. Comply with requirements in Section 078400 "Firestopping."

B. Comply with TIA-569, Annex A, "Firestopping."

C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.4 GROUNDING

A. Install grounding in accordance with BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607 and NECA/BICSI-607.

C. Locate grounding bus bar to minimize length of bonding conductors. Fasten to wall allowing at least 2 inch (50 mm) clearance behind grounding bus bar. Connect grounding bus bar with minimum 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to grounding bus bar, using not smaller than 6 AWG equipment grounding conductor.

3.5 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Administration Class: Class 3.
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Paint and label colors for equipment identification must comply with TIA-606 for Class 3 level of administration.

C. Comply with requirements in Section 271523 "Communications Optical Fiber Horizontal Cabling" for cable and asset management software.

D. Cable Schedule: Install in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish electronic copy of final comprehensive schedules for Project.

E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

F. Cable and Wire Identification:

1. Label each cable within 4 inch (100 mm) of each termination and tap, where it is accessible in cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 ft (4.5 m).
4. Label each unit and field within distribution racks and frames.
5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use different color for jacks and plugs of each service.

G. Labels must be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606, for the following:

1. Flexible vinyl or polyester that flexes as cables are bent.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect optical fiber jacket materials for qualified electrical testing laboratory certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Optical Fiber Cable Tests:

    a. Test instruments must meet or exceed applicable requirements in TIA-568.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:

        1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in one direction in accordance with TIA-526-14, Method B, One Reference Jumper.
        2) Attenuation test results for backbone links must be less than 2.0 dB. Attenuation test results must be less than those calculated in accordance with equation in TIA-568.1.

B. Nonconforming Work:

1. Cables will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective cables and retest.

C. Collect, assemble, and submit test and inspection reports.

1. Data for each measurement must be documented.
2. Data for field quality-control report submittals must be printed in summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from instrument to computer, saved as text files, and printed and submitted.

3.7 MAINTENANCE

A. Software Service Agreement:

1. Technical Support: Beginning at Substantial Completion, verify that software service agreement includes software support for two years.
2. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Verify that upgrading software includes operating system and new or revised licenses for using software.

    a. Upgrade Notice: No fewer than 30 days to allow Owner to schedule and access the system

3. Upgrade Reports: Prepare report after each update, documenting upgrades installed.

END OF SECTION 271323

SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Category 6a twisted pair cable.
2. Twisted pair cable hardware.
3. Cable management system.
4. Identification products.

B. Related Requirements:

1. Section 270513 "Conductors and Cables for Communications Systems" for data cabling associated with system panels and devices.

1.2 DEFINITIONS

A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

B. EMI: Electromagnetic interference.

C. FTP: Shielded twisted pair.

D. F/FTP: Overall foil screened cable with foil screened twisted pair.

E. F/UTP: Overall foil screened cable with unscreened twisted pair.

F. IDC: Insulation displacement connector.

G. Jack: Also commonly called an "outlet," it is the fixed, female connector.

H. LAN: Local area network.

I. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.

J. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

K. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

L. S/FTP: Overall braid screened cable with foil screened twisted pair.

M. S/UTP: Overall braid screened cable with unscreened twisted pairs.

N. UTP: Unscreened (unshielded) twisted pair.

1.3 COPPER HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable cabling system shall provide interconnections between the Intermediate Distribution Frame (IDF) and the equipment outlet. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

1. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
2. Bridged taps and splices shall not be installed in the horizontal cabling.

B. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Category 6 twisted pair cable.
2. Twisted pair cable hardware.
3. Cable management system.
4. Identification products.

B. Shop Drawings: Reviewed and stamped by Technician.

1. System Labeling Schedules:

a. Electronic copy of labeling schedules, in software and format selected by Owner.
b. Electronic copy of labeling schedules that are part of cabling and asset identification system of software.

2. Cabling administration Drawings and printouts.
3. Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment, including the following:

a. Telecommunications rooms plans and elevations.
b. Telecommunications pathways.
c. Telecommunications system access points.
d. Telecommunications grounding system.
e. Telecommunications conductor drop locations.
f. Typical telecommunications details.
g. Mechanical, electrical, and plumbing systems.

C. Twisted pair cable testing plan.

D. Field quality-control reports.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, installation supervisor, and field inspector.

B. Product Certificates: For each type of product.

C. Source quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For splices and connectors to include in maintenance manuals.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Connecting Blocks: One of each type.
2. Cover Plates: One of each type.
3. Jacks: Ten of each type.
4. Patch-Panel Units: One of each type.
5. Plugs: Ten of each type.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings and cabling administration Drawings by a Technician.
2. Installation Supervision: Installation shall be under the direct supervision of Technician or Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.

B. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.11 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. Communications, Non-Plenum Rated:

a. Type CMR complying with UL 1666 and ICEA S-103-701.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. RoHS compliant.

2.3 CATEGORY 6 TWISTED PAIR CABLE

A. Category 6 Twisted Pair Cable: Four-pair, balanced -twisted pair cable, certified to meet transmission characteristics of Category 6a cable at frequencies up to 250 MHz.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AMP NETCONNECT; a TE Connectivity Ltd. company.
2. Belden Inc.
3. Berk-Tek, a Leviton Company.
4. CommScope, Inc.

C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6a cables.

D. Conductors: 100-ohm, 23 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: Riser.

G. Jacket: Blue thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

A. Twisted Pair Cable Hardware: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AMP NETCONNECT; a TE Connectivity Ltd. company.
2. Belden Inc.
3. Berk-Tek, a Leviton Company.
4. CommScope, Inc.

C. General Requirements for Twisted Pair Cable Hardware:

1. Comply with the performance requirements of Category 6a.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables shall be terminated with connecting hardware of same category or higher.

D. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.

E. Connecting Blocks:

1. 110-style IDC for Category 6a.
2. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.

F. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

G. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.

1. Features:

a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. Replaceable connectors.
d. 24 or 48 ports.

2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
3. Number of Jacks per Field: One for each four-pair conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.

H. Patch Cords: Factory-made, four-pair cables in 36-inch (900-mm) lengths; terminated with an eight-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.
2. Patch cords shall have color-coded boots for circuit identification.

I. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Standard: Comply with TIA-568-C.2.
3. Marked to indicate transmission performance.

J. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Designed to snap-in to a patch panel or cover plate.
3. Standard: Comply with TIA-568-C.2.
4. Marked to indicate transmission performance.

K. Cover Plate:

1. Six port, vertical single gang cover plates designed to mount to single gang wall boxes.
2. Plastic Cover Plate: High-impact plastic. Coordinate color with Section 260533.16 "Boxes and Covers for Electrical Systems."
3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.

L. Legend:

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

2.5 CABLE MANAGEMENT SYSTEM

A. Cable Management System: Computer-based cable management system, with integrated database capabilities.

B. 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. Telsoft Solutions.
2. iTRACS Corporation.

C. Document physical characteristics by recording the network, TIA details, and connections between equipment and cable.

D. Information shall be presented in database view, schematic plans, or technical drawings.

1. AutoCAD drawing software shall be used as drawing and schematic plans software.

E. System shall interface with the following testing and recording devices:

1. Direct upload tests from circuit testing instrument into the personal computer.
2. Direct download circuit labeling into labeling printer.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.7 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test cables on reels according to TIA-568-C.1.

C. Factory test twisted pair cables according to TIA-568-C.2.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

A. Routing:

1. Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and attics, unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.

a. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

2. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

3.2 INSTALLATION OF PATHWAYS

A. Comply with requirements for demarcation point, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings."

B. Comply with Section 270528 "Pathways for Communications Systems."

C. Comply with Section 260529 "Hangers and Supports for Electrical Systems."

D. Comply with Section 260536 "Cable Trays for Electrical Systems."

E. Drawings indicate general arrangement of pathways and fittings.

3.3 INSTALLATION OF TWISTED PAIR HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568.

B. General Requirements for Cabling:

1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Consolidation points may be used only for making a direct connection to equipment outlets:

    a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
    b. Locate consolidation points for twisted pair cables at least 49 feet (15 m) from communications equipment room.

7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
8. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.
11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
12. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
13. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Group connecting hardware for cables into separate logical fields.

E. Separation from EMI Sources:

1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.4 FIRESTOPPING

A. Comply with requirements in Section 078400 "Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with "Firestopping Systems" Article in BISCI's "Telecommunications Distribution Methods Manual."

3.5 GROUNDING

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."

C. Comply with TIA-607-B and NECA/BICSI-607.

D. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.

E. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Administration Class: Class 3.
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 3 level of administration.

C. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

E. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
4. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.

    a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from a panel or cabinet to a building-mounted device, with the name and number of a particular device.
    b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

F. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

B. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

C. Nonconforming Work:

1. End-to-end cabling will be considered defective if it does not pass tests and inspections.
2. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

D. Collect, assemble, and submit test and inspection reports.

3.8 MAINTENANCE

A. Software Service Agreement:

1. Technical Support: Beginning at Substantial Completion, verify that software service agreement includes software support for two years.
2. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Verify that upgrading software includes operating system and new or revised licenses for using software.

    a. Upgrade Notice: No fewer than 30 days to allow Owner to schedule and access the system.

3. Upgrade Reports: Prepare report after each update, documenting upgrades installed.

END OF SECTION 271513

SECTION 275116 - PUBLIC ADDRESS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Battery backup power unit.
2. Preamplifiers.
3. Power amplifiers.
4. Volume limiter/compressor.
5. Equipment cabinet.
6. Telephone paging adapter.
7. Tone generator.
8. Monitor panel.
9. Loudspeakers.
10. Noise-operated gain controller.
11. Conductors and cables.

1.3 DEFINITIONS

A. Channels: Separate parallel signal paths, from sources to loudspeakers or loudspeaker zones, with separate amplification and switching that permit selection between paths for speaker alternative program signals.

B. VU: Volume unit.

C. Zone: Separate group of loudspeakers and associated supply wiring that may be arranged for selective switching between different channels.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Power, signal, and control wiring.

1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, required clearances, method of field assembly, components, and location and size of each field connection.
3. Control panels.
4. Calculations: For sizing backup battery.
5. Wiring Diagrams: For power, signal, and control wiring.

a. Identify terminals to facilitate installation, operation, and maintenance.
b. Single-line diagram showing interconnection of components.
c. Cabling diagram showing cable routing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Seismic Qualification Certificates: For control consoles, equipment cabinets, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation. Include qualification data for testing agency.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For public address systems to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017700 "Closeout Procedures" and Section 017823 "Operation and Maintenance Data," include the following:

a. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
b. Operating instructions laminated and mounted adjacent to operating console location.
c. Training plan.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Personnel certified by NICET as Audio Systems Level III Technician.

B. Testing Agency Qualifications: Qualified agency, with the experience and capability to conduct testing indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Bogen Communications, Inc.

B. Source Limitations: Obtain public address system from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NFPA 70.

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. System Functions:

1. Selectively connect any zone to any available signal channel.
2. Selectively control sound from microphone outlets and other inputs.
3. "All-call" feature shall connect the all-call sound signal simultaneously to all zones regardless of zone or channel switch settings.
4. Telephone paging adapter shall allow paging by dialing an extension from any local telephone instrument and speaking into the telephone.
5. Produce a program-signal tone that is amplified and sounded over all speakers, overriding signals currently being distributed.
6. Reproduce high-quality sound that is free of noise and distortion at all loudspeakers at all times during equipment operation including standby mode with inputs off; output free of nonuniform coverage of amplified sound.

2.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Supports and seismic restraints for control consoles, equipment cabinets and racks, and components shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified."

2.4 SYSTEM DESCRIPTION

A. Compatibility of Components: Coordinate component features to form an integrated system. Match components and interconnections for optimum performance of specified functions.

B. Equipment: Comply with UL 813. Equipment shall be modular, using solid-state components, and fully rated for continuous duty unless otherwise indicated. Select equipment for normal operation on input power usually supplied at 110 to 130 V, 60 Hz.

C. Equipment Mounting: Where rack, cabinet, or console mounting is indicated, equipment shall be designed to mount in a 19-inch (483-mm) housing complying with EIA/ECA-310-E.

D. Weather-Resistant Equipment: Listed and labeled by a qualified testing agency for duty outdoors or in damp locations.

2.5 PREAMPLIFIERS

A. Preamplifier:

1. Separately mounted.
2. Integral to power amplifier.

B. Output Power: Plus 4 dB above 1 mW at matched power-amplifier load.

C. Total Harmonic Distortion: Less than 1 percent.

D. Frequency Response: Within plus or minus 2 dB from 20 to 20,000 Hz.

E. Input Jacks: Minimum of three. One matched for low-impedance microphone; one USB port; and the other matchable to DVD or CD player, or radio tuner signals without external adapters.

F. Minimum Noise Level: Minus 55 dB below rated output.

G. Controls: On-off, input levels, and master gain.

2.6 POWER AMPLIFIERS

A. Output Power: 70-V balanced line. 80 percent of the sum of wattage settings of connected for each station and speaker connected in all-call mode of operation, plus a 10 percent allowance for future stations.

B. Total Harmonic Distortion: Less than 3 percent at rated power output from 50 to 12,000 Hz.

C. Minimum Signal-to-Noise Ratio: 80 dB, at rated output.

D. Frequency Response: Within plus or minus 3 dB from 20 to 12,000 Hz.

E. Output Regulation: Less than 2 dB from full to no load.

F. Controls: On-off, input levels, and low-cut filter.

G. Input Sensitivity: Matched to preamplifier and to provide full-rated output with sound-pressure level of less than 10 dynes/sq. cm impinging on speaker microphone or handset transmitter.

2.7 VOLUME LIMITER/COMPRESSOR

A. Minimum Performance Requirements:

1. Frequency Response: 45 to 15,000 Hz, plus or minus 1 dB minimum.
2. Reduction Ratio: Automatically vary compression ratio, and attack and release times for voice and music inputs.

a. Compression Ratio Range: 3:1 to 10:1 minimum.
b. Averaging Compressor Attack Time: Up to 500 milliseconds.
c. Signal Fast Compression Attack Time: Less than 10 milliseconds.
d. Release time: Up to 500 milliseconds.

3. Distortion: 0.5 percent, maximum.

4. Rated Output: Minimum of plus 14 dB.
5. Inputs: Minimum of two inputs with variable front-panel gain controls and VU or decibel meter for input adjustment.
6. Rack mounted.

2.8 EQUIPMENT CABINET

A. Comply with EIA/ECA-310-E.

B. House amplifiers and auxiliary equipment at each location.

C. Cabinet Housing:

1. Constructed of 0.0478-inch (1.2-mm) steel, minimum, with front- and rear-locking doors and standard EIA/ECA-310-E-compliant, 19-inch (483-mm) racks.
2. Arranged for floor or wall mounting as indicated.
3. Sized to house all equipment indicated, plus spare capacity.

D. Power Provisions: A single switch in cabinet shall disconnect cabinet power distribution system and electrical outlets, which shall be uniformly spaced to accommodate ac-power cords for each item of equipment.

E. Ventilation: A low-noise fan for forced-air cabinet ventilation. Fan shall be equipped with a filtered input vent and shall be connected to operate from 105- to 130-V ac, 60 Hz; separately fused and switched; arranged to be powered when main cabinet power switch is on.

2.9 TELEPHONE PAGING ADAPTER

A. Adapters shall accept voice signals from telephone extension dialing access and automatically provide amplifier input and program override for preselected zones.

1. Minimum Frequency Response: Flat, 200 to 2500 Hz.
2. Impedance Matching: Adapter matches telephone line to public address equipment input.
3. Cabinet mounted.

2.10 TONE GENERATOR

A. Tone generator shall provide clock and program interface with public address system.

B. Signals: Minimum of seven distinct, audible signal types including wail, warble, high/low, alarm, repeating and single-stroke chimes, and tone.

C. Pitch Control: Chimes and tone.

D. Volume Control: All outputs.

E. Activation-Switch Network: Establishes priority and hierarchy of output signals produced by different activation setups.

F. Mounting: Cabinet.

2.11 MONITOR PANEL

A. Monitor power amplifiers.

B. Components: VU or dB meter, speaker with volume control, and multiple-position rotary selector switch.

C. Selector Switch and Volume Control: Selective monitoring of output of each separate power amplifier via VU or dB meter and speaker.

D. Mounting: Cabinet.

2.12 LOUDSPEAKERS

A. Cone-Type Loudspeakers:

1. Minimum Axial Sensitivity: 91 dB at 1 m, with 1-W input.
2. Frequency Response: Within plus or minus 3 dB from 50 to 15,000 Hz.
3. Size: 8 inches (200 mm) with 1-inch (25-mm) voice coil and minimum 5-oz. (140-g) ceramic magnet.
4. Rated Output Level: 8 W.
5. Minimum Dispersion Angle: 100 degrees.
6. Matching Transformer: Full-power rated with four taps. Maximum insertion loss of 0.5 dB.
7. Surface-Mounted Units: Ceiling, wall, or pendant mounted, as indicated, in steel back boxes, acoustically dampened. Front face of at least 0.0478-inch (1.2-mm) steel and whole assembly rust proofed and shop primed for field painting.
8. Flush-Ceiling-Mounted Units: In steel back boxes, acoustically dampened. Metal ceiling grille with white baked enamel.

B. Horn-Type Loudspeakers:

1. Type: Single-horn units, double-reentrant design, with minimum full-range power rating of 15 W.
2. Matching Transformer: Full-power rated with four standard taps. Maximum insertion loss of 0.5 dB.
3. Frequency Response: Within plus or minus 3 dB from 250 to 12,000 Hz.
4. Dispersion Angle: 130 by 110 degrees.
5. Mounting: Integral bracket.
6. Units in Damp, Wet, or Outdoor Locations: Listed and labeled for environment in which they are located.
7. Units in Hazardous (Classified) Locations: Listed and labeled for environment in which they are located. Provide any accessories required to maintain listing.

2.13 NOISE-OPERATED GAIN CONTROLLER

A. Gain controller shall be designed to continuously sense space noise level and automatically adjust signal level to local speakers.

B. Frequency Response: 20 to 20,000 Hz, plus or minus 1 dB.

C. Level Adjustment Range: 30 dB minimum.

D. Maximum Distortion: 0.5 percent.

E. Control: Permits adjustment of sensing level of device.

2.14 OUTLETS

A. Volume Attenuator Station: Wall-plate-mounted autotransformer type with paging priority feature.

1. Wattage Rating: 10 W unless otherwise indicated.
2. Attenuation per Step: 3 dB, with positive off position.
3. Insertion Loss: 0.4 dB maximum.
4. Attenuation Bypass Relay: SPDT. Connected to operate and bypass attenuation when all-call, paging, program signal, or prerecorded message features are used. Relay returns to normal position at end of priority transmission.
5. Label: "PA Volume."

2.15 BATTERY BACKUP POWER UNIT

A. Unit shall consist of time-delay relay, sealed lead-calcium battery, battery charger, on-off switch, "normal" and "emergency" indicating lights, and adequate capacity to supply maximum equipment power requirements for one hour of continuous full operation.

B. Unit shall supply public address equipment with 12- to 15-V dc power automatically during an outage of normal 120-V ac power.

C. Battery shall be on float charge when not supplying system and able to transfer automatically to supply system after three to five seconds of continuous outage of normal power, as sensed by time-delay relay.

D. Unit shall automatically retransfer system to normal supply when normal power has been reestablished for three to five seconds continuously.

2.16 CONDUCTORS AND CABLES

A. Jacketed, twisted pair and twisted multipair, untinned solid copper.

1. Insulation for Wire in Conduit: Thermoplastic, not less than 1/32 inch (0.8 mm) thick.

2.17 PATHWAYS

A. Conduit and Boxes: Comply with Section 270528 "Pathways for Communications Systems."

1. Outlet boxes and concealed conduit sleeves in walls are provided as part of the manufactured building system.

2. Provide additional conduit as required to complete system.

PART 3 - EXECUTION

3.1 WIRING METHODS

A. Wiring Method:

1. Install cables in pathways and cable trays except within consoles, cabinets, desks, and counters, and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal pathway and cables except in unfinished spaces.

    a. Comply with requirements for pathways and boxes specified in Section 270528 "Pathways for Communications Systems."

2. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

B. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 INSTALLATION OF PATHWAYS

A. Comply with requirements in Section 270528 "Pathways for Communications Systems." for installation of conduits and wireways.

B. Install manufactured conduit sweeps and long-radius elbows whenever possible.

3.3 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Cable Installation Requirements:

1. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
2. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
3. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
6. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend speaker cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceiling by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.

D. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate pathways or, where exposed or in same enclosure, separate conductors at least 12 inches (300 mm) apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other communication equipment conductors as recommended by equipment manufacturer.

3.4 INSTALLATION

A. Coordinate layout and installation of system components and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

C. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.

D. Equipment Cabinets:

1. Group items of same function together, either vertically or side by side, and arrange controls symmetrically. Mount monitor panel above the amplifiers.
2. Arrange all inputs, outputs, interconnections, and test points so they are accessible at rear of rack for maintenance and testing, with each item removable from rack without disturbing other items or connections.
3. Blank Panels: Cover empty space in equipment racks so entire front of rack is occupied by panels.

E. Volume Limiter/Compressor: Equip each zone with a volume limiter/compressor. Install in central equipment cabinet. Arrange to provide a constant input to power amplifiers.

F. Wall-Mounted Outlets: Flush mounted.

G. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.

H. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.

I. Speaker-Line Matching Transformer Connections: Make initial connections using tap settings indicated on Drawings.

J. Connect wiring according to Section 271500 "Communications Horizontal Cabling" and Section 280513 "Conductors and Cables for Electronic Safety and Security."

3.5 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes as specified in Section 270526 "Grounding and Bonding for Communications Systems."

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Schedule tests with at least seven days' advance notice of test performance.
2. After installing public address system and after electrical circuitry has been energized, test for compliance with requirements.
3. Operational Test: Perform tests that include originating program and page messages at microphone outlets, preamplifier program inputs, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.
4. Signal-to-Noise Ratio Test: Measure signal-to-noise ratio of complete system at normal gain settings as follows:

    a. Disconnect microphone at connector or jack closest to it and replace it in the circuit with a signal generator using a 1000-Hz signal. Replace all other microphones at corresponding connectors with dummy loads, each equal in impedance to microphone it replaces. Measure signal-to-noise ratio.
    b. Repeat test for each separately controlled zone of loudspeakers.
    c. Minimum acceptance ratio is 50 dB.

5. Distortion Test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 50, 200, 400, 1000, 3000, 8000, and 12,000 Hz into each preamplifier channel. For each frequency, measure distortion in the paging and all-call amplifier outputs. Maximum acceptable distortion at any frequency is 3 percent total harmonics.
6. Acoustic Coverage Test: Feed pink noise into system using octaves centered at 500 and 4000 Hz. Use sound-level meter with octave-band filters to measure level at five locations in each zone. For spaces with seated audiences, maximum permissible variation in level is plus or minus 2 dB. In addition, the levels between locations in same zone and between locations in adjacent zones must not vary more than plus or minus 3 dB.
7. Power Output Test: Measure electrical power output of each power amplifier at normal gain settings of 50, 1000, and 12,000 Hz. Maximum variation in power output at these frequencies must not exceed plus or minus 1 dB.
8. Signal Ground Test: Measure and report ground resistance at public address equipment signal ground. Comply with testing requirements specified in Section 270526 "Grounding and Bonding for Communications Systems."

C. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.

D. Public address system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

1. Include a record of final speaker-line matching transformer-tap settings and signal ground-resistance measurement certified by Installer.

3.7 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.
2. Complete installation and startup checks according to manufacturer's written instructions.

3.8 ADJUSTING

A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the public address system and equipment. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 275116

SECTION 28 00 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Basic Electrical Requirements specifically applicable to Division 28 Sections.

1.2 SCOPE OF WORK

A. The specifications describe the quality and character of the materials and methods of installation.

B. The drawings and these specifications are complementary to each other in that all apparatus, materials and equipment outlined in the Drawings and/or specified herein shall be considered essential to the contract.

C. The drawings include plans of the building, with diagrammatic layouts showing approximate locations of equipment and devices. Before installing, study adjacent architectural features, and make installation in the most logical manner in accordance with Code and Regulatory Requirements.

D. The symbols, notes, instructions and schedules on the drawings are included as part of these specifications.

1.3 WORK SCHEDULE AND SEQUENCE

A. Install work in stages to accommodate the Owner’s operational requirements. Coordinate schedule and hours of operation with the Owner prior to start of construction.

B. Coordinate installation sequence with detailed coordination shop drawings provided under Division 1.

1.4 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code

B. ANSI/NFPA 72 – National Fire Alarm Code

C. National Electrical Safety Code

D. ADA – Americans with Disabilities Act

1.5 SUBMITTALS

A. Conform to Division 1 requirements.

B. Include a transmittal form clearly indicating the Project, the name of the Contractor and the contents of the submittal.

C. Include Contractor's stamp and signature indicating that the submittal has been reviewed and conforms to Contract Documents. Submittals without Contractor's stamp will be returned without review.

D. Identify deviations from Contract Documents, including variations and limitations. Review of a submittal does not constitute acceptance of deviations from the Contract Documents, unless such deviation is clearly indicated as such on the submittal, and specifically accepted as such.

E. Submit shop drawings and product data, grouped to include complete systems, products and accessories in a single package.
   1. Reference catalog cuts and brochures of products to proper paragraph in specifications. Furnish numerical index by specification article number, listing product name, catalog number and reference to page number of submittal brochure.
   2. Arrange the submittals in the same sequence as the specifications and reference in the upper right-hand corner, the particular specification provision for which each submittal is intended.
   3. Cross reference individual catalog numbers of substitute products to number of specified materials.
   4. Submit manufacturer's certification that equipment meets or exceeds the minimum requirements as specified.
   5. Where materials, equipment and installations are specified to conform with societies or agencies such as ANSI, NECA, etc., submit certification of such compliance.
   6. The submittal shall be complete and with catalog data and information properly marked to show, among other things, material capacity and performance to meet capacities or performance as specified or indicated
   7. Mark dimensions and values in units to match those specified.

F. Review of the submittal is only for general conformance with design concept of project and general compliance with information given in the contract documents. The Contractor is responsible for confirmation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination work of all trades.

G. Ordering of equipment prior to approval of submittals is done entirely at the risk of the Contractor.

1.6 COORDINATION SUBMITTALS

A. Develop detailed coordination shop drawings in conjunction with other trades, where required by complex and/or congested spaces, to minimize conflict, to allow for correct sequence of installation, and to provide all required clearances. See Division 1 for expanded requirements.

1.7 PROJECT RECORD DRAWINGS

A. Conform to Division 1 requirements.

B. Keep an accurate record of the work under this Contract, as it progresses, to be available for inspection at all times. See individual Division 28 Sections for specific requirements.

C. Upon completion of the work, transfer all changes and information onto a new set of reproducible drawings in an orderly and legible manner.

1.8 QUALITY ASSURANCE

A. For actual fabrication, installation and testing of the work, use only trained and experienced workers completely familiar with the equipment and materials, and the manufacturer's installation requirements.

B. Include the services of experienced superintendents for each sub-section who shall be constantly in charge of the work, together with the qualified journeymen, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate and test the work involved, including equipment and materials furnished by others.

C. Perform the work under this section shall be in cooperation with the work of other trades to prevent conflict or interference and to aid in timely completion of the overall project.

1.9 DELIVERY, STORAGE AND HANDLING

A. Storage and handling of equipment and/or systems for project, whether it be onsite or offsite, shall be addressed by the Contractor's IAQ Management Plan. Plan must meet or exceed the recommended control measures of the "Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3)."

1.10 REGULATORY REQUIREMENTS

A. Conform to International Building Code, International Fire Code, and NFPA 101 Life Safety Code

B. Electrical: Conform to NFPA 70.

C. Fire Alarm: Conform to NFPA 72 and ADA.

1.11 FIELD CONDITIONS

A. Visit the project site and become familiar with field conditions including accessibility and physical obstructions. Bid submission indicates familiarity with, and acceptance of, field conditions.

B. Separate Sections cover site, architectural and mechanical Work. Study the complete set of contract documents to become familiar with the entire Project including site, architectural and structural features and systems as related to Work in this Division. Pay special attention to Divisions featuring equipment requiring electrical interface including Owner-furnished equipment, elevator equipment, and mechanical systems (plumbing, hvac, fire sprinkler, controls).

C. Study and become familiar with any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. Exercise due and particular caution to determine that all parts of work are made quickly and easily accessible.

D. If any conflicts occur which necessitate departures from the Drawings, submit details of departures and reasons therefore for written approval. Do not install the affected equipment or related impacted wiring until approval is received.

E. Should there be omissions or discrepancies in the plans and specifications, or discrepancies from actual site conditions, bring them to the attention of the Architect ten (10) working days in advance of the date of bid opening so that corrections or clarifications can be made.

F. Install Work in locations shown on Drawings, unless prevented by Project conditions. Coordinate work with that of other trades. Verify that adjacent and related construction conforms to contract documents and to coordination shop drawings.

G. If Project conditions, including changes initiated by other trades or discovery of conditions unknown at time of bid, require unspecified materials and methods or rearrangement of Work, prepare drawings showing proposed changes to meet Project conditions. Obtain permission of the Architect before proceeding.

H. All RFIs must include a proposed solution. RFIs submitted without proposed solutions will be returned without review.

1.12 COORDINATION

A. Provide and coordinate all information, drawings or layouts of equipment or work under this section which affect the work of the other trades.

B. In case changes in the indicated locations or arrangements are necessary due to developed conditions in the construction, or rearrangement of furnishings, or equipment, these changes shall be made without extra cost to the Owner, provided the change is ordered before work directly connected is installed, and no extra materials are required.

1.13 EXISTING UTILITIES

A. The location of utilities shown on the plans are the best known information available at time of design. Contact the appropriate agencies and confirm the information and make arrangements for connection thereto, prior to excavation and installation of any piping or systems.

B. Perform exploratory excavation and/or use locate service as needed to confirm locations of existing underground utilities.

1.14 PROJECT SITE VISITS

A. Periodic visits to the project site by the Architect/Engineer are for the express purpose of verifying compliance with the contract documents. Such site visits shall not be construed as construction supervision, i.e., the Architect/Engineer assumes no responsibility for providing a safe place for the performance of the work by the Contractor or the Contractor's employees or the safety of the supplies of the Contractor. Neither shall such site visits relieve the Contractor of the responsibility for the discovery of his own errors and the correction of them, nor of the responsibility of properly performing the work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. See Drawings and individual Sections of Division 28.

2.2 SUBSTITUTIONS

A. Conform to Division 1 requirements. Conformance to construction documents is the responsibility of the substitutor, regardless of approval.

B. Layout on drawings, including space allotted for clearances, access, etc., is based on performance and physical attributes of equipment specified and/or scheduled on plans. Coordinate with other systems, subsystems and trades as required when using substituted materials or equipment.

C. If the use of substitute materials or equipment requires alternate arrangement of equipment, fixtures, devices, wiring or accessories, prepare drawings showing proposed changes. Obtain permission of the Architect before proceeding.

D. If the use of substitute materials or equipment results in different performance than that provided by the specified materials or equipment, adjust Work as required to provide parity performance, at no additional cost to the Owner. Obtain permission of the Architect before proceeding.

E. If the use of substitute materials or equipment results in an increase in the cost, including changes to the Work of other trades, pay for any said increase in cost.

F. See Drawings and individual Sections of Division 28 for further specific information required for substitutions.

2.3 VALUE ENGINEERING

A. Conform to SUBSTITUTIONS above.

B. In addition, obtain a Professional 3rd Party review and opinion on the implementation of VE proposals.

PART 3 - EXECUTION

3.1 INSTALLATION

A. See Drawings and individual Sections of Division 28. In addition the following general requirements shall apply:
   1. Obtain Manufacturer's printed installation instruction to aid in properly executing work of installing equipment whenever such instructions are available. Submit copies of such instructions to the Architect prior to time of installation.
   2. Install equipment in a neat and workmanlike manner. Align, level and adjust for satisfactory appearance and operation. Install so that connection and disconnection of wiring and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, maintenance and repair

END OF SECTION 28 05 00

SECTION 283100 - INTRUSION DETECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Intrusion detection with communication links to perform monitoring, alarm, and control functions.

B. Related Sections:

1. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for power cabling between master control units and field-mounted devices and control units.
2. Section 271323 "Communications Optical Fiber Backbone Cabling" for multi- and single-mode backbone (riser-rated) optical fiber.
3. Section 271513 "Communications Copper Horizontal Cabling" for Category 5e, 6, and 7 horizontal (general use, riser-, and plenum-rated) cabling.

1.3 DEFINITIONS

A. CCTV: Closed-circuit television.

B. PIR: Passive infrared.

C. RFI: Radio-frequency interference.

D. UPS: Uninterruptible power supply.

E. Control Unit: System component that monitors inputs and controls outputs through various circuits.

F. Master Control Unit: System component that accepts inputs from other control units and may also perform control-unit functions. The unit has limited capacity for the number of protected zones and is installed at an unattended location or at a location where it is not the attendant's primary function to monitor the security system.

G. Monitoring Station: Facility that receives signals and has personnel in attendance at all times to respond to signals. A central station is a monitoring station that is listed.

H. Protected Zone: A protected premises or an area within a protected premises that is provided with means to prevent an unwanted event.

I. Standard Intruder: A person who weighs 100 lb (45 kg) or less and whose height is 60 inches (1525 mm) or less; dressed in a long-sleeved shirt, slacks, and shoes.

J. Standard-Intruder Movement: Any movement, such as walking, running, crawling, rolling, or jumping, of a "standard intruder" in a protected zone.

K. Zone. A defined area within a protected premises. It is a space or area for which an intrusion must be detected and uniquely identified. The sensor or group of sensors must then be assigned to perform the detection, and any interface equipment between sensors and communication must link to master control unit.

1.4 ACTION SUBMITTALS

A. Product Data: Components for sensing, detecting, and control, including dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: Detail assemblies of standard components that are custom assembled for specific application on this Project.

1. Functional Block Diagram: Show single-line interconnections between components including interconnections between components specified in this Section and those furnished under other Sections. Indicate methods used to achieve systems integration. Indicate control, signal, and data communication paths and identify control interface devices and media to be used. Describe characteristics of network and other data communication lines.

    a. Indicate control, signal, and data communication paths and identify PLCs, networks, control interface devices, and media to be used.
    b. Describe characteristics of network and other data communication lines.
    c. Describe methods used to protect against power outages and transient voltages including types and ratings of isolation and surge suppression devices used in data, communication, signal, control, and ac and dc power circuits.

2. Site and Floor Plans: Indicate final outlet and device locations, routing of raceways, and cables inside and outside the building.
3. Device Address List: Coordinate with final system programming.
4. System Wiring Diagrams: Include system diagrams unique to Project. Show connections for all devices, components, and auxiliary equipment. Include diagrams for equipment and for system with all terminals and interconnections identified.
5. Details of surge-protection devices and their installation.
6. Sensor detection patterns and adjustment ranges.

C. Design Data: Include method of operation and supervision of each component and each type of circuit. Show sequence of operations for manually and automatically initiated system or equipment inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are unacceptable.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Warranty: Sample of special warranty.

C. Field Test Reports: Test plan and report defining all tests required to ensure that system meets technical, operational, and performance specifications within 60 days of date of Contract award.

D. Evaluation Reports: Examination reports documenting inspections of substrates, areas, and conditions.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For intrusion detection system to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Data for each type of product, including features and operating sequences, both automatic and manual.
2. Master control-unit hardware and software data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. An employer of workers, at least one of whom is a Certified Alarm Technician, Level 1.
2. Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
3. Layout Responsibility: Preparation of Shop Drawings and cabling administration Drawings by a Technician.
4. Installation Supervision: Installation shall be under the direct supervision of Technician or Level 2 Commercial Installer, who shall be present at all times when Work of this Section is performed at Project site.
5. Testing Supervisor: Currently certified by BICSI as a Technician to supervise on-site testing.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Altitude: Sea level to 2000 ft..
2. Master Control Unit: Rated for continuous operation in an ambient of 60 to 85 deg F (16 to 29 deg C) and a relative humidity of 20 to 80 percent, noncondensing.
3. Interior, Controlled Environment: System components, except master control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambients of 36 to 122 deg F (2 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing.
4. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambients of 0 to 122 deg F (minus 18 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing.
5. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambients of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Comply with UL 294 and UL 639 for outdoor-use equipment. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h).

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Installer agree to repair or replace components of intrusion detection devices and equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Description: Hard-wired, modular, microprocessor-based controls, intrusion sensors and detection devices, and communication links to perform monitoring, alarm, and control functions.

B. Supervision: System components shall be continuously monitored for normal, alarm, supervisory, and trouble conditions. Indicate deviations from normal conditions at any location in system. Indication includes identification of device or circuit in which deviation has occurred and whether deviation is an alarm or malfunction.

1. Alarm Signal: Display at master control unit and actuate audible and visual alarm devices.
2. Trouble Condition Signal: Distinct from other signals, indicating that system is not fully functional. Trouble signal shall indicate system problems such as battery failure, open or shorted transmission line conductors, or control-unit failure.
3. Supervisory Condition Signal: Distinct from other signals, indicating an abnormal condition as specified for the particular device or control unit.

C. System Control: Master control unit shall directly monitor intrusion detection units and connecting wiring.

D. System shall automatically reboot program without error or loss of status or alarm data after any system disturbance.

E. Operator Commands:

1. Help with System Operation: Display all commands available to operator. Help command, followed by a specific command, shall produce a short explanation of the purpose, use, and system reaction to that command.
2. Acknowledge Alarm: To indicate that alarm message has been observed by operator.
3. Place Protected Zone in Access: Disable all intrusion-alarm circuits of a specific protected zone. Tamper circuits may not be disabled by operator.
4. Place Protected Zone in Secure: Activate all intrusion-alarm circuits of a protected zone.
5. Protected Zone Test: Initiate operational test of a specific protected zone.
6. System Test: Initiate system-wide operational test.

F. Timed Control at Master Control Unit: Allow automatically timed "secure" and "access" functions of selected protected zones.

G. Response Time: Two seconds between actuation of any alarm and its indication at master control unit.

H. Circuit Supervision: Supervise all signal and data transmission lines, links with other systems, and sensors from master control unit. Indicate circuit and detection device faults with both protected zone and trouble signals, sound a distinctive audible tone, and illuminate an LED. Maximum permissible elapsed time between occurrence of a trouble condition and indication at master control unit is 20 seconds. Initiate an alarm in response to opening, closing, shorting, or grounding of a signal or data transmission line.

I. Programmed Secure-Access Control: System shall be programmable to automatically change status of various combinations of protected zones between secure and access conditions at scheduled times. Status changes may be preset for repetitive, daily, and weekly; specially scheduled operations may be preset up to a year in advance. Manual secure-access control stations shall override programmed settings.

J. Manual Secure-Access Control: Coded entries at manual stations shall change status of associated protected zone between secure and access conditions.

2.2 SYSTEM COMPONENT REQUIREMENTS

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

B. Control Units, Devices, and Communications with Monitoring Station: Listed and labeled by a qualified testing agency for compliance with SIA CP-01.

C. FM Global Compliance: FM-Approved and -labeled intrusion detection devices and equipment.

D. Comply with NFPA 70.

E. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor entry connection to components.

1. Minimum Protection for Power Lines 120 V and More: Auxiliary panel suppressors complying with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Lines: Listed and labeled by a qualified testing agency for compliance with NFPA 731.

F. Intrusion Detection Units: Listed and labeled by a qualified testing agency for compliance with UL 639.

G. Interference Protection: Components shall be unaffected by radiated RFI and electrical induction of 15 V/m over a frequency range of 10 to 10,000 MHz and conducted interference signals up to 0.25-V rms injected into power supply lines at 10 to 10,000 MHz.

H. Tamper Protection: Tamper switches on detection devices, control units, annunciators, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled and when entering conductors are cut or disconnected. Master control-unit alarm display shall identify tamper alarms and indicate locations.

I. Self-Testing Devices: Automatically test themselves periodically, but not less than once per hour, to verify normal device functioning and alarm initiation capability. Devices transmit test failure to master control unit.

J. Antimasking Devices: Automatically check operation continuously or at intervals of a minute or less, and use signal-processing logic to detect blocking, masking, jamming, tampering, or other operational dysfunction. Devices transmit detection of operational dysfunction to master control unit as an alarm signal.

2.3 ENCLOSURES

A. Interior Electronics: NEMA 250, Type 12.

B. Screw Covers: Where enclosures are readily accessible, secure with security fasteners of type appropriate for enclosure.

2.4 SECURE AND ACCESS DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Sonitrol.

B. Keypad and Display Module: Arranged for entering and executing commands for system-status changes and for displaying system-status and command-related data.

C. Key-Operated Switch: Change protected zone between secure and access conditions.

2.5 DOOR AND WINDOW SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Sonitrol.

B. Description: Balanced-magnetic switch, complying with UL 634, installed on frame with integral overcurrent device to limit current to 80 percent of switch capacity. Bias magnet and minimum of two or three encapsulated reed switches shall resist compromise from introduction of foreign magnetic fields.

C. Flush-Mounted Switches: Unobtrusive and flush with surface of door and window frame.

D. Overhead Door Switch: Balanced-magnetic type, listed for outdoor locations, and having door-mounted magnet and floor-mounted switch unit.

E. Remote Test: Simulate movement of actuating magnet from master control unit.

2.6 MASTER CONTROL UNIT

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Sonitrol.

B. Description: Supervise sensors and detection subsystems and their connecting communication links, status control (secure or access) of sensors and detector subsystems, activation of alarms and supervisory and trouble signals, and other indicated functions.

1. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
2. Include a real-time clock for time annotation of events on the event recorder and printer.
3. Addressable initiation devices that communicate device identity and status.
4. Control circuits for operation of mechanical equipment in response to an alarm.

C. Construction: , modular, with separate and independent alarm and supervisory system modules. Alarm-initiating protected zone boards shall be plug-in cards. Arrangements that require removal of field wiring for module replacement are unacceptable.

D. Comply with UL 609, UL 1023 or UL 1076.

E. Console Controls and Displays: Arranged for interface between human operator at master control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: LCD, two line(s) of 40 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
3. Control-Unit Network: Automatic communication of alarm, status changes, commands, and other communications required for system operation. Communication shall return to normal after partial or total network interruption such as power loss or transient event. Total or partial signaling network failures shall identify the failure and record the failure at the annunciator display and at the system printer.
4. Field Device Network: Communicate between the control unit and field devices of the system. Communications shall consist of alarm, network status, and status and control of field-mounted processors. Each field-mounted device shall be interrogated during each interrogation cycle.
5. Operator Controls: Manual switches and push-to-test buttons that do not require a key to operate. Prevent resetting of alarm, supervisory, or trouble signals while alarm or trouble condition persists. Include the following:

    a. Acknowledge alarm.
    b. Silence alarm.
    c. System reset.
    d. LED test.

6. Timing Unit: Solid state, programmable, 365 days.
7. Confirmation: Relays, contactors, and other control devices shall have auxiliary contacts that provide confirmation signals to system for their on or off status. Software shall interpret such signals, display equipment status, and initiate failure signals.
8. Alarm Indication: Audible signal sounds and a plain-language identification of the protected zone originating the alarm appears on LED or LCD display at master control unit. Annunciator panel displays a common alarm light and sounds an audible tone.

F. Protected Zones: Quantity of alarm and supervisory zones as indicated, with capacity for expanding number of protected zones by a minimum of 25 percent.

G. Power Supply Circuits: Master control units shall provide power for remote power-consuming detection devices. Circuit capacity shall be adequate for at least a 25 percent increase in load.

H. Cabinet: Lockable, steel enclosure arranged so operations required for testing, normal operation, and maintenance are performed from front of enclosure. If more than a single cabinet

is required to form a complete control unit, provide exactly matching modular enclosures. Accommodate all components and allow ample gutter space for field wiring. Identify each enclosure by an engraved, laminated, phenolic-resin nameplate. Lettering on enclosure nameplate shall not be less than 1 inch (25 mm) high. Identify, with permanent labels, individual components and modules within cabinets.

I. Transmission to Monitoring Station: A communications device to automatically transmit alarm, supervisory, and trouble signals to the monitoring station, operating over a standard voice grade telephone leased line. Comply with UL 1635.

J. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

2.7 SECURITY FASTENERS

A. Operable only by tools produced for use on specific type of fastener by fastener manufacturer or other licensed fabricator. Drive system type, head style, material, and protective coating as required for assembly, installation, and strength.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of intrusion detection.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of intrusion detection connections before intrusion detection installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection.

D. Inspect built-in and cast-in anchor installations, before installing intrusion detection, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional anchor installations. Prepare inspection reports.

E. For material whose orientation is critical for its performance as a ballistic barrier, verify installation orientation.

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

3.2 SYSTEM INSTALLATION

A. Comply with UL 681 and NFPA 731.

B. Install wall-mounted equipment, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Section 270548.16 "Seismic Controls for Communications Systems."

C. Connecting to Existing Equipment: Verify that existing security system is operational before making changes or connections.

1. Connect new equipment to existing control panel in existing building.
2. Connect new equipment to existing monitoring equipment at the Supervising Station.
3. Expand, modify, and supplement existing equipment as necessary to extend existing functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

D. Security Fasteners: Where accessible to inmates, install intrusion detection components using security fasteners with head style appropriate for fabrication requirements, strength, and finish of adjacent materials except that a maximum of two different sets of tools shall be required to operate security fasteners for Project.

3.3 WIRING INSTALLATION

A. Wiring Method: Install wiring in metal raceways according to Section 270528 "Pathways for Communications Systems," except in accessible indoor ceiling spaces and in interior hollow gypsum board partitions where cable may be used. Conceal raceways and wiring except in unfinished spaces and as indicated. Minimum conduit size shall be 1/2 inch (13 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Wires and Cables:

1. Conductors: Size as recommended in writing by system manufacturer unless otherwise indicated.
2. 120-V Power Wiring: Install according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.
3. Control and Signal Transmission Conductors: Install unshielded, twisted-pair cable unless otherwise indicated or if manufacturer recommends shielded cable, according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

E. Install power supplies and other auxiliary components for detection devices at control units unless otherwise indicated or required by manufacturer. Do not install such items near devices they serve.

F. Identify components with engraved, laminated-plastic or metal nameplate for master control unit and each terminal cabinet, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 270553 "Identification for Communications Systems."

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with identification requirements in Section 270553 "Identification for Communications Systems."

B. Install instructions frame in a location visible from master control unit.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Tests and Inspections: Comply with provisions in NFPA 731, Ch. 9, "Testing and Inspections."

1. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
2. Test Methods: Intrusion detection systems and other systems and equipment that are associated with detection and accessory equipment shall be tested according to Table "Test Methods" and Table "Test Methods of Initiating Devices."

C. Documentation: Comply with provisions in NFPA 731, Ch. 4, "Documentation."

D. Tag all equipment, stations, and other components for which tests have been satisfactorily completed.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other-than-normal occupancy hours for this purpose. Visits for this purpose shall be in addition to any required by warranty.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the intrusion detection system. Comply with documentation provisions in NFPA 731, Ch. 4, "Documentation and User Training."

END OF SECTION 283100

SECTION 284621.11 - ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fire-alarm control unit (FACU).
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Fire-alarm notification appliances.
5. Fire-alarm addressable interface devices.
6. Digital alarm communicator transmitters (DACTs).
7. Connection to existing addressable fire-alarm system.

B. Related Requirements:

1. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" or Section 260523 "Control Voltage Electrical Power Cables" for cables and conductors for fire-alarm systems.

1.3 DEFINITIONS

A. DACT: Digital alarm communicator transmitter.

B. EMT: Electrical metallic tubing.

C. FACU: Fire-alarm control unit.

D. Mode: The terms "Active Mode," "Off Mode," and "Standby Mode" are used as defined in the 2007 Energy Independence and Security Act (EISA).

E. NICET: National Institute for Certification in Engineering Technologies.

F. PC: Personal computer.

G. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:

1. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by a Class 2 or Class 3 power supply having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.

2. Low Voltage: Listed and labeled for use in circuits supplied by a Class 1 or other power supply having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.

1.4 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational. When new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service.

1.5 ACTION SUBMITTALS

A. Approved Permit Submittal: Submittals must be approved by authorities having jurisdiction prior to submitting them to Architect.

B. Product Data: For each type of product, including furnished options and accessories.

1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

C. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in "Documentation" section of "Fundamentals" chapter in NFPA 72.
2. Include plans, elevations, sections, and details, including details of attachments to other Work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. Detail assembly and support requirements.
5. Include voltage drop calculations for notification-appliance circuits.
6. Include battery-size calculations.
7. Include input/output matrix.
8. Include written statement from manufacturer that equipment and components have been tested as a system and comply with requirements in this Section and in NFPA 72.
9. Include performance parameters and installation details for each detector.
10. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

1.6 INFORMATIONAL SUBMITTALS

A. Certificates:

1. Seismic Performance Certificates: For FACU, accessories, and components, from manufacturer. Include the following information:

a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

c. Detailed description of equipment anchorage devices on which certification is based and their installation requirements.

B. Field quality-control reports.

C. Qualification Statements: For Installer.

D. Sample Warranty: Submittal must include line item pricing for replacement parts and labor.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:

a. Comply with "Records" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.
b. Provide "Fire-Alarm and Emergency Communications System Record of Completion Documents" in accordance with "Completion Documents" Article in "Documentation" section of "Fundamentals" chapter in NFPA 72.
c. Complete wiring diagrams showing connections between devices and equipment. Each conductor must be numbered at every junction point with indication of origination and termination points.
d. Riser diagram.
e. Device addresses.
f. Record copy of site-specific software.
g. Provide "Inspection and Testing Form" in accordance with "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:

1) Equipment tested.
2) Frequency of testing of installed components.
3) Frequency of inspection of installed components.
4) Requirements and recommendations related to results of maintenance.
5) Manufacturer's user training manuals.

h. Manufacturer's required maintenance related to system warranty requirements.
i. Abbreviated operating instructions for mounting at FACU.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media and approved online or cloud solution.
3. Device address list.
4. Printout of software application and graphic screens.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Personnel must be trained and certified by manufacturer for installation of units required for this Project.

2. Installation must be by personnel certified by NICET as fire-alarm Level IV technician.
3. Obtain certification by NRTL in accordance with NFPA 72.
4. Licensed or certified by authorities having jurisdiction.

1.9 FIELD CONDITIONS

A. Seismic Conditions: Unless otherwise indicated on Contract Documents, specified Work in this Section must withstand the seismic hazard design loads determined in accordance with ASCE/SEI 7 for installed elevation above or below grade.

1. The term "withstand" means "unit must remain in place without separation of parts from unit when subjected to specified seismic design loads."

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail because of defects in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ADDRESSABLE FIRE-ALARM SYSTEM

A. Description:

1. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn-and-strobe notification for evacuation.

B. Performance Criteria:

1. Regulatory Requirements:

a. Fire-Alarm Components, Devices, and Accessories: Listed and labeled by a NRTL in accordance with NFPA 70 for use with selected fire-alarm system and marked for intended location and application.

2. General Characteristics:

a. Automatic sensitivity control of certain smoke detectors.
b. Fire-alarm signal initiation must be by one or more of the following devices:

1) Manual stations.
2) Smoke detectors.

c. Fire-alarm signal must initiate the following actions:

1) Continuously operate alarm notification appliances.

2) Identify alarm and specific initiating device at FACU, connected network control panels, off-premises network control panels, and remote annunciators.
3) Transmit alarm signal to remote alarm receiving station.
4) Switch HVAC equipment controls to fire-alarm mode.
5) Record events in system memory.
6) Record events by system printer.

d. Supervisory signal initiation must be by one or more of the following devices and actions:

1) Zones or individual devices have been disabled.
2) FACU has lost communication with network.

e. System trouble signal initiation must be by one or more of the following devices and actions:

1) Open circuits, shorts, and grounds in designated circuits.
2) Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3) Loss of communication with addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4) Loss of primary power at FACU.
5) Ground or single break in internal circuits of FACU.
6) Abnormal ac voltage at FACU.
7) Break in standby battery circuitry.
8) Failure of battery charging.
9) Abnormal position of switch at FACU or annunciator.

f. System Supervisory Signal Actions:

1) Initiate notification appliances.
2) Identify specific device initiating event at FACU, connected network control panels, off-premises network control panels, and remote annunciators.
3) Record event on system printer.
4) After time delay of 200 seconds, transmit trouble or supervisory signal to remote alarm receiving station.

g. Network Communications:

1) Provide network communications for fire-alarm system in accordance with fire-alarm manufacturer's written instructions.
2) Provide network communications pathway per manufacturer's written instructions and requirements in NFPA 72 and NFPA 70.

h. System Printer:

1) Printer must be listed and labeled as integral part of fire-alarm system.

i. Device Guards:

1) Description: Welded wire mesh of size and shape for manual station, smoke detector, gong, or other device requiring protection.

a) Factory fabricated and furnished by device manufacturer.

b) Finish: Paint of color to match protected device.

j. Document Storage Box:

1) Description: Enclosure to accommodate standard 8-1/2-by-11 inch (216-by-279 mm) manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
2) Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
3) Color: Red powder-coat epoxy finish.
4) Labeling: Permanently screened with 1 inch (25 mm) high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.
5) Security: Locked with 3/4 inch (19 mm) barrel lock. Provide solid 12 inch (304 mm) stainless steel piano hinge.

2.2 FIRE-ALARM CONTROL UNIT (FACU)

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Silent Knight.

B. Description: Field-programmable, microprocessor-based, modular, power-limited design with electronic modules.

C. Performance Criteria:

1. Regulatory Requirements: Comply with NFPA 72 and UL 864.
2. General Characteristics:

a. System software and programs must be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining information through failure of primary and secondary power supplies.
b. Include real-time clock for time annotation of events on event recorder and printer.
c. Provide communication between FACU and remote circuit interface panels, annunciators, and displays.
d. FACU must be listed for connection to central-station signaling system service.
e. Provide nonvolatile memory for system database, logic, and operating system and event history. System must require no manual input to initialize in the event of complete power down condition. FACU must provide minimum 500-event history log.
f. Addressable Initiation Device Circuits: FACU must indicate which communication zones have been silenced and must provide selective silencing of alarm notification appliance by building communication zone.

1) Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: FACU must be listed for releasing service.

g. Alphanumeric Display and System Controls: Arranged for interface between human operator at FACU and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and programming and control menu.

1) Annunciator and Display: LCD, two line(s) of 40 characters, minimum.

2) Keypad: Arranged to permit entry and execution of programming, display, and control commands.

h. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:

1) Pathway Class Designations: NFPA 72, Class B.
2) Pathway Survivability: Level 0.
3) Install no more than 50 addressable devices on each signaling-line circuit.
4) Install fault circuit isolators to comply with circuit performance requirements of NFPA 72 or with manufacturer's written instructions, whichever is more conservative.

i. Serial Interfaces:

1) One dedicated RS 485 port for central-station or remote station operation using point ID DACT.
2) One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
3) One USB or RS 232 port for PC configuration.

j. Smoke-Alarm Verification:

1) Initiate audible and visible indication of "alarm-verification" signal at FACU.
2) Activate approved "alarm-verification" sequence at FACU and detector.
3) Record events by system printer.
4) Sound general alarm if alarm is verified.
5) Cancel FACU indication and system reset if alarm is not verified.

k. Notification-Appliance Circuit:

1) Audible appliances must sound in three-pulse temporal pattern, as defined in NFPA 72.
2) Where notification appliances provide signals to sleeping areas, alarm signal must be 520 Hz square wave with intensity 15 dB above average ambient sound level or 5 dB above maximum sound level, or at least 75 dB(A-weighted), whichever is greater, measured at pillow.
3) Visual alarm appliances must flash in synchronization where multiple appliances are in same field of view, as defined in NFPA 72.

l. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to remote alarm station.

m. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from other printed indications. Also, print system reset event, including same information for device, location, date, and time. Commands initiate printing of list of existing alarm, supervisory, and trouble conditions in system and historical log of events.

n. Primary Power: 24 V(dc) obtained from 120 V(ac) service and power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, and supervisory signals must be powered by 24 V(dc) source.

o. Alarm current draw of entire fire-alarm system must not exceed 80 percent of power-supply module rating.

p. Secondary Power: 24 V(dc) supply system with batteries, automatic battery charger, and automatic transfer switch.

q. Batteries: Sealed lead calcium.

D. Accessories:

1. Instructions: Computer printout or typewritten instruction card mounted behind plastic or glass cover in stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe functional operation of system under normal, alarm, and trouble conditions.

2.3 MANUAL FIRE-ALARM BOXES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Silent Knight.

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes must be finished in red with molded, raised-letter operating instructions in contrasting color; must show visible indication of operation; and must be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate alarm, pull-lever type; with integral or attached addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to FACU.
2. Station Reset: Key- or wrench-operated switch.
3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at top to permit lifting for access to initiate alarm. Lifting cover actuates integral battery-powered audible horn intended to discourage false-alarm operation.
4. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at top to permit lifting for access to initiate alarm.
5. Able to perform at up to 90 percent relative humidity at 90 deg F (32 deg C).
6. Material: Manual stations made of Lexan polycarbonate.
7. Able to be used in indoor or outdoor areas.

2.4 SYSTEM SMOKE DETECTORS

A. Photoelectric Smoke Detectors:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Silent Knight.

2. Performance Criteria:

a. Regulatory Requirements:

1) NFPA 72.
2) UL 268.

b. General Characteristics:

1) Detectors must be four or two-wire type.

2) Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
3) Base Mounting: Detector and associated electronic components must be mounted in twist-lock module that connects to fixed base. Provide terminals in fixed base for connection to building wiring.
4) Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5) Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
6) Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
7) Operator at FACU, having designated access level, must be able to manually access the following for each detector:

a) Primary status.
b) Device type.
c) Present average value.
d) Present sensitivity selected.
e) Sensor range (normal, dirty, etc.).

8) Detector must have functional humidity range within 10 to 90 percent relative humidity.
9) Color: White.
10) Remote Control: Unless otherwise indicated, detectors must be digital-addressable type, individually monitored at FACU for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by FACU.
11) Multiple levels of detection sensitivity for each sensor.

2.5 FIRE-ALARM NOTIFICATION APPLIANCES

A. Fire-Alarm Audible Notification Appliances:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Silent Knight.

2. Description: Horns, bells, or other notification devices that cannot output voice messages.
3. Performance Criteria:

a. Regulatory Requirements:

1) NFPA 72.

b. General Characteristics:

1) Individually addressed, connected to signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.
2) Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
3) Audible notification appliances must have functional humidity range of 10 to 95 percent relative humidity.

4) Horns: Electric-vibrating-polarized type, 24 V(dc); with provision for housing operating mechanism behind grille. Comply with UL 464. Horns must produce sound-pressure level of 90 dB(A-weighted), measured 10 ft. (3 m) from horn, using coded signal prescribed in UL 464 test protocol.
5) Combination Devices: Factory-integrated audible and visible devices in single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Fire-Alarm Visible Notification Appliances:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Silent Knight.

2. Performance Criteria:

a. Regulatory Requirements:

1) NFPA 72.
2) UL 1971.

b. General Characteristics:

1) Rated Light Output:

a) 15/30/75/110 cd, selectable in field.

2) Clear or nominal white polycarbonate lens mounted on aluminum faceplate.
3) Mounting: Wall mounted unless otherwise indicated.
4) For units with guards to prevent physical damage, light output ratings must be determined with guards in place.
5) Flashing must be in temporal pattern, synchronized with other units.
6) Strobe Leads: Factory connected to screw terminals.
7) Mounting Faceplate: Factory finished, white.

2.6 FIRE-ALARM ADDRESSABLE INTERFACE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Silent Knight.

B. Performance Criteria:

1. Regulatory Requirements:

a. NFPA 72.

2. General Characteristics:

a. Include address-setting means on module.
b. Store internal identifying code for control panel use to identify module type.
c. Listed for controlling HVAC fan motor controllers.

d. Monitor Module: Microelectronic module providing system address for alarm-initiating devices for wired applications with normally open contacts.
e. Integral Relay:

1) Allow control panel to switch relay contacts on command.
2) Have minimum of two normally open and two normally closed contacts available for field wiring.

f. Control Module:

1) Operate notification devices.
2) Override intercom/public address system.

2.7 DIGITAL ALARM COMMUNICATOR TRANSMITTERS (DACTs)

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Silent Knight.

B. Performance Criteria:

1. Regulatory Requirements:

a. NFPA 72.

2. General Characteristics:

a. DACT must be acceptable to remote central station and must be listed for fire-alarm use.
b. Functional Performance: Unit must receive alarm, supervisory, or trouble signal from FACU and automatically capture two telephone line(s) and dial preset number for remote central station. When contact is made with central station(s), signals must be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter must initiate local trouble signal and transmit signal indicating loss of telephone line to remote alarm receiving station over remaining line. Transmitter must automatically report telephone service restoration to central station. If service is lost on both telephone lines, transmitter must initiate local trouble signal.
c. Local functions and display at DACT must include the following:

1) Verification that both telephone lines are available.
2) Programming device.
3) LED display.
4) Manual test report function and manual transmission clear indication.
5) Communications failure with central station or FACU.

d. Digital data transmission must include the following:

1) Address of alarm-initiating device.
2) Address of supervisory signal.
3) Address of trouble-initiating device.
4) Loss of ac supply.
5) Loss of power.
6) Low battery.

7) Abnormal test signal.
8) Communication bus failure.

e. Secondary Power: Integral rechargeable battery and automatic charger.
f. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

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

3.2 PREPARATION

A. Preinstallation Testing: Perform verification of functionality of installed components of existing system prior to starting work. Document equipment or components not functioning as designed.

B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service in accordance with requirements indicated:

1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of fire-alarm service.
2. Do not proceed with interruption of fire-alarm service without Construction Manager's written permission.

C. Protection of In-Place Conditions: Protect devices during construction unless devices are placed in service to protect facility during construction.

3.3 INSTALLATION OF EQUIPMENT

A. Comply with NECA 305, NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

1. Devices placed in service before other trades have completed cleanup must be replaced.
2. Devices installed, but not yet placed, in service must be protected from construction dust, debris, dirt, moisture, and damage in accordance with manufacturer's written storage instructions.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

1. Connect new equipment to existing control panel.
2. Connect new equipment to existing monitoring equipment at supervising station.
3. Expand, modify, and supplement existing equipment as necessary to extend existing functions to new points. New components must be capable of merging with existing configuration without degrading performance of either system.

C. Install wall-mounted equipment, with tops of cabinets not more than 78 inch (1980 mm) above finished floor.

D. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in normal path of egress within 60 inch (1520 mm) of exit doorway.
2. Mount manual fire-alarm box on background of contrasting color.
3. Operable part of manual fire-alarm box must be between 42 and 48 inch (1060 and 1220 mm) above floor level. Devices must be mounted at same height unless otherwise indicated.

E. Smoke Detector Spacing:

1. Comply with "Smoke-Sensing Fire Detectors" section in "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
2. Comply with "Heat-Sensing Fire Detectors" section in "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
3. Smooth ceiling spacing must not exceed 30 ft. (9 m).
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas must be determined in accordance with Annex A or Annex B in NFPA 72.
5. HVAC: Locate detectors not closer than 36 inch (910 mm) from air-supply diffuser or return-air opening.
6. Lighting Fixtures: Locate detectors not closer than 12 inch (300 mm) from lighting fixture and not directly above pendant mounted or indirect lighting.

F. Install cover on each smoke detector that is not placed in service during construction. Cover must remain in place except during system testing. Remove cover prior to system turnover.

G. Remote Status and Alarm Indicators: Install in visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

H. Audible Alarm-Indicating Devices: Install not less than 6 inch (150 mm) below ceiling. Install bells and horns on flush-mounted back boxes with device-operating mechanism concealed behind grille. Install devices at same height unless otherwise indicated.

I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inch (150 mm) below ceiling. Install devices at same height unless otherwise indicated.

J. Device Location-Indicating Lights: Locate in public space near device they monitor.

3.4 ELECTRICAL CONNECTIONS

A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate must be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
2. Nameplate must be laminated acrylic or melamine plastic signs with black background and engraved white letters at least 1/2 inch (13 mm) high.

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

C. Install nameplate for each control connection, indicating field control panel designation and I/O control designation feeding connection.

3.6 PATHWAYS

A. Concealed wiring in accessible ceiling spaces may be run free using j-hooks.

1. Cable support system must be dedicated to fire alarm and not shared with other systems.

B. Exposed pathways must be installed in EMT.

C. Exposed EMT must be painted red enamel.

3.7 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

3.8 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."

B. Install framed instructions in location visible from FACU.

3.9 GROUNDING

A. Conform to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Ground shielded cables at control panel location only. Insulate shield at device location.

3.10 FIELD QUALITY CONTROL

A. Field tests must be witnessed by authorities having jurisdiction.

B. Administrant for Tests and Inspections:

1. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.

C. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

    a. Inspection must be based on completed record Drawings and system documentation that is required by "Completion Documents, Preparation" table in "Documentation" section of "Fundamentals" chapter in NFPA 72.
    b. Comply with "Visual Inspection Frequencies" table in "Inspection" section of "Inspection, Testing and Maintenance" chapter in NFPA 72; retain "Initial/Reacceptance" column and list only installed components.

2. System Testing: Comply with "Test Methods" table in "Testing" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Test audible appliances for public operating mode in accordance with manufacturer's written instructions. Perform test using portable sound-level meter complying with Type 2 requirements in ASA S1.4 Part 1/IEC 61672-1.
4. Test audible appliances for private operating mode in accordance with manufacturer's written instructions.
5. Test visible appliances for public operating mode in accordance with manufacturer's written instructions.
6. Factory-authorized service representative must prepare "Fire Alarm System Record of Completion" in "Documentation" section of "Fundamentals" chapter in NFPA 72 and "Inspection and Testing Form" in "Records" section of "Inspection, Testing and Maintenance" chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

3.11 Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.12 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

3.13 MAINTENANCE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service must include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies must be manufacturer's authorized replacement parts and supplies.

1. Include visual inspections in accordance with "Visual Inspection Frequencies" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.
2. Perform tests in "Test Methods" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Perform tests per "Testing Frequencies" table in "Testing" paragraph of "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.14 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement must include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software must include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

END OF SECTION 284621.11

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 57 13 - Temporary Erosion and Sediment Control.

D. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

E. Section 31 23 23 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

A. Comply with other requirements specified in Section 01 70 00.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

A. Do not remove or damage vegetation beyond the limits indicated on drawings.

B. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.

C. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 31 23 16 - Excavation.

C. Section 31 23 16.13 - Trenching: Trenching and backfilling for utilities.

D. Section 31 23 23 - Fill: Filling and compaction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Other Fill Materials: See Section 31 23 23.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03 ROUGH GRADING

A. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

3.04 SOIL REMOVAL

A. Remove excavated topsoil from site.

B. Remove excavated subsoil from site.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

3.06 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.07 CLEANING

A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2316
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Site grading.

B. Section 31 23 23 - Fill: Backfilling at building and foundations.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Compaction Density Test Reports.

1.04 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill - Fill Type 3/4" minus CRB: Complying with State of Oregon Highway Department standard.

B. Structural Fill - Fill Type 3/4" minus CRB: Complying with State of Oregon Highway Department standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Trenches to be left open for more than 24-hours shall have Approval prior to excavation.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Notify utility company to remove and relocate utilities.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Protect plants, lawns, rock outcroppings, and other features to remain.

F. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove excavated material that is unsuitable for re-use from site.

G. Remove excess excavated material from site.

H. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

I. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.04 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

F. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At other locations: 90 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Utility Piping and Conduits:
   1. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

3.08 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 31 2323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Site grading.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill - Fill Type 3/4" minus crushed rock: Complying with State of Oregon Highway Department standard.

B. Structural Fill - Fill Type 3/4" minus crushed rock: Complying with State of Oregon Highway Department standard.

2.02 ACCESSORIES

A. Geotextile: Non-biodegradable, woven.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

F. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.

2. At other locations: 90 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Structural Fill under bridge and at sidewalks.
1. Maximum depth per lift: 6 inches, compacted.
2. Compact to minimum 95 percent of maximum dry density.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Soil Fill Materials:
1. If tests indicate work does not meet specified requirements, remove work, replace and retest.
2. Proof roll compacted fill at surfaces that will be under slabs-on-grade and paving.

3.06 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 1123
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Paving aggregates.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Compacted fill over utility trenches under base course.

B. Section 32 12 16 - Asphalt Paving: Finish and binder asphalt courses.

C. Section 32 13 13 - Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil–Aggregate Subbase, Base, and Surface Courses 2017 (Reapproved 2021).

B. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)) 2012 (Reapproved 2021).

D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)) 2012 (Reapproved 2021).

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2017a, with Editorial Revision (2021).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where directed by Owner.

C. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Coarse Aggregate Type 3/4" minus CRB: Coarse aggregate, complying with State of Oregon Highway Department standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Place aggregate in maximum 4 inch layers and roller compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection and testing.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and roads.

1.02 RELATED REQUIREMENTS

A. Section 32 11 23 - Aggregate Base Courses: 3/4" minus CRB base course.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Concrete Construction 2020.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

D. ACI 305R - Guide to Hot Weather Concreting 2020.

E. ACI 306R - Guide to Cold Weather Concreting 2016.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.

G. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.

J. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

K. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

L. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).

M. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2022.

N. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.

O. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

P. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

C. Submit concrete mix design to Architect for approval.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES

A. Comply with applicable requirements of ACI 301.

B. Concrete Sidewalks and Median Barrier: 3,000 psi 28 day concrete, 4 inches thick, buff color Portland cement, broomed finish.

2.02 FORM MATERIALS

A. Wood form material, profiled to suit conditions.

B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
   1. Thickness: 1/2 inch.

2.03 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished.

B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.04 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Concrete Materials: Provide in accordance with State of Oregon Highways standards.

2.05 ACCESSORIES

2.06 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

2.07 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

A. Prepare subbase in accordance with State of Oregon Highways standards.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

A. Place reinforcement as indicated.

B. Place dowels to achieve pavement and curb alignment as detailed.

3.06 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.07 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Ensure reinforcement, inserts, embedded parts, formed joints and [____] are not disturbed during concrete placement.

3.08 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/8 inch wide expansion joints at 15 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.

C. Provide scored joints.

D. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.09 FINISHING

A. Area Paving: Light broom, texture perpendicular to pavement direction.

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

3.10 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.11 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.12 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

SECTION 33 3113
SITE SANITARY SEWERAGE GRAVITY PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories.

B. Connection of building sanitary drainage system to municipal sewers.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.

B. Section 312316 - Excavation: Excavating of trenches.

C. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.

D. Section 312323 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS

A. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings 2021.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories, and fittings.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents:
   1. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Joint Seals: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 PIPE ACCESSORIES

A. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Sewer Service" in large letters.

2.03 CLEANOUT MANHOLE

A. Lid and Frame: Cast iron construction, hinged lid.
   1. Lid Design: Open checkerboard grille.
   2. Nominal Lid and Frame Size: 26 inches (660 mm).

PART 3 EXECUTION

3.01 GENERAL

A. Perform work in accordance with applicable code(s).

3.02 TRENCHING

A. See Section 312316.13 for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).

D. Connect to building sanitary sewer outlet and municipal sewer system , through installed sleeves.

E. Install trace wire 6 inches (150 mm) above top of pipe; coordinate with Section 312316.13.

3.04 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 4211
STORMWATER GRAVITY PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stormwater drainage piping.

B. Stormwater pipe accessories.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

A. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications 2020.

B. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings 2021.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories, and [_____].

C. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe: ASTM D3034, Type PSM, Poly Vinyl Chloride (PVC) material; inside nominal diameter of per plan inches, bell and spigot style solvent sealed joint end.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Stormwater Service" in large letters.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 23 16.13 - Trenching for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.

D. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.03 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

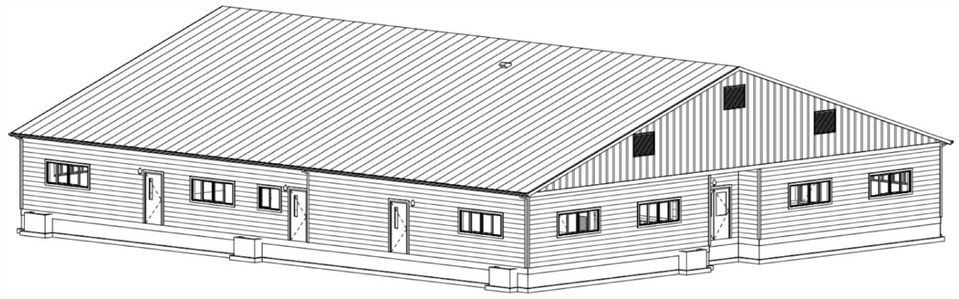
END OF SECTION

OWNER	PROJECT MANAGER	ARCHITECT	BUILDING DESIGNER	ELECTRICAL ENGINEER	CIVIL ENGINEER	MECHANICAL ENGINEER
EAGLE POINT SCHOOL DISTRICT CONTACT: SCOTT WHITMAN 11 N ROYAL AVE, PO BOX 548, EAGLE POINT OR 97524 541-830-6559 WHITMANS@EAGLEPNT.K12.OR.US	HMK COMPANY CONTACT: DAVID MCKAY 695 COMMERCIAL ST. SE SUITE 116 SALEM, OR 97301 971.304.0710 DAVID@HMKCO.ORG	ARKITEK: DESIGN & ARCHITECTURE CONTACT: CHRISTOPHER BROWN 426 A ST. SUITE 101 ASHLAND,OR 97520 541.591.9988 ARKITEK@ARKITEK.US	MODERN BUILDING SYSTEMS CONTACT: ALAN RASMUSSEN PO BOX 110 / 9493 PORTER RD AUMSVILE, OR 97325 5034794949 ARASMUSSEN@MODERNBUILDINGSYSTEMS.COM	DOUGLAS ENGINEERING PACIFIC, INC. CONTACT: MYRON K. HUDSON CSI 415 WILLIAMSON WAY, SUITE 7 ASHLAND, OR 97520 (541) 482-3938 ext 303 MHUDSON@DOUGLASENGINEERING.COM	POWELL ENGINEERING + CONSULTING CONTACT: TODD POWELL 1874 ROSSANLEY DR. MEDFORD, OR 97501 541.613.0723 TODD@POWELLENGINEERINGCONSULTING.COM	INSIGHT CONSULTING ENGINEERS, LLC. CONTACT: AARON MUELLER, P.E. 3825 CRATER LAKE HIGHWAY MEDFORD, OR 97504 563-272-1364 AARON.MUELLER@INSIGHTCONSULTINGENG.COM

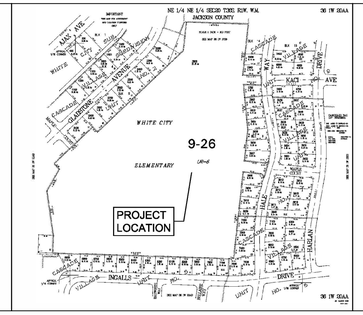
ATTACHMENT 1

TABLE ROCK ELEMENTARY SCHOOL

2830 MAPLE COURT, WHITE CITY, OR



VICINITY MAP - WHITE CITY, OREGON



MATERIALS LEGEND

	EARTH		DIMENSIONAL LUMBER
	GRAVEL, ROCK		BLOCKING / SHIM
	SAND, GROUT		WOOD
	CONCRETE		PLYWOOD
	MASONRY		CEILING / ACOUSTIC TILE / PANEL
	METAL		BATT INSULATION

DRAWING INDEX

01 GENERAL:

G1.01	COVER SHEET
G2.01	ARCHITECTURAL SITE PLAN
G2.02	ENLARGED SITE PLAN AND DETAILS
G2.03	CODE ANALYSIS

02 CIVIL:

C1.0	CIVIL GENERAL NOTES
C1.2	SITE DEMOLITION PLAN
C2.1	EROSION CONTROL PLAN
C2.2	ESC DETAILS
C3.0	CIVIL SITE PLAN
C4.0	DRAINAGE PLAN
C4.1	GRADING PLAN
C5.0	SITE UTILITY PLAN
C6.0	PROJECT DETAILS
C6.1	PROJECT DETAILS
C6.2	ADS STANDARD DETAILS

03 LANDSCAPE:

L1	PLANTING PLAN
L2	IRRIGATION PLAN

04 MECHANICAL:

M1.01	MECHANICAL LEGEND AND GENERAL NOTES
M2.01	MECHANICAL PLAN
M3.01	MECHANICAL SCHEDULES AND DETAILS

05 ELECTRICAL:

E0.01	ELECTRICAL LEGENDS AND NOTES
E0.02	ELECTRICAL LEGENDS AND NOTES
E1.01	SITE PLAN - ELECTRICAL
E2.01	FLOOR PLAN - ELECTRICAL
E2.02	ATTIC PLAN - ELECTRICAL

06 MODULAR CLASSROOM BUILDING:

A0.0	COVER SHEET
A0.1	FIRE & LIFE SAFETY PLAN
A1.0	FLOOR PLAN
A1.1	FLOOR PLAN - ATTIC
A1.2	ENLARGED PLANS & DETAILS
A2.0	EXTERIOR ELEVATIONS
A2.1	EXTERIOR ELEVATIONS
A3.0	FINISH NOTES & SCHEDULES
A4.0	INTERIOR ELEVATIONS
E0.1	ELEC. PANELS & LOAD CALCS
E1.0	ELECTRICAL PLAN
E1.1	ELEC. & LIGHTING PLAN - ATTIC
E2.0	LIGHTING PLAN
M1.0	HVAC PLAN
P0.1	PLUMBING PLAN & NOTES

GENERAL NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH ANY WORK.

2. DIMENSIONS TAKE PRECEDENCE OVER DRAWING. DO NOT SCALE DRAWING TO DETERMINE ANY LOCATIONS. THE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO CONTINUING WITH WORK. DIMENSIONS ARE TAKEN TO THE FOF, FOC, FOM, OR GRID, UNO.

3. ALL CONSTRUCTION SHALL COMPLY WITH THE 2014 O.S.S.C. BUILDING CODE AND METHODS AND SHALL MAINTAIN THE STRUCTURAL INTEGRITY OF ANY CONSTRUCTION UNTIL ALL FINAL LATERAL AND VERTICAL CARRYING SYSTEMS ARE COMPLETED.

4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTIONS MEANS AND METHODS.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION AND COORDINATION OF SUBCONTRACTORS WORK TO SECURE COMPLIANCE OF DRAWINGS AND SPECIFICATIONS FOR THE ACCURATE LOCATION OF STRUCTURAL MEMBERS, AND OPENINGS FOR MECHANICAL, ELECTRICAL, AND MISCELLANEOUS EQUIPMENT. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND OPENING SIZES, CLEARANCES REQUIRED FROM MFR PRIOR TO CONSTRUCTION AND INSTALLATION OF EQUIPMENT, FURNISHINGS, ACCESSORIES ETC.

6. TRADE PERMITS, INCLUDING BUT NOT LIMITED TO, MECHANICAL, ELECTRICAL, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION TO BE DESIGN-BUILD BY SUBCONTRACTOR.

7. DETAILS NOTED AS "TYPICAL" OR "TYP" APPLY IN ALL CASES WHETHER OR NOT SPECIFICALLY REFERENCED. DETAILS THAT ARE SPECIFICALLY REFERENCED SHALL TAKE PRECEDENCE OVER "TYPICAL" OR "TYP." DETAILS. SPECIFIC DETAILS AND NOTES SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND DETAILS.

8. WHERE COMPONENTS, ASSEMBLIES, ITEMS, EQUIP, ETC. ARE BASED UPON A PARTICULAR SUPPLIER, FABRICATOR AND/OR MFR. THE CONTRACTOR SHALL ENSURE, PROVIDE OPTIONS, ALLOW FOR, AND SHALL MAKE ANY CHANGES REQUIRED FOR THE APPROVED ALTERNATE TO MEET THE DESIGN INTENT OF THE DOCUMENTS.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE GENERAL SECURITY OF THE SITE WHILE THE JOB IS IN PROGRESS AND UNTIL JOB COMPLETION. EACH CONTRACTOR/SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY AND PROTECTION OF ITS OWN MATERIALS, WORK PRODUCT AND EQUIPMENT.

10. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSES OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE PROSECUTION OF THE WORK. SEE CIVIL DRAWINGS FOR ADDITIONAL.

11. CONTRACTOR SHALL VERIFY ALL COMPONENTS TO BE INSTALLED W/ EXT. WALL FOR DIMENSIONAL ACCURACY AND FIT IN MASONRY COURSING PRIOR TO FABRICATION, PURCHASE, INSTALLATION, ETC.

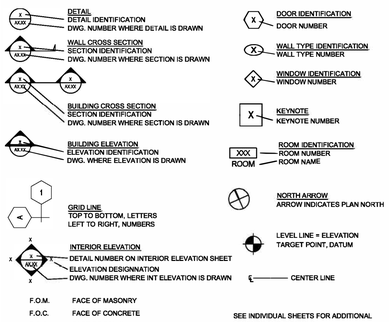
12. ALL UNPAINTED FERROUS METALS EXPOSED TO THE WEATHER SHALL BE GALVANIZED, UNO.

13. SEPARATE ALL AL AND OTHER METALS FROM DIS-SIMILAR METALS WITH BITUMINOUS TAPE OR PT.

14. APPROPRIATE SEALANT SHALL BE USED TO SEAL ALL JOINTS OF MILLWORK, TRIM, EQUIPMENT WALL MOUNTING PENETRATIONS TO PRODUCE A WATERTIGHT SEAL.

15. FASTENER SIZES AND CONNECTIONS PER STRUCTURAL ENGINEER OR AS NOTED. UNREFERENCED CONNECTIONS PER OSSC TABLE 2304.9.1.

LEGEND AND SYMBOLS



F.O.M.	FACE OF MASONRY
F.O.C.	FACE OF CONCRETE
F.O.C.	FACE OF COLUMN
F.O.S.	FACE OF STUD / STRUC
F.O.FIN.	FACE OF FINISH

SEE INDIVIDUAL SHEETS FOR ADDITIONAL LEGENDS AND SYMBOLS

GOVERNING CODES

THE DESIGN OF THIS PROJECT IS BASED ON THE FOLLOWING CODES:

OREGON STRUCTURAL SPECIALTY CODE, 2014 ed.

OREGON MECHANICAL SPECIALTY CODE, 2014 ed.

OREGON PLUMBING SPECIALTY CODE, 2017 ed.

OREGON ELECTRICAL SPECIALTY CODE, 2017 ed.

OREGON ENERGY EFFICIENCY SPECIALTY CODE, 2014

OREGON FIRE CODE, 2014 ed.

ABBREVIATIONS

ABV	ABOVE	HGT	HEIGHT
ACT	ACOUSTIC CEILING TILE	HR	HOUR
AFF	ABOVE FINISHED FLOOR	HW	HOT WATER
ALT	ALTERNATE	INSUL	INSULATION
B.O.	BOTTOM OF	IR	INSIDE RADIUS
BM	BEAM	JST	JOIST
CJ	CONTROL JOINT	M	MIRROR
CLG	CEILING	MAX	MAXIMUM
CLR	CLEAR	MB	MACHINE BOLT
CLT	CROSS LAMINATED TIMBER	MDL	MODEL
COL	COLUMN	MECH	MECHANICAL
CONC	CONCRETE	MTL	METAL
CONT	CONTINUOUS	N.I.C.	NOT IN CONTRACT
CPT	CARPET	(N)	NEW
DBL	DOUBLE	O/	OVER, ON
DIA	DIAMETER	OCC	OCCUPANCY
DIMS	DIMENSIONS	OPNG	OPENING
DW	DISHWASHER	O.C.	ON CENTER
EA	EACH	O.D.	OUTSIDE DIAMETER
ELEC	ELECTRICAL	P	PAINT
EQ	EQUAL(Y)	PWD	PLYWOOD
EX	EXISTING	P.T.	PRESSURE TREATED
FD	FLOOR DRAIN	RM	ROOM
FF	FINISHED FLOOR	R.O.	ROUGH OPENING
FIN	FINISH(ED)	SEP	SEPARATION
FRMG	FRAMING	SF	SQUARE FEET
FRZR	FREEZER	SJ	SAW JOINT
FTG	FOOTING	SQ. FT.	SQUARE FEET
F.R.	FIRE RESISTANT	SHTG	SHEATHING
GA	GAUGE	SIM	SIMILAR
GALV.	GALVANIZED	T.O.	TOP OF
GWB	GYPSUM WALL BOARD	TS	TUBE STEEL
G.B.	GRAB BAR	TYP	TYPICAL
G.I.	GALVANIZED IRON	TH	THRESHOLD
G.S.	GALVANIZED STEEL	UL	UNDERWRITERS LABORATORY
H	HIGH	UTIL	UTILITY
HDBD	HARDBOARD	U.N.O.	UNLESS NOTED OTHERWISE
HDR	HEADER	WD	WOOD
HDWD	HARDWOOD		

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TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6022
ASHLAND, OREGON
STATE OF OREGON

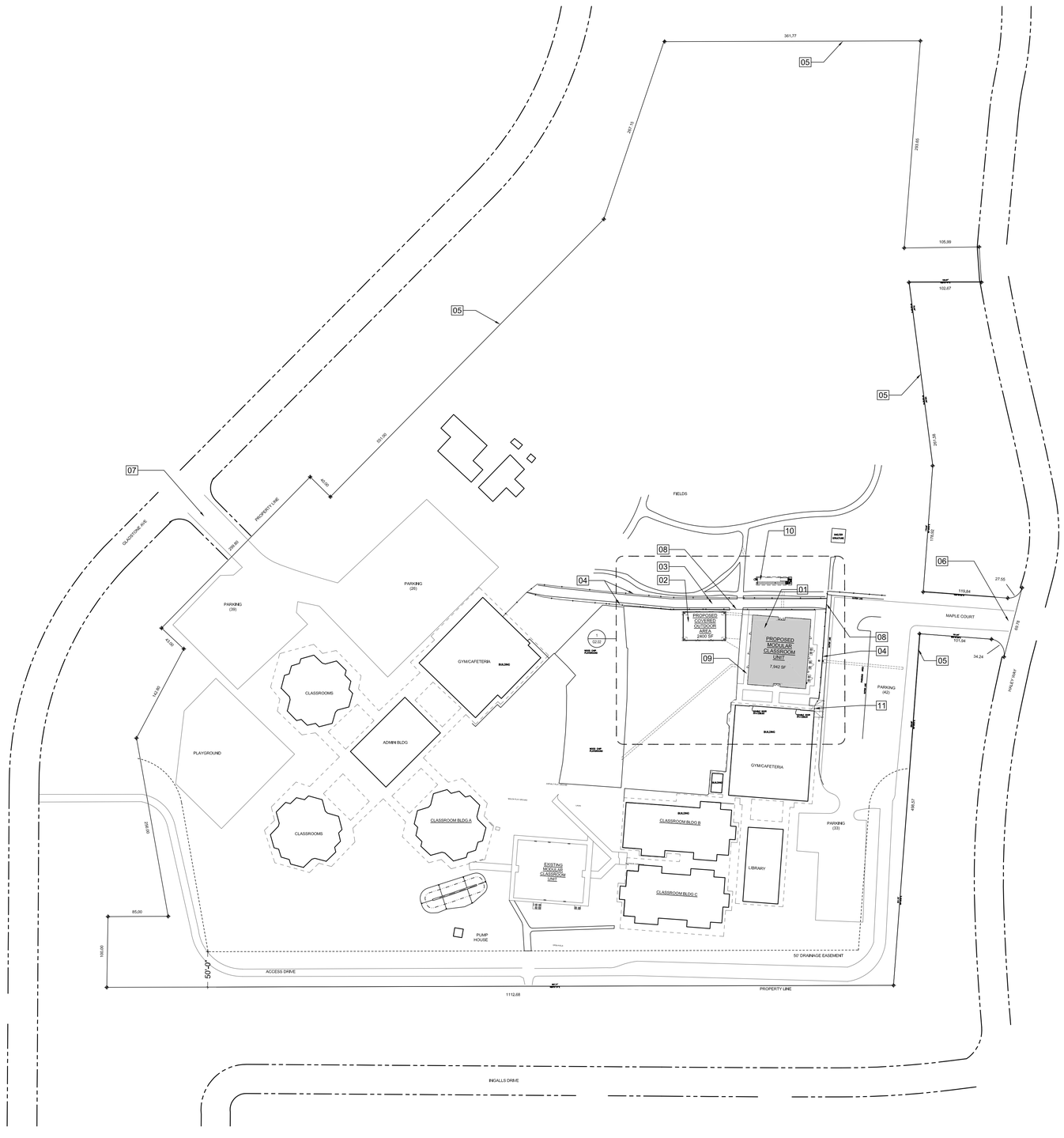
Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
COVER SHEET

Drawing No.
G1.01



1 ARCHITECTURAL SITE PLAN

1" = 80'-0"

NORTH

0 40' 80' 160'

PROJECT INFORMATION

PROJECT NAME:	TABLE ROCK ELEMENTARY
PROJECT DESCRIPTION:	NEW MODULAR CLASSROOM INSTALLATION
ADDRESS:	2830 MAPLE COURT WHITE CITY, OR 97503
MAP & TAX LOT:	361W20AA 3800

CLIENT INFORMATION

NAME:	SCHOOL DISTRICT NO. 9
ADDRESS:	11 N ROYAL AVE EAGLE POINT, OR 97524

NARRATIVE

THIS PROJECT INCLUDES THE CONSTRUCTION OF A NEW MODULAR CLASSROOM BUILDING, CONTAINING SIX (6) CLASSROOMS AND RESTROOMS. NEW ACCESSIBLE SIDEWALKS, SECURITY GATE, AND A COVERED OUTDOOR LEARNING SPACE ARE ALSO PROPOSED TO COMPLETE THE PROJECT.

PLANNING SUMMARY

LOT AREA COVERAGE	AREA	% OF LOT
TOTAL LOT AREA	1,095,534 SF	100.0%
EXISTING STRUCTURES (TO REMAIN)	139,422 SF	12.7%
PROPOSED STRUCTURES	10,342 SF	0.94%
TOTAL LOT COVERAGE	149,764 SF	13.6%
TOTAL LANDSCAPED AREA	750,858 SF	68.5%
TOTAL IMPERVIOUS AREA	141,583 SF	18.0%

ZONING INFORMATION

ZONING: WCUR-6
MIN. SETBACKS:

FRONT: 20' FRONT,
SIDE: 6' (FOR 25' HIGH BUILDING)
REAR: 10' (FOR 25' HIGH BUILDING)
MAX BUILDING HEIGHT: 35'

BUILDING AREA SUMMARY

CLASSROOMS	6,118 SF
RESTROOMS	993 SF
CIRCULATION	831 SF
PROPOSED COVERED AREA	2,400 SF
TOTAL SQUARE FEET	10,342 SF

KEYNOTES:

01 (N) MODULAR CLASSROOM UNIT
02 (N) COVERED OUTDOOR AREA
03 (E) ACCESS DRIVE
04 (E) CHAIN LINK FENCE
05 (E) PROPERTY LINE
06 (E) ACCESS TO UPPER TABLE ROCK SCHOOL ENTRANCE
07 (E) ACCESS TO LOWER TABLE ROCK SCHOOL ENTRANCE
08 (E) VEHICLE ACCESS GATE
09 (N) CONCRETE SIDEWALK, SEE CIVIL
10 (N) UNDERGROUND STORMWATER SYSTEM, SEE CIVIL
11 REPLACE (E) GATE WITH (N) PANIC GATE, SEE G2.02
12 (N) CHAIN LINK FENCE AT MECHANICAL UNITS

TABLE ROCK ELEMENTARY SCHOOL

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White City, OR 97503

arkitek:
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REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6028
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
ARCHITECTURAL SITE PLAN

Drawing No.
G2.01

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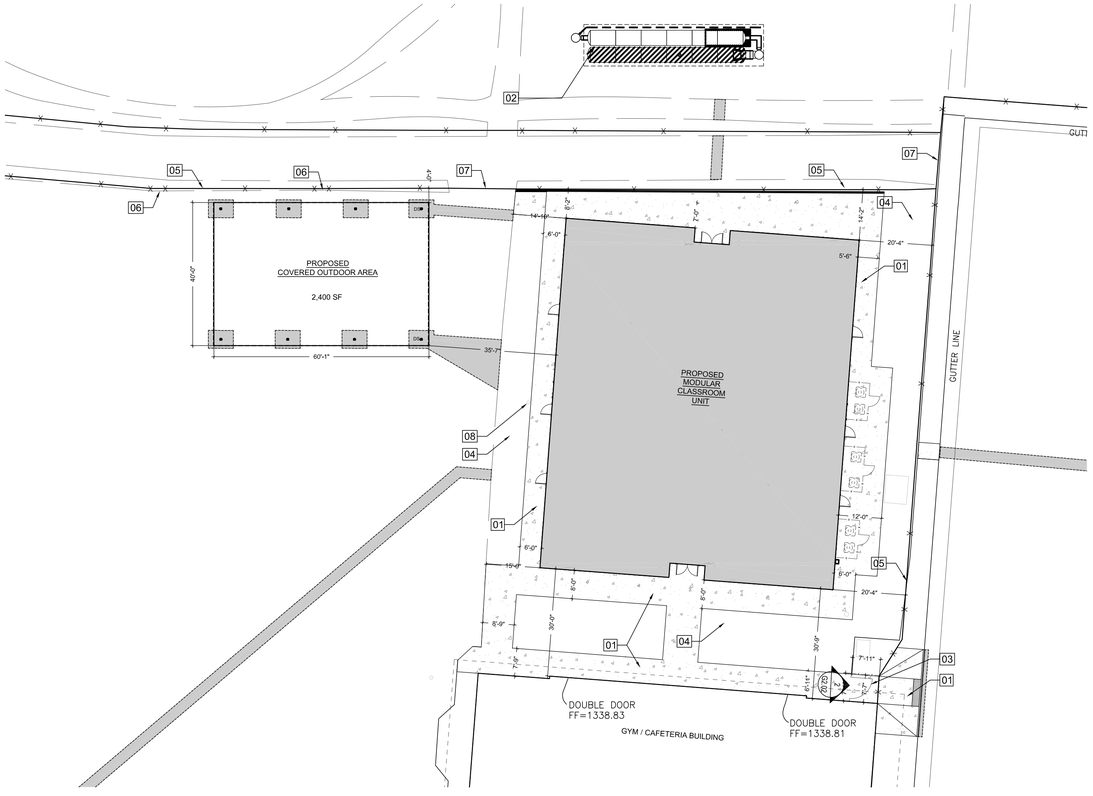
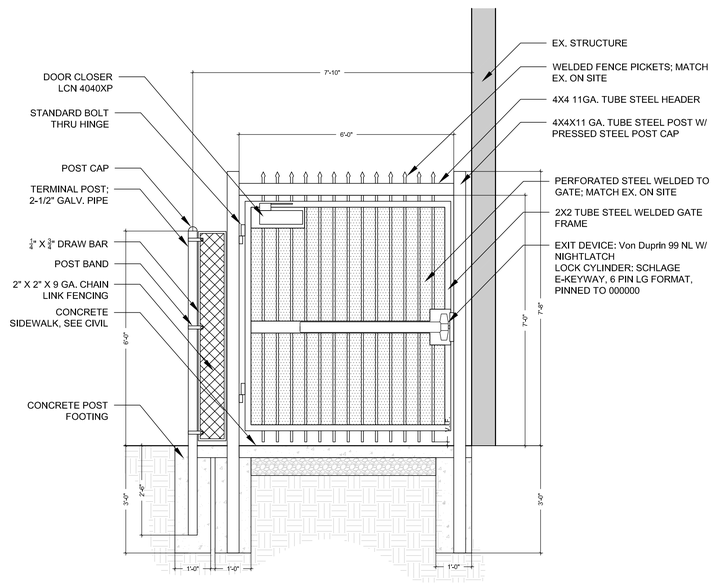


1 ENLARGED SITE PLAN

1" = 20'-0"



2 PANIC GATE DETAIL

1/2" = 1'-0"

SHEET NOTES:

1. SEE MECHANICAL, ELECTRICAL, PLUMBING AND CIVIL DRAWINGS FOR ADDITIONAL PROJECT SCOPE.

2. SEE CIVIL, ELECTRICAL, AND PLUMBING DRAWINGS FOR LOCATION AND ELEVATION OF ALL UTILITY CONNECTIONS.

3. SEE CIVIL AND LANDSCAPE DRAWINGS FOR ALL FINISHED GRADES, SITE DRAINAGE, STORM WATER PROCESSING, SITE IMPROVEMENTS, HARDSCAPE, & SITE PLANTINGS.

4. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING TRAFFIC CONTROL DEVICES SUCH AS BARRICADES, WARNING SIGNS, DIRECTIONAL SIGNS, FLAGMEN AND LIGHTS TO CONTROL THE MOVEMENT OF TRAFFIC WHERE NECESSARY. PLACEMENT OF THESE DEVICES SHALL BE APPROVED BY THE OWNER PRIOR TO PLACEMENT. TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE APPROPRIATE CITY AND STATE REGULATIONS.

6. ALL PAVING, CONCRETE CURB, GUTTER AND SIDEWALK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE COUNTY. SEE ARCHITECTURAL AND CIVIL DRAWINGS FOR ADDITIONAL HARDSCAPE APPLICATIONS.

7. CLEARED MATERIALS SHALL BE REMOVED FROM PROJECT SITE.

8. PROTECT AND MAINTAIN BENCHMARKS AND SURVEY CONTROL POINTS FROM DISTURBANCE DURING CONSTRUCTION.

KEYNOTES:

01	(N) CONCRETE SIDEWALK, SEE CIVIL
02	(N) UNDERGROUND STORMWATER SYSTEM, SEE CIVIL
03	(N) PANIC GATE, SEE DETAIL 2/G2.02
04	(N) LANDSCAPE AREA, SEE L.01
05	(E) CHAIN LINK FENCE
06	(E) PEDESTRIAN GATE
07	(E) VEHICLE GATE
08	(E) LIGHT POST

TABLE ROCK ELEMENTARY SCHOOL

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arkitek:
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ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
8022
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
ENLARGED
SITE PLAN & DETAILS

Drawing No.
G2.02

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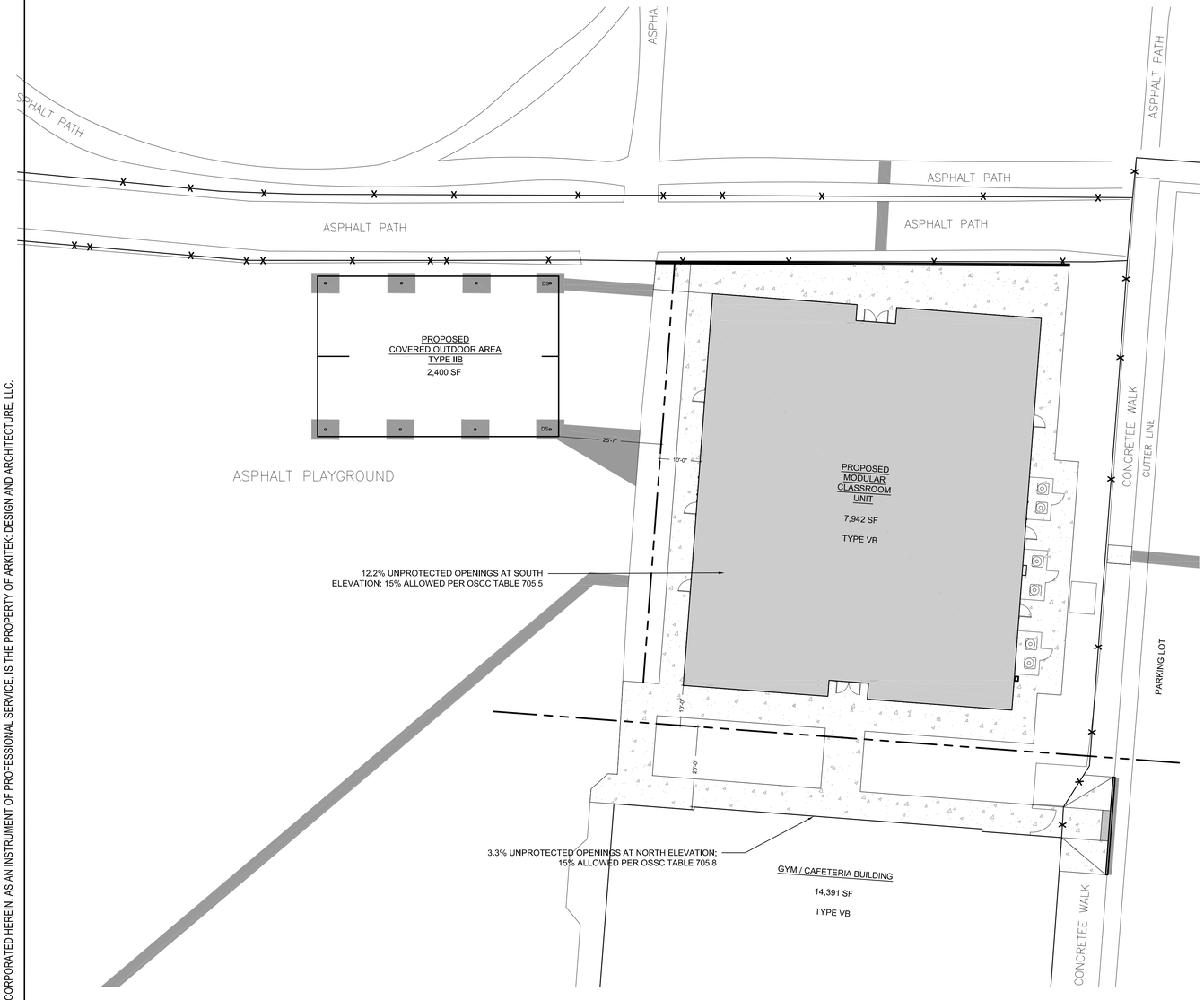
LEGEND	
— - - —	IMAGINARY PROPERTY LINE



NORTH

1 CODE ANALYSIS

1" = 16'-0"

SHEET NOTES:

1. THIS CODE ANALYSIS IS FOR REFERENCE ONLY. SEE OTHER PLAN SHEETS FOR CONTRACT DOCUMENT INFORMATION. THIS CODE ANALYSIS IDENTIFIES SOME SPECIFIC BUILDING CODE REQUIREMENTS BUT IS NOT INTENDED TO LIST ALL BUILDING CODE REQUIREMENTS.
2. ALL PORTIONS OF THE BUILDINGS ARE ACCESSIBLE. SEE MODULAR BUILDING DRAWINGS AND OTHER PLANS AND DETAIL SHEETS FOR ACCESSIBILITY CONFORMANCE.
3. SEE FIRE PROTECTION DRAWINGS FOR LOCATION AND RATING OF ALL FIRE EXTINGUISHERS.
4. SEE MODULAR BUILDING DRAWINGS FOR OCCUPANCY AND EXITING REQUIREMENTS.
5. SEE MODULAR BUILDING DRAWINGS FOR PLUMBING FIXTURE COUNT.

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
9022
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
CODE ANALYSIS

Drawing No.
G2.03

GENERAL NOTES

1. ALL WORK PERTAINING TO THIS PROJECT SHALL BE SUBJECT TO INSPECTION BY THE PROJECT ENGINEER AND/OR PUBLIC AGENCY HAVING AUTHORITY (AHJ). PRIOR TO ANY SITE WORK, THE CONTRACTOR SHALL CONTACT THE AHJ AND PROJECT ENGINEER TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE.
2. PRIOR TO ANY SITE DISTURBING ACTIVITY INCLUDING CLEARING, LOGGING OR GRADING, THE SITE BOUNDARIES & CLEARING LIMITS AS SHOWN ON THESE PLANS SHALL BE LOCATED AND FIELD IDENTIFIED BY THE PROJECT SURVEYOR AND ALL ESC MEASURES SHALL BE INSTALLED AS IDENTIFIED ON THE EROSION & SEDIMENT CONTROL PLAN.
3. A COPY OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
4. ALL SITE WORK IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE PRIOR APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES PRIOR TO PERFORMING THE CHANGES IN THE FIELD.
5. ALL LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITIES LOCATION SERVICE (DIAL 811) AT LEAST TWO BUSINESS DAYS PRIOR TO CONSTRUCTION. THE APPLICANT OR HIS REPRESENTATIVE AND THE ENGINEER SHALL BE CONTACTED IMMEDIATELY IF CONFLICTS EXIST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT.
7. THE CONTRACTOR SHALL KEEP OFF-SITE STREETS CLEAN AT ALL TIMES BY SWEEPING. STREET WASHING WILL NOT BE ALLOWED WITHOUT PRIOR CITY APPROVAL.
8. THE CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS PRIOR TO INITIATING WORK. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER WHEN CONFLICTS OCCUR BETWEEN THE PLANS AND FIELD CONDITIONS. CONFLICTS SHALL BE RESOLVED PRIOR TO PROCEEDING WITH CONSTRUCTION. REVISIONS SHALL BE FORMALLY APPROVED BY THE APPLICANT AND PROJECT ENGINEER PRIOR TO MAKING CHANGES IN THE FIELD.
9. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY UTILITY RELOCATIONS WITH UTILITY COMPANIES.
10. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.
11. CONTRACTOR SHALL DOCUMENT AND RECORD FIELD CHANGES, PIPE INVERT, PIPE SLOPE, AND ANY OTHER CRITICAL AS-CONSTRUCT DATA. AS-BUILT DRAWINGS AND FINAL REPORTS WILL BE REQUIRED BEFORE FINAL APPROVAL.
12. WORK IN CITY OR COUNTY RIGHT-OF-WAY REQUIRES AN ENCROACHMENT PERMIT FROM THE LOCAL AUTHORITY.
13. WORK IN ANY STATE RIGHT-OF-WAY REQUIRES A MISCELLANEOUS PERMIT FROM OREGON DEPARTMENT OF TRANSPORTATION.
14. DURING PROJECT CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL TEMPORARY CONSTRUCTION SIGNS, TRAFFIC CONTROL SIGNS, DELINEATORS AND TEMPORARY MARKINGS AS REQUIRED.
15. ACCESS BY EMERGENCY VEHICLES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
16. UNLESS OTHERWISE SPECIFIED, ALL CLEARED AND GRUBBED MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED AT AN APPROVED LOCATION.
17. ALL AREAS WITH ABANDONED UTILITY LINES, STORM DRAINS, UNDERGROUND TANKS, ETC. WHICH MAY PROVIDE VOID SPACE BENEATH THE SURFACE SHALL BE REMOVED. WHEN APPROVED BY THE ENGINEER THE VOID SPACE MAY BE FILED WITH APPROVED MATERIAL. ALL TANKS OR HAZARDOUS MATERIALS SHALL BE DEALT WITH IN ACCORDANCE TO ALL LOCAL, STATE AND FEDERAL LAWS.
18. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY GRADES AT SAWCUT LOCATIONS AND MATCHING OF EXISTING GRADE LOCATIONS.
19. CONTRACTOR IS RESPONSIBLE FOR ANY ASPHALT GRINDING, OVERLAY AND SLURRY SEAL. ALL SPECIFICATIONS SHALL COMPLY WITH ALL LOCAL AUTHORITY REQUIREMENTS.
20. CONTRACTOR SHALL BE RESPONSIBLE TO CLEAN AND/OR MAINTAIN EXISTING PUBLIC STREETS OF SOIL OR OTHER DEBRIS DEPOSITED BY CONSTRUCTION OPERATIONS AND REPAIR ALL STREETS DAMAGED BY CONSTRUCTION OPERATIONS IN A TIMELY MANNER TO AVOID INCONVENIENCES OR HAZARDS TO THE PUBLIC.
21. THE CONTRACTOR SHALL NOT PERFORM WORK WITHOUT AGENCY INSPECTIONS WHERE INSPECTIONS ARE REQUIRED BY THE SPECIFICATIONS.
22. WHEN PERFORMING EXCAVATIONS, THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS OF ORS 757.541 TO 757.571, WHICH INCLUDE REQUIREMENTS THAT THE CONTRACTOR HAND-EXPOSE (POTHOLE) UNDERGROUND FACILITIES AND USE REASONABLE CARE TO AVOID DAMAGING THEM.
23. PLACEMENT OR STORAGE OF SPOILS FROM TRENCHES IS NOT PERMITTED ON HARD SURFACE STREETS WITHIN PUBLIC RIGHT-OF-WAY. SPOILS STORED IN OTHER RIGHT-OF-WAY AREAS SHALL BE COVERED TO PREVENT EROSION.

APPLICABLE CODES

ALL WORK SHALL BE IN CONFORMANCE WITH ALL FEDERAL, STATE, AND SOCIAL CODES. SPECIFICATIONS AND STANDARDS SHALL MEAN, AND ARE INTENDED TO BE, THE LATEST EDITION, AMENDMENT OR REVISION OF SUCH REFERENCE STANDARD IN EFFECT AS OF THE DATE OF THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO TO FOLLOWING:

OREGON STANDARD DRAWINGS (ODOT)

JACKSON COUNTY ADOPTED STANDARD DETAILS AND SPECIFICATIONS

ROGUE VALLEY SEWER SERVICES (RVSS) STORMWATER MANAGEMENT MANUAL, LATEST EDITION.

OPSC: OREGON PLUMBING SPECIALTY CODE, LATEST EDITION

OFC: OREGON FIRE CODE, LATEST EDITION

NFPA: NATIONAL FIRE PROTECTION ASSOCIATION 101 LIFE SAFETY CODE, LATEST EDITION

GRADING NOTES

1. DEQ 1200-C PERMIT IS NOT REQUIRED.
2. UNLESS DIRECTED OTHERWISE, REMOVE CLEARED AND GRUBBED MATERIAL FROM THE SITE AND DISPOSE AT AN APPROVED LOCATION.
3. PRIOR TO THE START OF CONSTRUCTION, VERIFY GRADES AT SAWCUT LOCATIONS AND MATCHING OF EXISTING GRADE LOCATIONS.
4. MINIMIZE TRAFFIC ON SOIL AREAS DURING WET WEATHER. IF THE SITE SOILS ARE EXPOSED DURING WET WEATHER, THE USE OF CRUSHED ROCK PLACED AS ENGINEERED FILL IN THE BOTTOM OF THE EXCAVATIONS MAY BE NECESSARY TO PROTECT THE SUBGRADE. TAKE ALL PRECAUTIONS TO LIMIT SURFACE DISTURBANCE AND PROTECT THE SITE GRADING AREA FROM EROSION AND RUNOFF.
5. UNLESS OTHERWISE NOTED, THE SAMPLING AND TESTING OF MATERIALS FOR USE ON THE JOBSITE SHALL BE AT THE EXPENSE OF THE CONTRACTOR. ALL TESTING OF MATERIALS AND WORKMANSHIP SHALL BE PERFORMED BY A CERTIFIED TESTER. RESULTS OF THE TESTS SHALL BE SENT DIRECTLY TO THE PROJECT ENGINEER AS WELL AS THE CONTRACTOR, BY THE LABORATORY. LOCATION AND FREQUENCY OF TESTS SHALL BE DESIGNATED BY THE GENERAL CONTRACTOR.
6. ALL CUT AND FILL SLOPES SHALL BE MAXIMUM OF 2:1.

STORM DRAIN NOTES

1. ALL STORM SEWER PIPE SHALL MEET THE OREGON STATE PLUMBING SPECIALTY CODE.
2. ALL PIPE SHALL BE PLACED ON STABLE EARTH, OR IF IN THE OPINION OF THE PROJECT ENGINEER THE EXISTING FOUNDATION IS UNSATISFACTORY, THEN IT SHALL BE EXCAVATED BELOW GRADE AND BACKFILLED WITH A GRAVEL MATERIAL TO SUPPORT THE PIPE.
3. THE BACKFILL SHALL BE PLACED EQUALLY ON BOTH SIDES OF THE PIPE IN LAYERS WITH A LOOSE AVERAGE DEPTH OF 6", MAXIMUM DEPTH 8"-9", THOROUGHLY TAMPING EACH LAYER. THESE COMPACTED LAYERS MUST EXTEND FOR ONE DIAMETER ON EACH SIDE OF THE PIPE OR TO THE SIDE OF THE TRENCH. MATERIALS TO COMPLETE THIS FILL OVER PIPE SHALL BE THE SAME AS DESCRIBED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL MANHOLE, INLET, AND CATCH BASIN FRAMES AND GRATES TO GRADE JUST PRIOR TO PAVING. MANHOLE GRATE SLOPES SHALL MATCH SLOPE OF FINISHED GRADE ASPHALT.
5. CULVERT ENDS AT OUTFALLS SHALL BE BEVELED TO MATCH SIDE SLOPES. FIELD CUT OF CULVERT ENDS IS PERMITTED WHEN APPROVED BY THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE. CULVERT OUTFALLS SHALL BE RIP RAPPED WITH A PAD MINIMUM OF 12" THICK, EXTENDING MINIMUM OF 6' FROM DISCHARGE POINT.
6. ALL STEEL PIPES, CULVERTS, TANKS AND OTHER STEEL PARTS OF ANY STORM DRAINAGE SYSTEM SHALL BE GALVANIZED OR HAVE A TREATMENT 1 ASPHALT COATING OR BETTER AS SPECIFIED IN THE ODOT STANDARD SPECIFICATIONS. ALUMINUM AND CONCRETE PIPES AND STRUCTURES DO NOT REQUIRE A TREATMENT 1 COATING.
7. STORM WATER RETENTION/DETENTION FACILITIES, STORM DRAINAGE PIPE AND CATCH BASINS SHALL BE FLUSHED AND CLEANED PRIOR TO CITY ACCEPTANCE.
8. ALL PIPES SHALL HAVE A MINIMUM OF 18" COVER AT THE TOP OF THE BELL, OR SHALL HAVE MINIMUM COVER PER THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.
9. CATCH BASIN STATIONS AND OFFSETS ARE MEASURED TO CENTER OF GRATE.
10. 100-FT MAX LINEAR RUN BETWEEN CLEANOUTS. 135° MAX AGGREGATE HORIZONTAL CHANGE IN DIRECTION WITHOUT CLEANOUT.

SANITARY SEWER NOTES

1. ALL PRIVATE SANITARY SEWER PIPE SHALL MEET THE OREGON STATE PLUMBING SPECIALTY CODE.
2. ALL PIPE SHALL BE PLACED ON STABLE EARTH, OR IF IN THE OPINION OF THE PROJECT ENGINEER THE EXISTING FOUNDATION IS UNSATISFACTORY, THEN IT SHALL BE EXCAVATED BELOW GRADE AND BACKFILLED WITH A GRAVEL MATERIAL TO SUPPORT THE PIPE.
3. THE BACKFILL SHALL BE PLACED EQUALLY ON BOTH SIDES OF THE PIPE IN LAYERS WITH A LOOSE AVERAGE DEPTH OF 6", MAXIMUM DEPTH 8"-9", THOROUGHLY TAMPING EACH LAYER. THESE COMPACTED LAYERS MUST EXTEND FOR ONE DIAMETER ON EACH SIDE OF THE PIPE OR TO THE SIDE OF THE TRENCH. MATERIALS TO COMPLETE THIS FILL OVER PIPE SHALL BE THE SAME AS DESCRIBED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL MANHOLE GRATES TO GRADE JUST PRIOR TO PAVING. MANHOLE GRATE SLOPES SHALL MATCH SLOPE OF FINISHED GRADE ASPHALT.
5. ALL PRIVATE SEWER PIPES SHALL HAVE A MINIMUM OF 36" COVER AT THE TOP OF THE BELL, OR SHALL HAVE MINIMUM COVER PER THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.
6. MANHOLE STATIONS AND OFFSETS ARE MEASURED TO CENTER OF STRUCTURE.
7. 100-FT MAX LINEAR RUN BETWEEN CLEANOUTS. 135° MAX AGGREGATE HORIZONTAL CHANGE IN DIRECTION WITHOUT CLEANOUT.
8. MINIMUM SLOPE ON 4" SEWER LATERALS IS 2%. MINIMUM SLOPE ON 6" SEWER LATERALS IS 1%. MINIMUM SLOPE ON 8" SEWER LATERALS IS 0.50%.

LEGEND:

EXIST. FIRE HYDRANT	FIRE HYDRANT
EXIST. WATER VALVE	WATER VALVE
EXIST. BLOW OFF	WATER METER
EXIST. WATER METER	BACKFLOW DEVICE
EXIST. HOSE BIB	IRRIGATION WATER METER
EXIST. IRRIGATION VALVE	AIR RELEASE VALVE
EXIST. AIR RELEASE VALVE	BLOWOFF DEVICE ASSEMBLY
EXIST. STORM DRAIN MANHOLE	FIRE DEPARTMENT CONNECTION
EXIST. CLEANOUT	END PLUG
EXIST. SANITARY SEWER MANHOLE	TEE
EXIST. MAILBOX	SANITARY SEWER CLEANOUT
HANDICAP PARKING SYMBOL	CONCENTRIC MANHOLE
PARALLEL PARKING STRIPING	STORM DRAIN CLEANOUT
BICYCLE LANE SYMBOL	CONTROL STRUCTURE MANHOLE
EXIST. SANITARY SEWER	ATRIUM DRAIN / BUBBLER
EXIST. STORM DRAIN	AREA DRAIN
EXIST. WATER	CATCH BASIN INLET
EXIST. GAS	CURB INLET
EXIST. ELECTRIC	LIGHTS
EXIST. OVERHEAD POWER	SIGN (TRAFFIC, INFORMATION)
EXIST. TELEPHONE	BOLLARD
EXIST. FIBER OPTIC	CONCRETE
EXIST. CURB AND GUTTER	HMAC PAVING
EXIST. CENTERLINE	NEW RIP RAP
EXIST. RIGHT OF WAY	
EXIST. CONTOUR	
PROPOSED CONTOUR	
SANITARY SEWER	
STORM DRAIN	
WATER	
GAS	
ELECTRIC	
CURB AND GUTTER	
PROPOSED RIGHT OF WAY	
FLOW LINE	
PROPERTY LINE	

CONCRETE NOTES

1. PROVIDE A MINIMUM 8' TRANSITION SECTION WHEN JOINING CURBS OF DIFFERENT CROSS SECTIONS.
2. CONCRETE SHALL NOT BE PLACED UNTIL FORMS HAVE BEEN INSPECTED AND APPROVED.
3. CONCRETE SHALL BE COMMERCIAL GRADE RETAINING THE FOLLOWING CHARACTERISTICS: ENTRAINED AIR – 4.0% TO 7.0%; SLUMP – 5 INCHES OR LESS; COMPRESSIVE STRENGTH – MINIMUM 3,000 PSI AT 28 DAYS; TEMPERATURE – MINIMUM 50°F TO MAXIMUM 90°F.
4. ALL CONCRETE STRUCTURES REINFORCED WITH REBAR SHALL BE VIBRATED TO REMOVE VOIDS.
5. SURFACE SHALL HAVE A FINISHED TEXTURE THAT WILL NOT BE SLICK WHEN WET (MEDIUM BROOM FINISH). CURING COMPOUND MAY BE APPLIED IMMEDIATELY AFTER CONCRETE IS FINISHED. WHITE PIGMENT RECOMMENDED, CLEAR ACCEPTABLE.
6. AN EDGING TOOL SHALL BE USED ON ALL EDGES AND JOINTS.
7. PROVIDE CONTRACTION JOINTS AT 15' INTERVALS AND "DUMMY" TOOLED JOINTS AT 5' INTERVALS ON CURBS, SIDEWALKS AND APPROACHES. CONTRACTION JOINT GROOVES SHALL BE AT MINIMUM, 1 ½" DEEP OR ONE-THIRD THE THICKNESS OF THE CONCRETE.
8. PROVIDE EXPANSION JOINTS OPPOSITE ABUTTING EXPANSION JOINTS IN ABUTTING CONCRETE, AT EACH POINT OF TANGENCY IN THE STRUCTURE ALIGNMENT, BETWEEN DRIVEWAYS AND CONCRETE PAVEMENT, AROUND POLES, POSTS, BOXES AND OTHER FIXTURES WHICH PROTRUDE THROUGH OR AGAINST THE STRUCTURES, AT ALL BCR'S AND ECR'S, AT MAXIMUM OF 100' INTERVALS. EXPANSION JOINT MATERIAL SHALL BE OF THE BITUMINOUS, PREFORMED FILLER TYPE NOT LESS THAN ½" WIDE, PLACED FLUSH OR NO MORE THAN 1/8" BELOW THE CONCRETE SURFACE.
9. STRAIGHT LINE EDGES SHALL NOT VARY MORE THAN ¼" UNDER A TWELVE-FOOT STRAIGHT EDGE.
10. CURE AND PROTECT CONCRETE AFTER PLACING AND FINISHING. KEEP STRUCTURES FREE FROM CONTACT, STRAIN AND PUBLIC TRAFFIC FOR AT LEAST SEVEN DAYS OR LONGER AS DIRECTED. MIXES TO EXPEDITE CURING MAY BE USED WITH APPROVAL OF THE ENGINEER OF RECORD.
11. CONCRETE SHALL BE REMOVED TO THE NEAREST CONTRACTION JOINT, COLD JOINT OR CRACK WITHIN 4' OF THE REPLACEMENT AREA. CONCRETE SHALL BE SAW CUT WITH A SMOOTH, UNIFORM JOINT PROVIDED.
12. EXISTING A/C SHALL BE REMOVED/REPLACED ALONG ENTIRE CURB SECTION TO A MINIMUM 18" WIDTH UNLESS APPROVED BY ENGINEER OF RECORD.

ADA NOTES

1. ALL ADA ACCESSIBLE FACILITIES SHALL BE INSTALLED PER THE CURRENT ADA REQUIREMENTS AND SHALL COMPLY WITH 405 ANSI ICC A117.1.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE ACCESSIBLE PATH OF TRAVEL AND ACCESSIBLE PARKING STALLS AND ACCESS AISLES COMPLIES WITH AMERICAN DISABILITIES ACT AND ALL LOCAL CODES.
3. THE ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLANS IS A BARRIER FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING ½" BEVELED AT 1:2 MAX SLOPE, OR VERTICAL CHANGES NOT EXCEEDING ¼" MAX AND AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE NOTED.
4. ALL ADA PARKING STALLS AND ACCESS AISLES SHALL BE CONSTRUCTED WITH A SLOPE NOT TO EXCEED 1.5% IN ANY DIRECTION. PARKING STALLS AND ACCESS AISLES WITH AS-BUILT SLOPES EXCEEDING 2.0% IN ANY DIRECTION WILL NOT PASS FINAL INSPECTION.
5. IF SPOT ELEVATIONS ON PLANS ARE NOT CONSISTENT WITH THESE ADA REQUIREMENTS, NOTIFY ENGINEER OF RECORD PRIOR TO PLACEMENT OF ACCESSIBLE ROUTE.

ABBREVIATIONS:

AC	ASPHALT
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ASTM	AMERICAN STANDARD TEST METHOD
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BACK OF CURB
BR	BOTTOM OF RAMP
BS	BOTTOM OF STAIRS
BW	BOTTOM OF WALL
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT RISER
C	CONCRETE
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
DIP	DUCTILE IRON PIPE
DWG	DRAWING
(E)	EXISTING
EG	EXISTING GRADE
EOC	EDGE OF CONCRETE
EOP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
G	GAS
GB	GRADE BREAK
GC	GENERAL CONTRACTOR
GRD	GROUND
GRVL	GRAVEL
HDPE	HIGH-DENSITY POLYETHYLENE
HP	HIGH POINT
IE	INVERT ELEVATION
LP	LOW POINT
MAX	MAXIMUM
ME	MATCH EXISTING
MIN	MINIMUM
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
(N)	NEW
NAVD	NORTH AMERICAN VERTICAL DATUM
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
P	PROPOSED
PERF	PERFORATED PIPE
PLY	PLAYGROUND SURFACE
PVC	POLYVINYL CHLORIDE
PVR	PAVER
RCP	REINFORCED CONCRETE PIPE
RE	RIM ELEVATION
REQ'D	REQUIRED
ROW	RIGHT-OF-WAY
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STD	STANDARD
SW	SIDEWALK
TBR	TO BE REMOVED
TC	TOP OF CURB
TR	TOP OF RAMP
TOW	TOP OF WALL
TYP	TYPICAL
UPC	UNIFORM PLUMBING CODE
W	WATER

Know what's **below.** **Call** before you dig.

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TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek: design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

POWELL engineering + consulting
STRONG RELATIONSHIPS • INFINITE POSSIBILITIES
100 E. Main St. Suite "O"
Medford, OR 97501
541.613.0723 phone
www.powellengineeringconsulting.com

REGISTERED PROFESSIONAL ENGINEER
OREGON
JAN. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
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Drawn By	
Checked By	TDP
Scale	

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Drawing Title

CIVIL GENERAL NOTES

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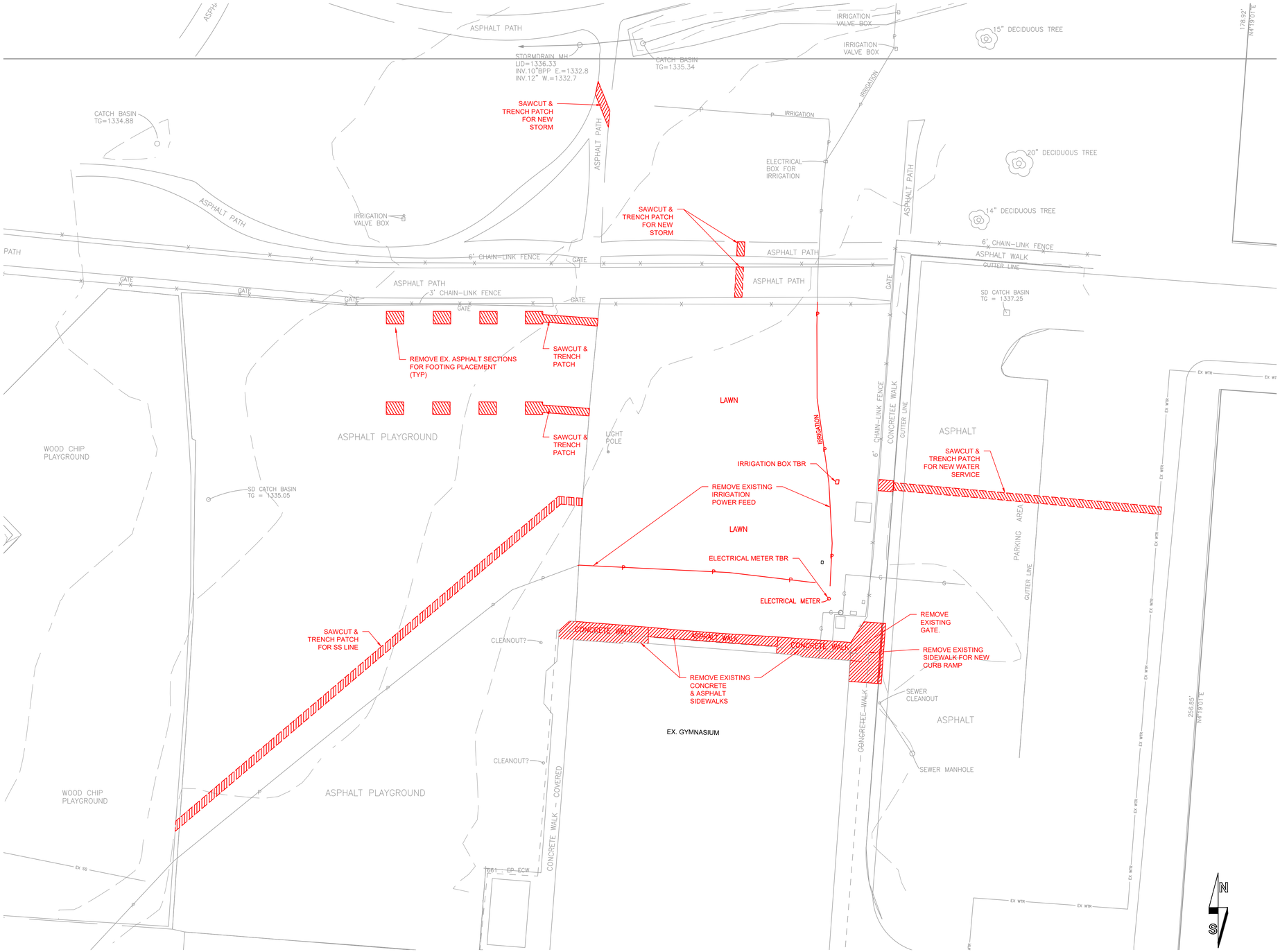

PLAN VIEW - SITE DEMOLITION PLAN

SCALE: 1" = 20' - 0" (24x36)

DEMO KEY

1) BOLD/RED ELEMENTS TO BE DEMOLISHED AND HAULED OFF TO AN APPROVED DISPOSAL GROUND.
2) TBR = "TO BE REMOVED"
3) CONTRACTOR TO COORDINATE ALL EXISTING UTILITY RELOCATION AND/OR REMOVALS WITH THE APPROPRIATE FRANCHISE UTILITY PRIOR TO CONSTRUCTION.

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arkitek:
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tel.: 541.591.9988

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100 E. Main St. Suite "O"
Medford, OR 97501
541.613.0723 phone
www.powellengineeringconsulting.com

REGISTERED PROFESSIONAL ENGINEER
58125PE
OREGON
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SITE DEMOLITION PLAN

Drawing No.

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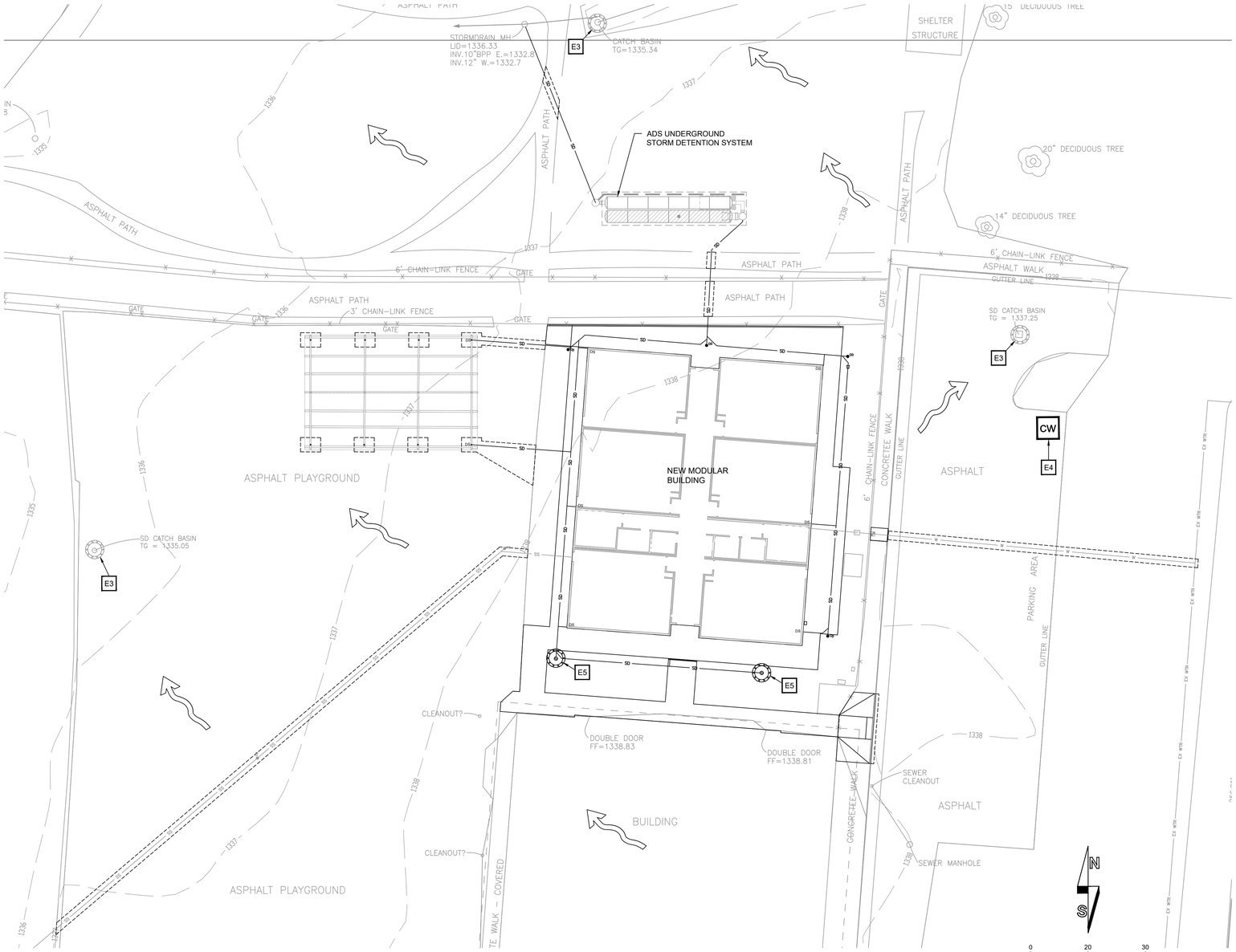


PLAN VIEW - EROSION CONTROL PLAN

SCALE: 1" = 20' - 0" (24x36)

ESCP LEGEND

E3	INSTALL INLET PROTECTION ON EXISTING CATCH BASINS PER ODOT DETAIL RD1010 ON SHEET C2.2.	
E4	INSTALL CONCRETE WASH OUT PER DETAIL 1, ON SHEET C2.1.	CW
E5	INSTALL INLET PROTECTION ON NEW CATCH BASINS PER ODOT DETAIL RD1010 ON SHEET C2.2.	
	EX. SURFACE FLOW DIRECTION	

WET WEATHER CONSTRUCTION

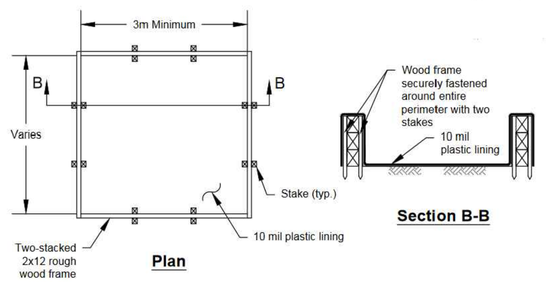
THE SITE SOILS ARE CONSIDERED VERY MOISTURE SENSITIVE AND, AS SUCH, ARE SUSCEPTIBLE TO DISTURBANCE BY CONSTRUCTION EQUIPMENT, PARTICULARLY DURING PERIODS OF WET WEATHER. DURING WET WEATHER, THE CONTRACTOR SHALL MINIMIZE TRAFFIC ON PREPARED SOIL SUBGRADE AREAS. IF THE SITE SOILS ARE EXPOSED DURING WET WEATHER, THE USE OF CRUSHED ROCK PLACED AS ENGINEERED FILL IN THE BOTTOM OF THE EXCAVATIONS MAY BE NECESSARY TO PROTECT THE SUBGRADE. THE GRADING CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO LIMIT SURFACE DISTURBANCE AND PROTECT THE SITE GRADING AREA FROM EXCESSIVE RUNOFF EROSION.

ESCP RESPONSIBILITY

IT IS THE INTENT OF THIS TEMPORARY EROSION AND SEDIMENT CONTROL PLAN THAT STORM WATER RUNOFF BE CONTROLLED AT ALL TIMES TO PREVENT SOIL EROSION AND TO MAINTAIN WATER QUALITY. ANY AND ALL MEASURES NECESSARY TO DO SO SHALL BE EMPLOYED BY THE CONTRACTOR.

1. REGARDLESS OF SITE, WEATHER, SOIL OR OTHER CONDITIONS, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ENSURING THAT EROSION DOES NOT OCCUR ON THE SITE AND THAT POLLUTED OR SILT-LADEN RUNOFF DOES NOT LEAVE THE SITE OR ENTER INTO ANY CREEK, STREAM, WETLAND OR WATER BODY ON THE SITE.
2. BEYOND THE MINIMUM REQUIREMENTS SHOWN ON THIS PLAN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND IMPLEMENTING APPROPRIATE METHODS, "BEST MANAGEMENT PRACTICES" (BMPS), FOR STORM WATER TREATMENT AND CONTROL THAT MEET THE REQUIREMENTS OF THE STATE AND LOCAL JURISDICTION.
3. THE CONTRACTOR SHALL REPORT ALL WATER QUALITY CONCERNS AND ACTIVITIES TO THE PROJECT ENGINEER. IN THE EVENT THAT THE INSTALLED WATER QUALITY CONTROL MEASURES ARE INEFFECTIVE AT CONTROLLING EROSION AND SEDIMENT, THE CONTRACTOR SHALL IMMEDIATELY REPORT TO AND CONSULT WITH THE PROJECT ENGINEER TO FIND AN APPROPRIATE REMEDY. ALL CONSTRUCTION ACTIVITIES, WITH THE EXCEPTION OF EROSION AND SEDIMENT CONTROL MEASURES, SHALL CEASE UNTIL SUCH TIME AS THE WATER QUALITY IS BROUGHT UNDER CONTROL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MONITORING WEATHER FORECASTS AND ANTICIPATING STORM ACTIVITY AND SHALL SCHEDULE ALL PROJECT ACTIVITIES IN ANTICIPATION OF THE WEATHER.
5. ALL SUPPLIES AND MATERIALS NECESSARY FOR IMPLEMENTING BMPS SHALL BE STORED ON SITE AND SHALL BE IMMEDIATELY AVAILABLE FOR USE. SUCH SUPPLIES AND MATERIALS SHALL INCLUDE, BUT NOT BE LIMITED TO, STRAW BALES OR OTHER MULCHING MATERIAL, SILT FENCING AND STAKES, FILTER FABRIC, ETC.
6. DURING AND AFTER RUNOFF PRODUCING STORM EVENTS, CONTRACTOR SHALL MONITOR ALL EROSION CONTROL MEASURES AND SHALL PRIORITIZE IMPLEMENTATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES ABOVE ALL OTHERS.

NOTE: IMPLEMENT EROSION CONTROL MEASURES PER EROSION AND SEDIMENT CONTROL PLANS PRIOR TO VEGETATION BEING DISTURBED. CONTACT ROGUE VALLEY SEWER SERVICES FOR EROSION CONTROL INSPECTION PRIOR TO THE START OF GRADING OR EXCAVATION.



NOTES

1. DETAIL SHOWN TO REPRESENT INTENT. EQUIVALENT ALTERNATIVES ARE AVAILABLE.
2. COORDINATE MODIFICATIONS WITH EROSION CONTROL INSPECTOR.

1 / --- **CONCRETE WASH OUT**

SCALE: NTS

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

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Medford, OR 97501
541.613.0723 phone
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REGISTERED PROFESSIONAL ENGINEER
87425PE
OREGON
Jan. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

EROSION CONTROL PLAN

Drawing No.

C2.1

Drawing Name: C:\Users\TekPowell Engineering and Consulting, LLC\PEC Shared - Documents\All Staff\Projects\Current Projects\Arktek TRES P2\Drawings\CADD\Arktek TREM C1-C5.dwg Last Save: March 26, 2023 12:43 PM Plot Date: March 29, 2023 11:32 AM By: TPOWELL

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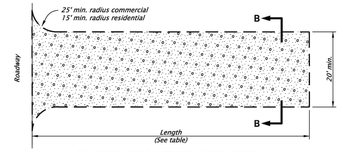
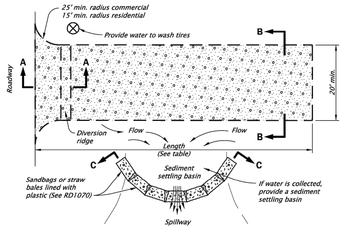
rd1000.dgm 01-20-2021



CONSTRUCTION ENTRANCE - TYPE 1
NOT TO SCALE



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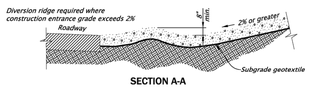
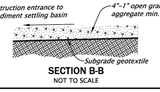
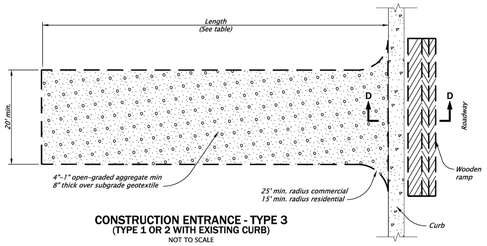


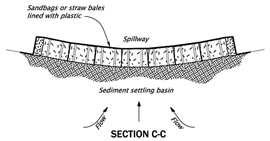
SECTION A-A
NOT TO SCALE



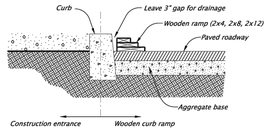
SECTION B-B
NOT TO SCALE



CONSTRUCTION ENTRANCE - TYPE 3
(TYPE 1 OR 2 WITH EXISTING CURB)
NOT TO SCALE



SECTION C-C
NOT TO SCALE



WOODEN CURB RAMP SECTION D-D
NOT TO SCALE

NOTES:
1. The Type 1 entrance is a simple entrance without a diversion ridge or settling basin.
2. The wooden ramp may be used on either Type 1 or Type 2 entrances in situations where there is curb and the curb is not removed for the construction entrance.

CONSTRUCTION ENTRANCE TABLE MINIMUM LENGTH	
Length (FT)	Area Of Exposed Soil (Acre)
20	0.25
50	0.25 < A < 1.0
100	A > 1.0

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CONSTRUCTION ENTRANCES

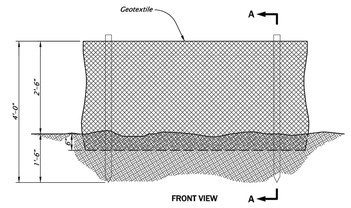
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

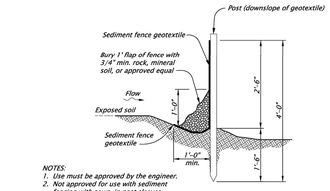
Effective Date: December 1, 2022 - May 31, 2023 RD1000

RD1000

rd1040.dgm 01-20-2021

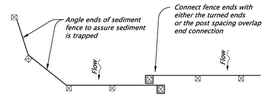


SEDIMENT FENCE AND GEOTEXTILE BURY DETAIL - TYPE 1
NOT TO SCALE

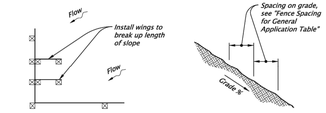


NOTES:
1. Use must be approved by the engineer.
2. Not approved for use with sediment fencing with sewn-in post sleeves.

ALTERNATE SEDIMENT FENCE WITHOUT TRENCHING - TYPE 2
NOT TO SCALE



PLAN VIEW

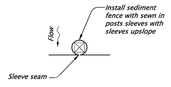


TERMINATION AT CORNER OR PROPERTY LINE

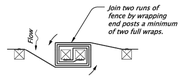
GENERAL NOTES:
1. Use 2"x2" wood fence posts.
2. Posts to be installed on downhill side of sediment fence geotextile. Position posts to prevent separation from geotextile.
3. Compact filter fabric trench backfill and soil on uphill side of fence.
4. Locate fence no closer than three feet to the toe of a slope.
5. Wing spacing shall comply with "Fence Spacing for General Application Table".

FENCE SPACING FOR GENERAL APPLICATION TABLE	
INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS	
GRADE	MAXIMUM SPACING ON GRADE
Grade < 10%	300'
10% ≤ Grade < 15%	150'
15% ≤ Grade < 20%	100'
20% ≤ Grade < 30%	50'
30% ≤ Grade	25'

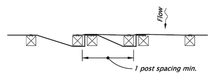
POST SPACING TABLE	
6"	Sediment Fence with Geotextile elongation less than 50%
4"	Sediment Fence with Geotextile elongation 50% or more



GEOTEXTILE WITH POST SLEEVES



TURNED ENDS CONNECTION



POST SPACING OVERLAP CONNECTION

GEOTEXTILE END CONNECTIONS
NOT TO SCALE

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

SEDIMENT FENCE

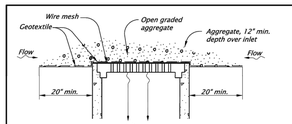
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

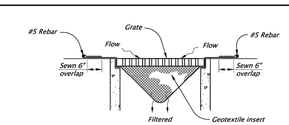
Effective Date: December 1, 2022 - May 31, 2023 RD1040

RD1040

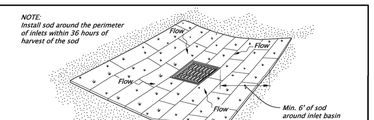
rd1010.dgm 01-20-2021



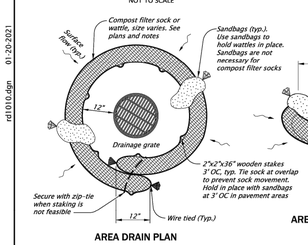
GEOTEXTILE/WIRE MESH/AGGREGATE - TYPE 2
NOT TO SCALE



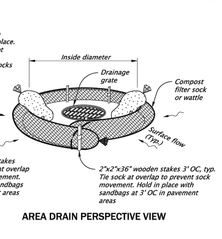
PREFABRICATED FILTER INSERT - TYPE 3
NOT TO SCALE



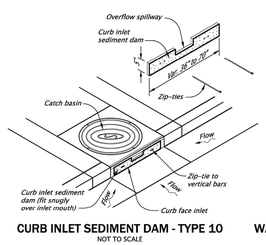
SOD PROTECTION - TYPE 6
NOT TO SCALE



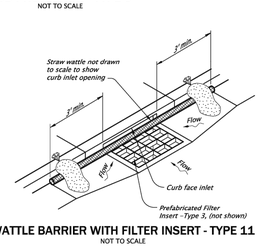
AREA DRAIN PLAN



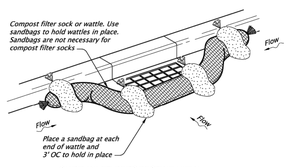
AREA DRAIN PERSPECTIVE VIEW



CURB INLET SEDIMENT DAM - TYPE 10
NOT TO SCALE



WATTLE BARRIER WITH FILTER INSERT - TYPE 11
NOT TO SCALE



CURB INLET PERSPECTIVE VIEW

COMPOST FILTER SOCK OR WATTLE - TYPE 7
NOT TO SCALE

NOTES:
Type 2 – Geotextile/wire mesh/aggregate
Place the wire mesh over the grate. Place sediment fence geotextile over the wire mesh and perimeter area around structure.
Install aggregate over the geotextile fabric.

Type 3 – Prefabricated filter inserts
Install prefabricated filter inserts according to the plans, special provisions, and manufacturer recommendations. Prefabricated inserts with provisions for overflow are allowed only when accompanied by additional BMP's to prevent the potential of sediments entering project storm systems. Field fabricated inserts are not allowed.

Type 7 – Compost filter sock
Drive 2"x2" wood stakes a minimum of 6" into ground and flush with the top of the sock.
Overlap ends of sock per manufacturers recommendations (12"min., 36" max.). Use 8" to 12" dia sock on curbside in traffic areas.

(Type 7 cont.)
Use 12" to 18" dia sock in non-traffic areas or areas where the larger socks can be used safely.
use synthetic mesh socks for temporary installations.

Type 10 – Curb inlet sediment dam
Fit curb inlet sediment dam snugly into inlet mouth. Curb inlet sediment dam is required for use with inlet filter insert where at-grade inlet grate and curb inlet are combined at a catch basin.

Type 11 – Wattle barrier with filter insert
Install prefabricated filter insert per Type 3 detail.
Install wattles over opening and 36" to each side of opening tight against curb. Adjust wattle to force storm water to flow through filter insert or wattle prior to leaving the site.
Adjust, replace or modify the inlet protection as needed to prevent sediment laden water from entering the catch basin.

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

INLET PROTECTION
TYPE 2, 3, 6, 7, 10 AND 11

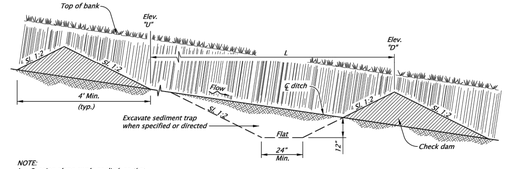
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers
Jan 2021	Moved notes up from overlapping the sheet border

Effective Date: December 1, 2022 - May 31, 2023 RD1010

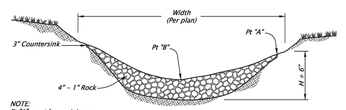
RD1010

rd1005.dgm 01-20-2021



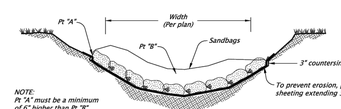
NOTE:
L = Spacing along swale or ditch so that Elevation "U" equals Elevation "D".

TYPICAL PROFILE SECTION CHECK DAMS
(SHOWN WITH AGGREGATE)
NOT TO SCALE



NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

AGGREGATE CHECK DAM - TYPE 1
NOT TO SCALE



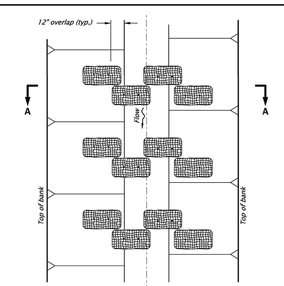
NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

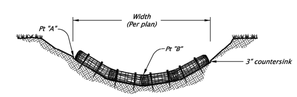
SANDBAG CHECK DAM - TYPE 4
NOT TO SCALE

NOTES:
1. Type 3 – stake biofilter bags with two 2"x2"x18" (minimum) wood stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags. Omit stakes if placed over paved surfaces. Overlap bags 12" minimum at each joint.
2. Type 4 – Tightly abut or overlap ends of sandbags at each joint.
3. Spacing between check dams for all check dam types shall comply with the typical profile section shown above.

MAXIMUM CHECK DAM SPACING "L"				
Ditch Grade	H=8"	H=12"	H=18"	H=24"
10%	* *	* *	15'	20'
9%	* *	* *	16'	22'
8%	* *	* *	18'	25'
7%	* *	* *	21'	28'
6%	* *	16'	25'	33'
5%	* *	20'	30'	40'
4%	16'	25'	37'	50'
3%	22'	33'	50'	66'
2%	33'	50'	75'	100'

* * Not allowed H = Min. dam height





SECTION A-A

BIOFILTER BAG CHECK DAM - TYPE 3
NOT TO SCALE

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CHECK DAMS
TYPE 1, 3 AND 4

2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

Effective Date: December 1, 2022 - May 31, 2023 RD1005

RD1005

Drawing Name: C:\Users\Tek\Powell Engineering and Consulting, LLC\PEC Shared - Documents\All Staff\Projects\Current Projects\Arktek TRES P2\Drawings\CAD\Arktek TRES P2 Drawings.dwg Last Save: March 24, 2023 3:08 PM By: TPOWELL Plot Date: March 26, 2023 10:23 AM

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2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

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REGISTERED PROFESSIONAL ENGINEER
56758PE
OREGON
Jan. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

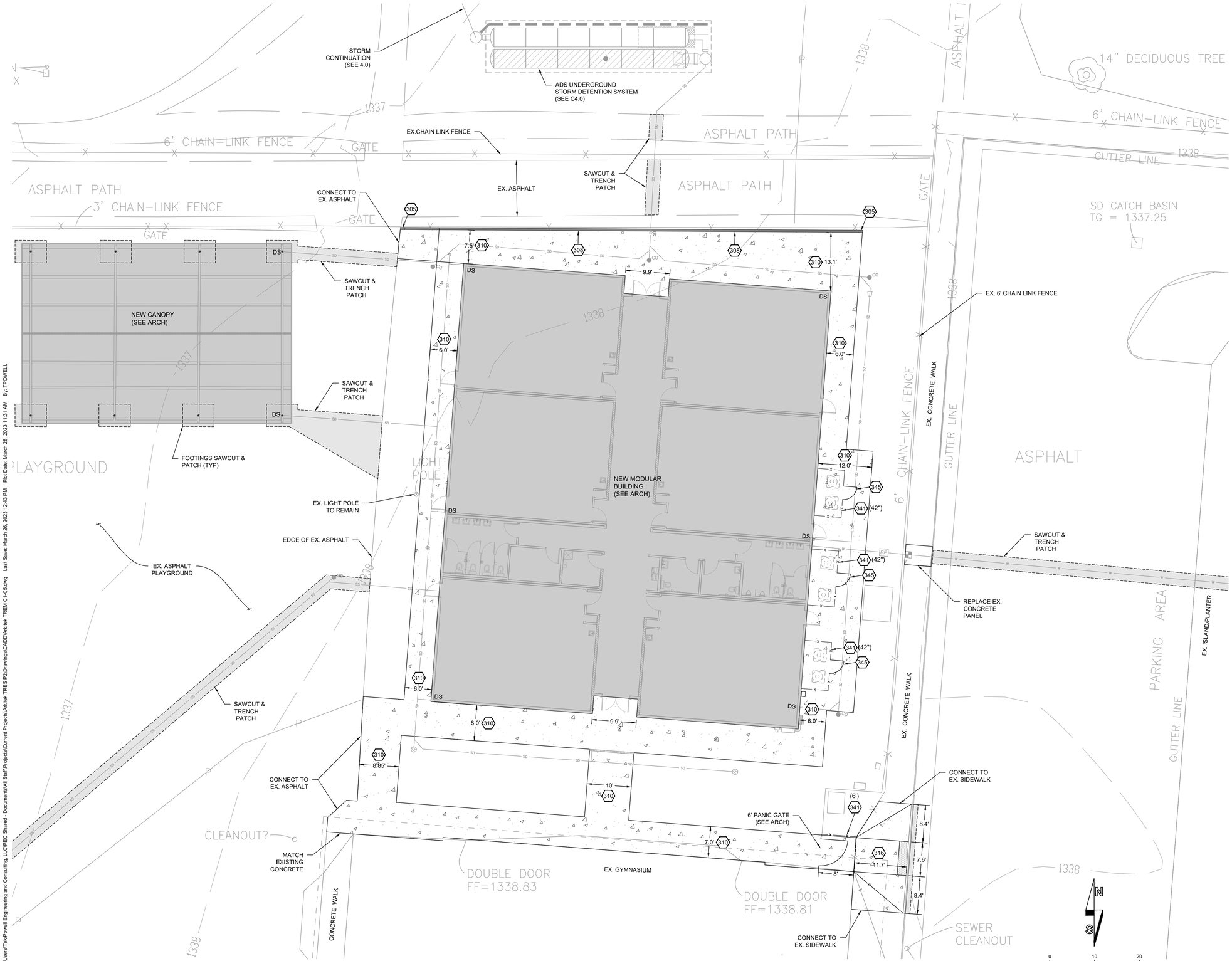
100% CD

Drawing Title

ESC DETAILS

Drawing No.

C2.2



PLAN VIEW - CIVIL SITE PLAN

SCALE: 1" = 10' - 0" (24x36)

KEYNOTES

- 305 CURB TAPER (305 C6.0)
- 308 CURB WALL (308 C6.0)
- 310 CONCRETE SIDEWALK OVER CRUSHED ROCK BASE. (309 C6.0) (310 C6.0)
- 316 PERPENDICULAR CURB RAMP WITH TRUNCATED DOMES. (rd910 C6.0)
- 341 CHAIN LINK FENCING (HEIGHT AS INDICATED) (341 C6.0)
- 345 3' WIDE CHAIN LINK SWING GATE (345 C6.0)

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Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

CIVIL SITE PLAN

Drawing No.

C3.0

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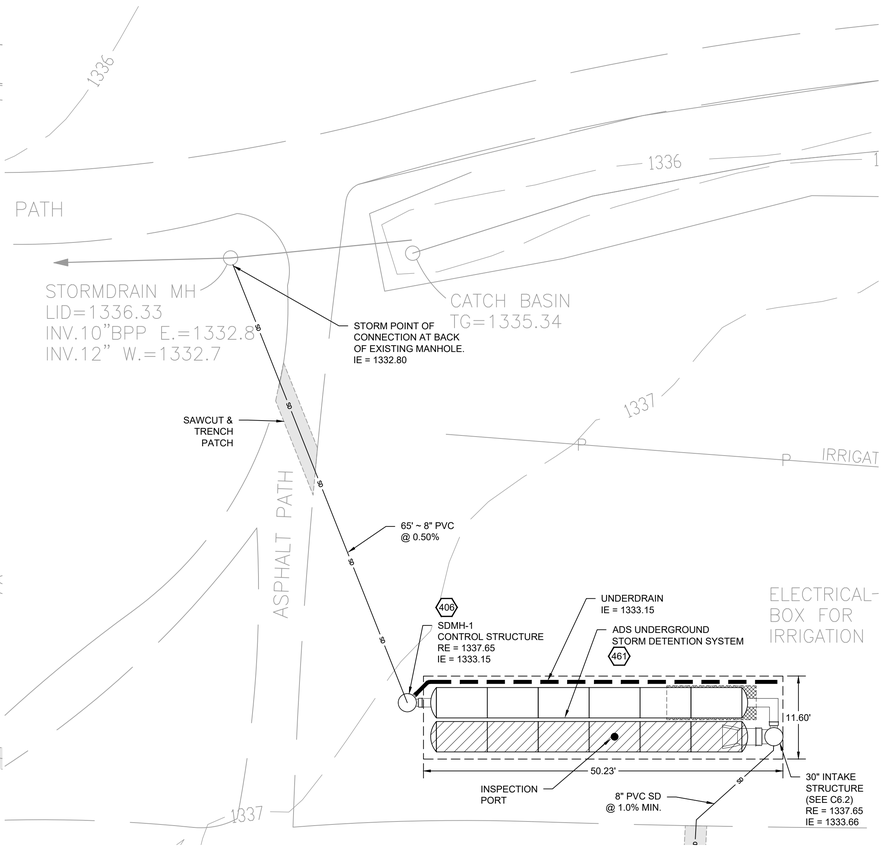
PLAN VIEW - DRAINAGE PLAN

SCALE: 1" = 10' - 0" (24x36)



PLAN VIEW - ADS STORMTECH CHAMBERS

SCALE: 1" = 10' - 0" (24x36)

KEYNOTES

- 406 CONTROL STRUCTURE MANHOLE (406 / C6.1)
- 408 AREA DRAIN (408 / C6.1)
- 415 4" NDS DURA SLOPE CHANNEL DRAIN WITH HEEL PROOF GRATE.
- 418 DOWNSPOUT TRANSITION (418 / C6.1)
- 461 ADS UNDERGROUND STORM DETENTION SYSTEM (SEE C6.2)
- 540 STORM CLEAN OUT (540 / C6.1)

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DRAINAGE PLAN

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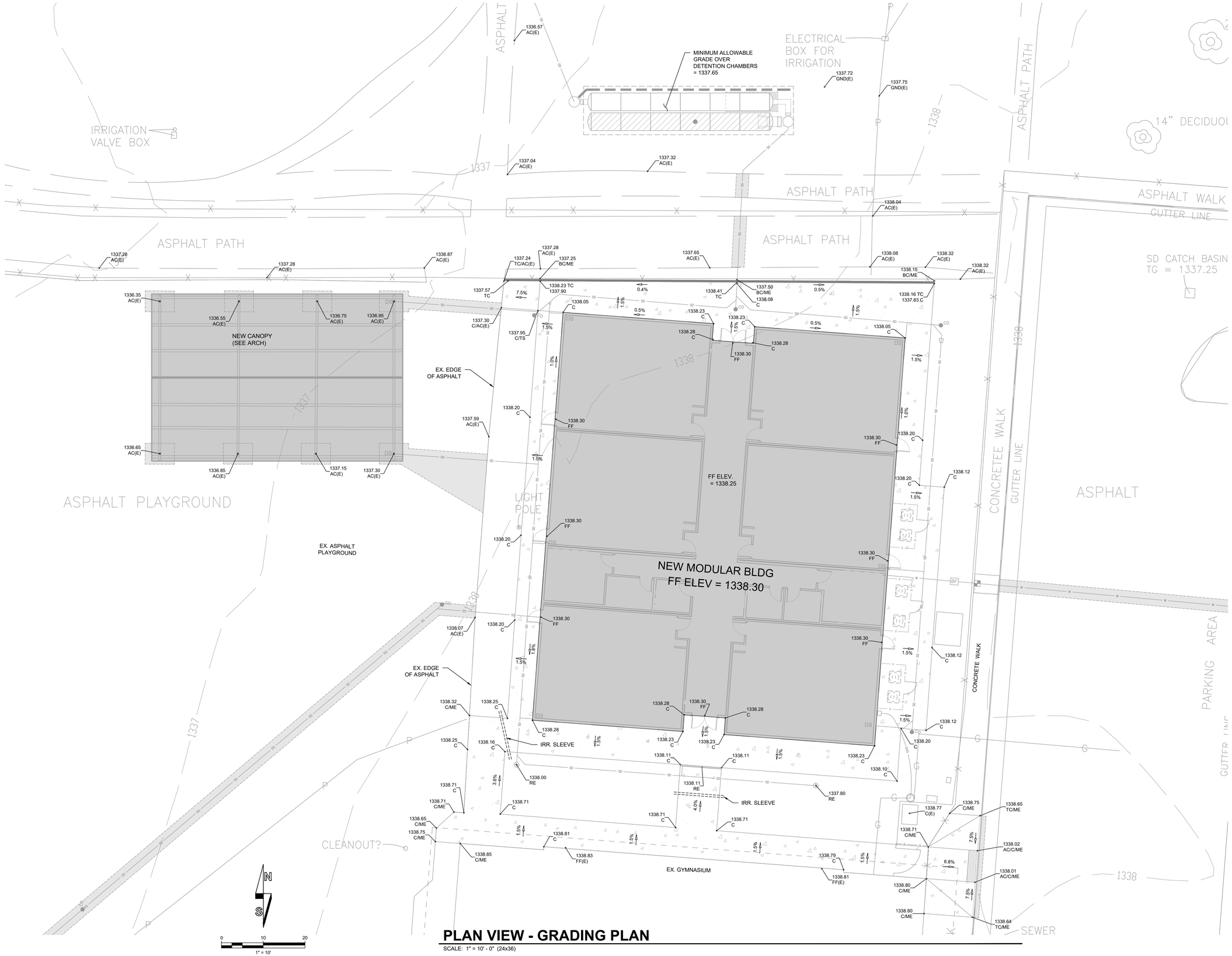

PLAN VIEW - GRADING PLAN

SCALE: 1" = 10' - 0" (24x36)

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56726PE
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GRADING PLAN

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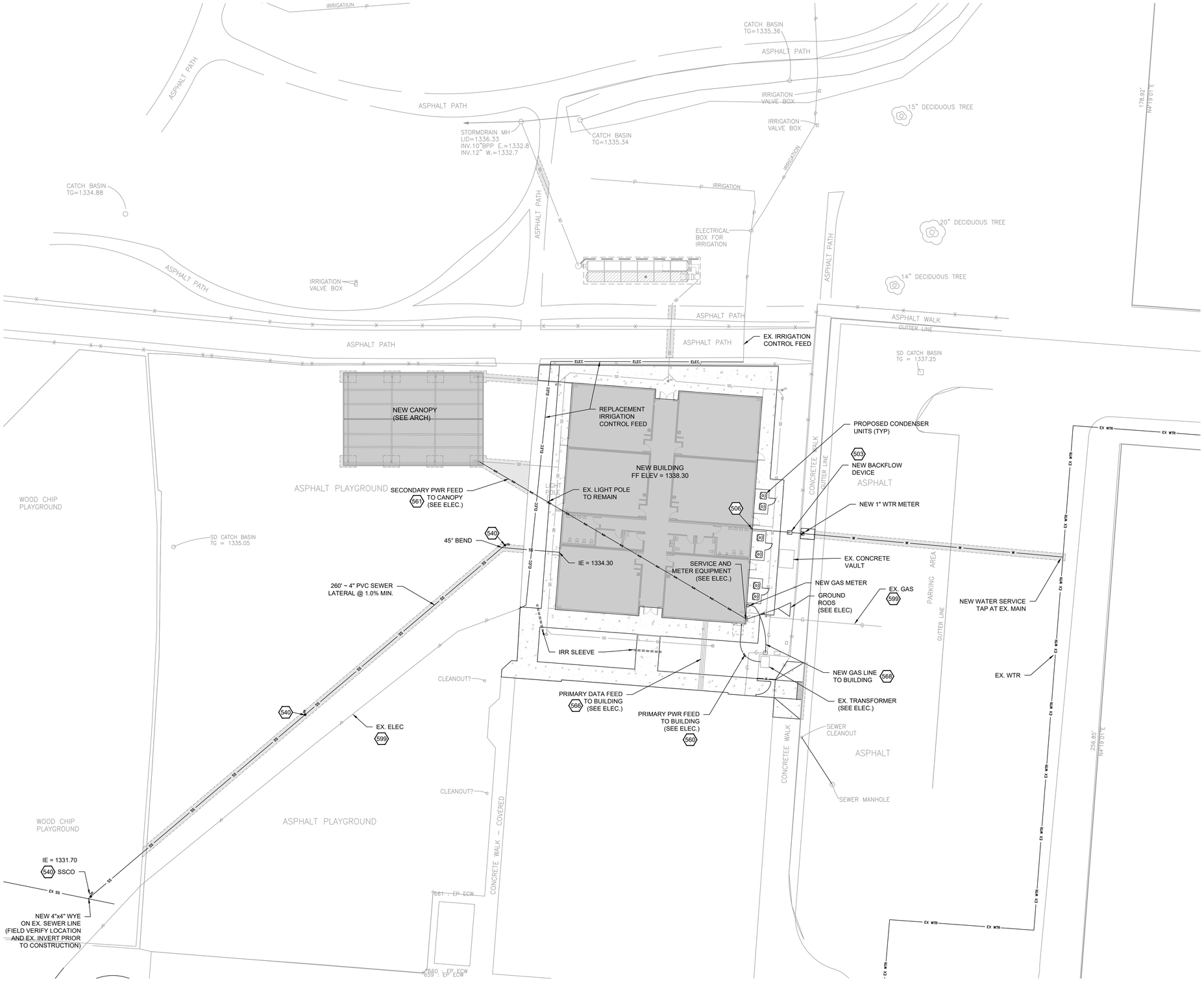

PLAN VIEW - SITE UTILITY PLAN

SCALE: 1" = 20' - 0" (24x36)

KEYNOTES

503 STATE OF OREGON APPROVED BACKFLOW DEVICE. TESTING SHALL BE COMPLETED BY AN OREGON CERTIFIED BACKFLOW ASSEMBLY TESTER.

506 1.5" DOMESTIC WATER MAIN CONNECTION AT BUILDING WITH SHUT OFF VALVE. SEE PLUMBING.

540 SANITARY SEWER CLEANOUT. (540 / C6.1)

560 PRIMARY POWER FEED TO BUILDING (SEE ELEC). CONTRACTOR TO COORDINATE WITH PPL ON SERVICE FEEDS TO BUILDING.

561 SECONDARY POWER FEED

566 PRIMARY DATA FEED TO BUILDING. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES ON SERVICE LATERALS TO BUILDING.

568 PRIMARY GAS SERVICE LINE TO BUILDING

599 EXISTING UNDERGROUND UTILITY. CONTRACTOR TO COORDINATE WITH APPROPRIATE UTILITY PRIOR TO CONSTRUCTION. REPLACE OR PROTECT DURING CONSTRUCTION AS DIRECTED BY FRANCHISE UTILITY.

UTILITY STATEMENT:

EXISTING UNDERGROUND UTILITIES ILLUSTRATED IN THESE PLANS ARE APPROXIMATED BASED ON MAPS OBTAINED FROM THE CITY OF MEDFORD PUBLIC WORKS, OR HAVE BEEN LOCATED BY A UTILITY LOCATE COMPANY. LAYOUT INDICATED IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. ALL LINES WITHIN PROJECTED WORK ZONE SHALL BE FIELD VERIFIED AS REQUIRED PRIOR TO CONSTRUCTION.

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SITE UTILITY PLAN

Drawing No.

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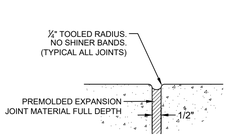
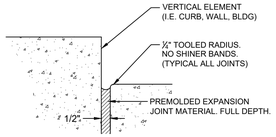
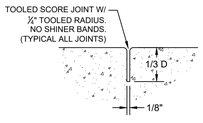


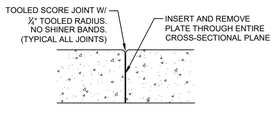
EXPANSION JOINT



EXPANSION JOINT AT VERTICAL ELEMENTS

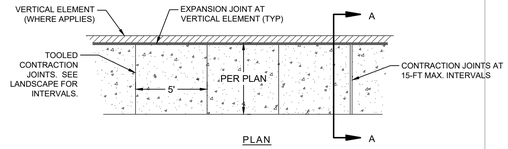


TOOLED CONTRACTION JOINT

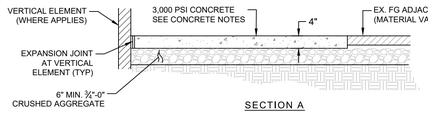


WEAKENED PLANE CONTRACTION JOINT

309 **CONCRETE CONTROL JOINTS**
SCALE: NTS



PLAN



SECTION A

NOTES

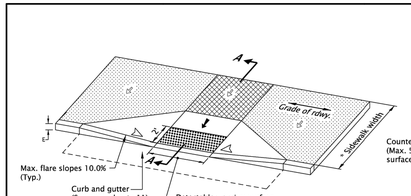
1. COMPACT SUBGRADE AND AGGREGATE TO 95% OF MAXIMUM DRY DENSITY.
2. FINISH SHALL BE MEDIUM BROOM PERPENDICULAR TO PEDESTRIAN TRAFFIC UNLESS OTHERWISE DIRECTED.
3. CROSS SLOPE OF SIDEWALK SHALL BE 1.5% AWAY FROM THE BUILDING.
4. SEE CONCRETE CONTROL JOINT DETAIL ON THIS SHEET.

310 **TYPICAL CONCRETE SIDEWALK**
SCALE: NTS

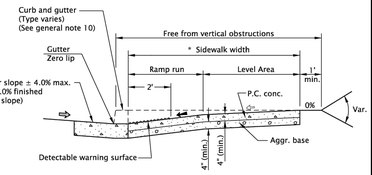
305 **CURB TAPER**
SCALE: NTS

308 **CURB WALL**
SCALE: NTS

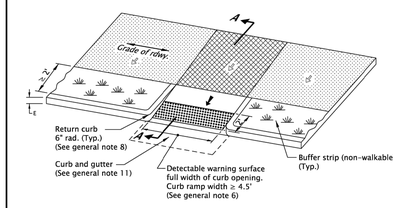
rd910.dgn 14-JAN-2022



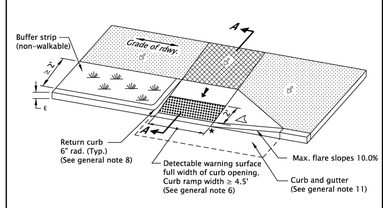
PERPENDICULAR CURB RAMP DETAIL
(Use "Parallel Curb Ramp Detail" or "Combination Curb Ramp Detail" when reqd. turning space cannot be obtained)



SECTION A-A
* NOTE: Minimum width of 14.25 feet sidewalk for E=7"



THROUGH BUFFER STRIP



WITH SINGLE FLARE

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on applicable ODOT Standards.
2. See Std. Dwgs. RD700 & RD701 for curbs.
   See Std. Dwgs. RD720 & RD721 for sidewalks.
   See Std. Dwgs. RD902 through RD908 for detectable warning surface installation details.
   See Std. Dwgs. RD912 through RD916 for curb ramp placement options.
3. Site conditions normally require a project specific design. See project plans for details not shown.
4. Tooled dummy joints are required at all curb ramp grade break lines, (see Std. Dwg. RD722).
5. Curb ramp slopes shown are relative to the true level horizon (zero bubble).
6. Place detectable warning surface at the back of curb for a minimum depth of 2' in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.
7. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
8. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping, see Std. Dwg. RD721. Return curb shall not reduce width of approaching sidewalk.
9. Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be ≥ 8' wide, (see Std. Dwg. RD909 for additional details).
10. Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.
11. On or along state highways, curb and gutter is required at curb ramps.

LEGEND:

- Sidewalk
- Detectable warning surface
- Level area (Turning space/landing)
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (Longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a max. 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Running slope 7.5% max. (Max. 8.3% finished surface slope)
- Counter slope 4.0% max. ascending or descending, (Max. 5.0% finished surface slope) Slope as required for drainage
- Flare slope (Max. 10% finished surface slope)

CALC. BOOK NO. N/A

SDR DATE 14-JAN-2022

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

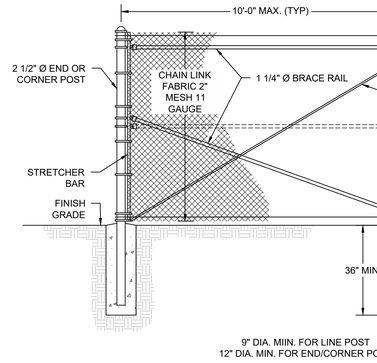
PERPENDICULAR CURB RAMP

2021

DATE	REVISION DESCRIPTION
07-2020	DRAWING CREATED
01-2022	REVISED NOTES

Effective Date: December 1, 2022 - May 31, 2023

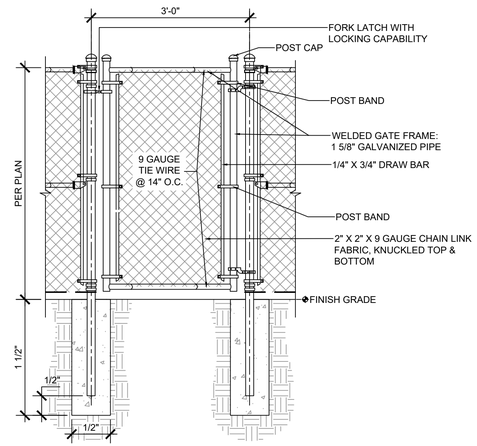
RD910



NOTES

1. SEE PLAN FOR FENCE HEIGHT.
2. CONCRETE SHALL BE COMMERCIAL GRADE.
3. CHAIN LINK FABRIC TOP AND BOTTOM SELVAGE SHALL BE KNUCKLED FINISH.
4. POSTS AND CHAIN LINK FENCE TO BE PAINTED BLACK.

341 **CHAIN LINK FENCE**
SCALE: NTS



NOTE

1. ALL WIRE FABRIC AND FENCE HARDWARE SHALL BE GALVANIZED.
2. FABRIC SHALL BE INSTALLED ON THE OUTSIDE.

345 **4 FT. CHAIN LINK GATE**
SCALE: NTS

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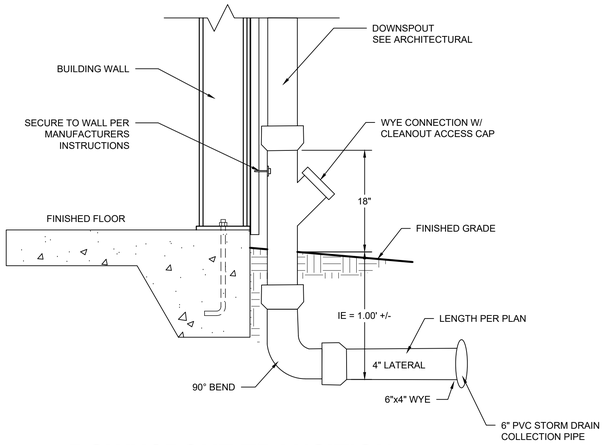
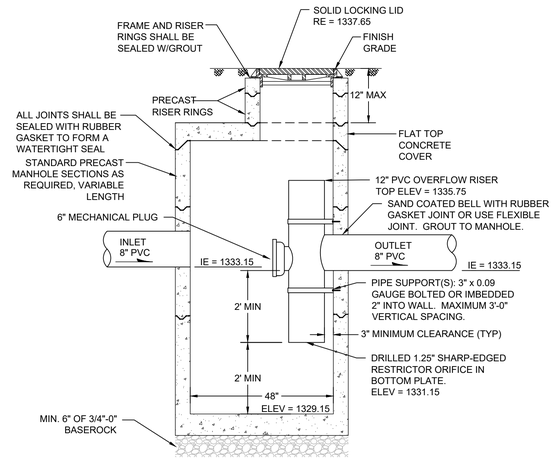


418 **DOWNSPOUT TRANSITION**

SCALE: NTS

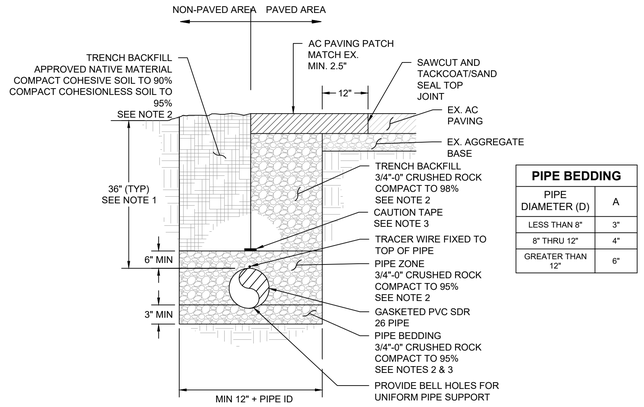


NOTE

ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C 478.

406 **CONTROL STRUCTURE MANHOLE**

SCALE: NTS



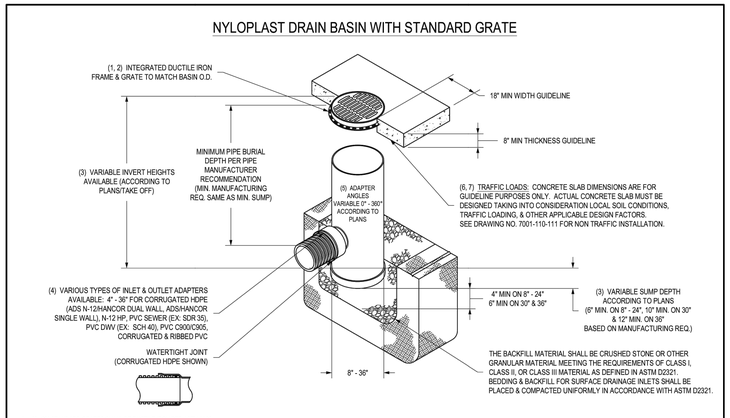
PIPE BEDDING	
PIPE DIAMETER (D)	A
LESS THAN 8"	3"
8" THRU 12"	4"
GREATER THAN 12"	6"

NOTES

1. COVER OVER PIPE MAY VARY FROM 36" MIN TO 42" MAX UPON APPROVAL FROM ENGINEER.
2. REQUIRED COMPACTION ACCORDING TO ASTM D 1557 MAXIMUM DRY DENSITY.
3. SEWER: 3" WIDE GREEN POLYETHYLENE TAPE IMPRINTED "CAUTION: BURIED SEWER LINE BELOW"

590 **SEWER TRENCH DETAIL**

SCALE: NTS



1 - 8" - 30" STANDARD GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - 12" - 30" FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05. 8" & 10" STANDARD GRATES FIT DIRECTLY ONTO DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" - 36").
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
6 - 12" - 30" STANDARD GRATES SHALL MEET H-20 LOAD RATING.
7 - 8" & 10" STANDARD GRATES ARE RATED FOR LIGHT DUTY APPLICATIONS ONLY; NO CONCRETE COLLAR NEEDED FOR LIGHT DUTY RATING.

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REVISED BY	NMH	PROJECT NO./NAME	
DATE	06-12-18		
DWG SIZE	A	SCALE 1:40	SHEET 1 OF 1

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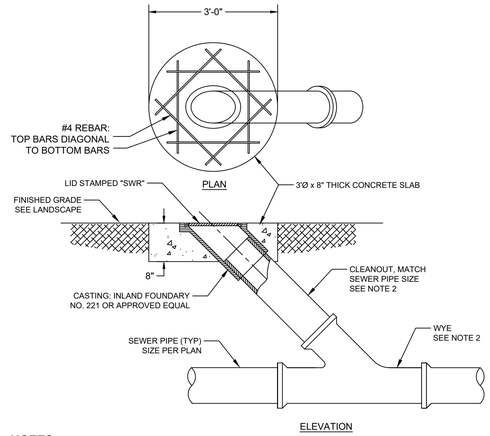
BUFORD, GA 30518
PHN (770) 932-3443
FAX (770) 932-2460
www.nyloplast-us.com

TITLE: DRAIN BASIN WITH STANDARD GRATE QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-144 REV J

408 **NYLOPLAST AREA DRAIN**

SCALE: NTS



NOTES

1. CONCRETE TO BE COMMERCIAL GRADE CONCRETE (CGC) PER 2015 ODOT STANDARD SPECIFICATIONS SECTION 00440. MINIMUM 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. FITTINGS AND PIPE TO BE GASKETED PVC SDR 26.

540 **TYPICAL CLEANOUT**

SCALE: NTS

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100% CD

Drawing Title

PROJECT DETAILS

Drawing No.

C6.1

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist® FOR STORMTECH® INSTALLATION INSTRUCTIONS VISIT OUR APP

TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING

WHITE CITY, OR, USA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD. THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM -6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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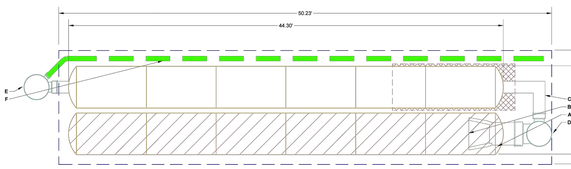
PROPOSED LAYOUT	PROPOSED ELEVATIONS		PART TYPE	ITEM OR LAYOUT	DESCRIPTION	*INVERT	MAX FLOW
12	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)	1344.19				
4	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)	1339.19				
4	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)	1337.69	EZ	PREFABRICATED EZ END CAP		
6	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF BASE/CONCRETE PAVEMENT)	1337.19				
35	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)	1337.69				
1072	INSTALLED SYSTEM VOLUME (CY) (PERIMETER STONE INCLUDED)	TOP OF STONE	1344.19				
		TOP OF SC-740 CHAMBER	1343.69				
	(BASE STONE INCLUDED)	12" BOTTOM CONNECTION INVERT	1339.19				
		12" BOTTOM CONNECTION INVERT	1339.19				
583	SYSTEM AREA (SF)	24" ISOLATOR ROW PLUS INVERT	1339.69				
123.7	SYSTEM PERIMETER (ft)	BOTTOM OF SC-740 CHAMBER	1339.69				
		UNDERDRAIN INVERT	1339.19				
		BOTTOM OF STONE	1339.19				

ITEM OR LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
A	24" BOTTOM PREFABRICATED EZ END CAP. PART#: SC740ECEZ / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	0.10"	
B	MINIMUM ADS "FLEXSTORM CATCH IT" INSERT		
B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: SC740245AMP		
C	12" x 12" TOP MANIFOLD. ADS N-12	12.50"	
D	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN
E	30" DIAMETER (DESIGN BY ENGINEER)		2.2 CFS OUT
F	9" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 12.50" OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES
- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.30 FOR MANIFOLD SIZING GUIDANCE.
- CUTTING FLEXSTORM AT THE JOINTS OF THE CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THE STORMTECH CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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StormTech® Chamber System — 888.892.2694 | WWW.STORMTECH.COM

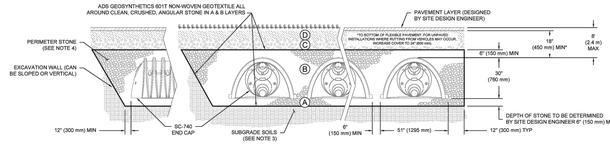
ADS — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1.800.733.7473

SHEET 2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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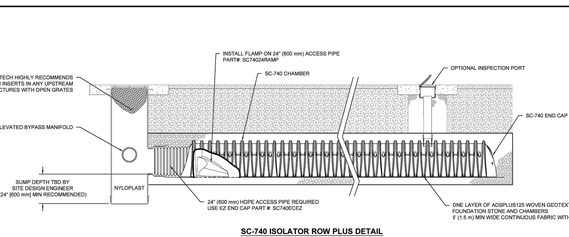
SHEET 3 OF 6



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A) INSPECTION PORTS (IF PRESENT)
  - A.1 REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2 REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3 USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4 LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5 IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B) ALL ISOLATOR PLUS ROWS
  - B.1 REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2 USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

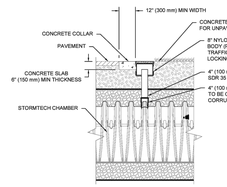
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)
NTS

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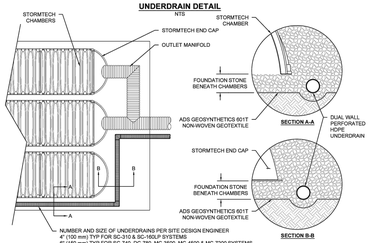
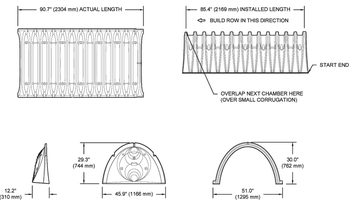
SHEET 4 OF 6

UNDERDRAIN DETAIL
NTS



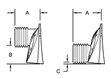
SC-740 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06BT / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			16.5" (419 mm)	0.5" (13 mm)
SC740EPE06T / SC740EPE06TPC				
SC740EPE08B / SC740EPE08BPC	8" (200 mm)	12.2" (310 mm)	---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.9" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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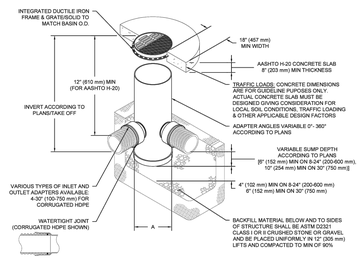
SHEET 5 OF 6

NYLOPLAST DRAIN BASIN
NTS



NOTES

1. 9.00" (600-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12.30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING — WHITE CITY, OR, USA — DRAWN: TP — CHECKED: N/A — DATE: — PROJECT #:

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ADS — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1.800.733.7473

SHEET 6 OF 6

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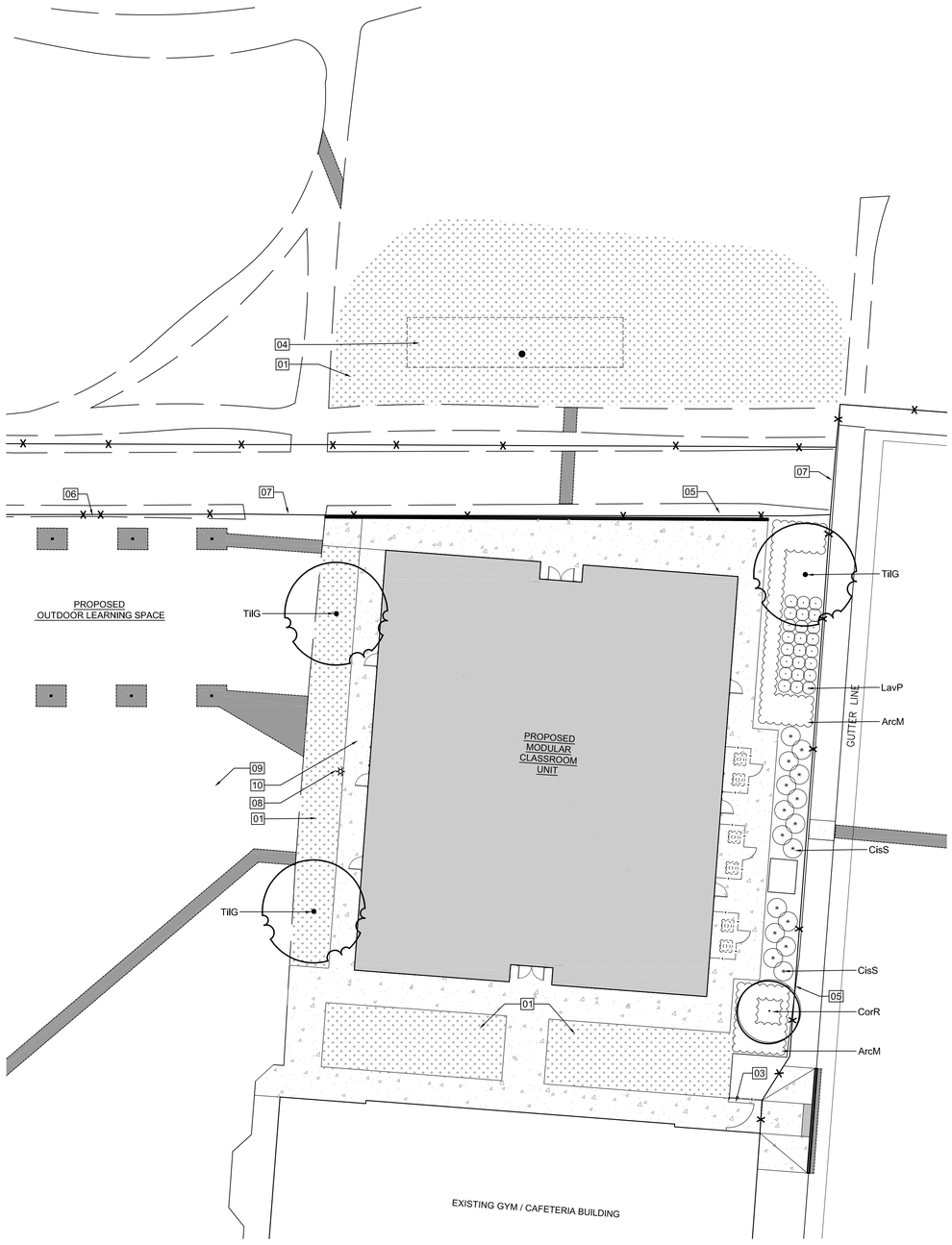


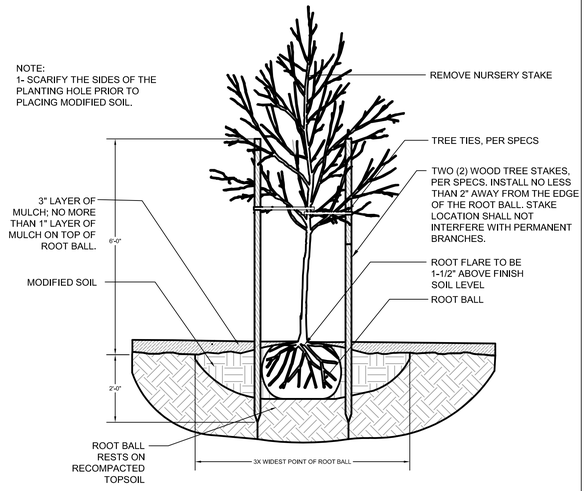
1 PLANTING PLAN

1" = 16'-0"

NORTH

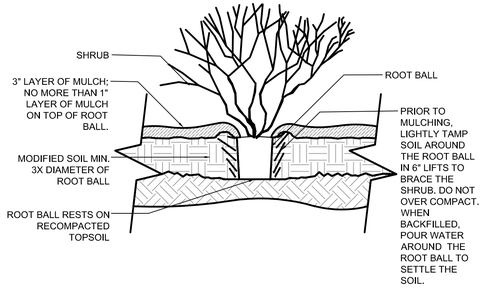
PLANT LIST

KEY	LATIN NAME	COMMON NAME	SIZE
TREES:			
CorR	CORNUS FLORIDA 'RUBRA'	PINK FLOWERING DOGWOOD	1.5" CAL
TilG	TILIA CORDATA 'GREENSPIRE'	LITTLE LEAF LINDEN	1.75" CAL
SHRUBS:			
ClsS	CISTUS 'SUNSET'	SUNSET ROCKROSE	3 GAL
LavP	LAVANDULA 'PROVENCE'	PROVENCE LAVENDER	1 GAL
GROUNDCOVERS:			
ArcM	ARCTOSTAPHYLOS UVA-URSI 'MASS'	KINNICKINNICK 'MASS.'	1 GAL



2 SHRUB PLANTING DETAIL, TYP.

1/2" = 1'-0"



3 SHRUB PLANTING DETAIL, TYP.

1/2" = 1'-0"

SHEET NOTES:

1. SEE CIVIL PLANS FOR PROPOSED UTILITY CONNECTIONS, GRADING, DRAINAGE, PROPOSED PAVED SURFACES, RAMPS, WALLS, AND STORMWATER SYSTEM.
2. EXAMINE SITE FOR CONDITIONS THAT WILL ADVERSELY EFFECT EXECUTION, PERFORMANCE, QUALITY OF WORK, AND SURVIVAL OF PLANT MATERIAL.
3. PROTECT UTILITY LINES AND SITE IMPROVEMENTS.
4. NEWLY DEVELOPED PLANTING BEDS TO RECEIVE 3" LAYER OF SHREDDED HEMLOCK OR FIR, 3/4" SCREENED, BARK MULCH.
5. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY THAT WILL NOT BE PLANTED ARE TO BE SEEDED WITH LAWN.
6. PROTECT PLANTS AGAINST DAMAGE AND DEHYDRATION.
7. STORE POTTED PLANT MATERIALS IN SHADE AND PROTECT AGAINST HARMFUL WEATHER.
8. NURSERY STOCK SHALL BE HEALTHY, WELL BRANCHED AND ROOTED, FULL FOLIAGE WHEN IN LEAD, FREE OF DISEASE, INJURY, INSECTS, WEEDS, AND WEED ROOTS.
9. WHERE DRAWING INDICATES ROW PLANTING, FURNISH PLANTS WITH MATCHING FORM.
10. REMOVE ALL GRAVEL, CONCRETE, AND CONSTRUCTION DEBRIS FROM PLANTING BEDS TO A MINIMUM DEPTH OF 12" BELOW FINISH GRADE.
11. PLACE 12" DEPTH OF TOPSOIL AT ALL NEW PLANTING BEDS. SPREAD 4" DEPTH OF COMPOST AND TILL INTO TOPSOIL TO A DEPTH OF 8".
12. FOLLOW PLANTING INSTRUCTIONS IN DETAILS 2 AND 3 FOR TREES AND SHRUBS.
13. PLACE MYCORRHIZAE TABLETS IN EACH PLANT PIT AT THE TIME OF PLANTING ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

KEYNOTES:

01	(N) SEEDED LAWN. PREPARE SOIL AND SEED ALL AREAS IMPACTED BY CONSTRUCTION UNLESS OTHERWISE NOTED.
02	(N) PLANTED AREA WITH SHRUBS, TREES, AND GROUNDCOVERS
03	(N) PANIC GATE, SEE DETAIL 2/G2.02
04	(N) UNDERGROUND STORMWATER SYSTEM, SEE CIVIL
05	(E) CHAIN LINK FENCE
06	(E) PEDESTRIAN GATE
07	(E) VEHICLE GATE
08	(E) LIGHT POST
09	(E) ASPHALT PLAYGROUND
10	(N) CONCRETE SIDEWALK, SEE CIVIL

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

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426 a street
ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6022
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
PLANTING PLAN

Drawing No.
L1

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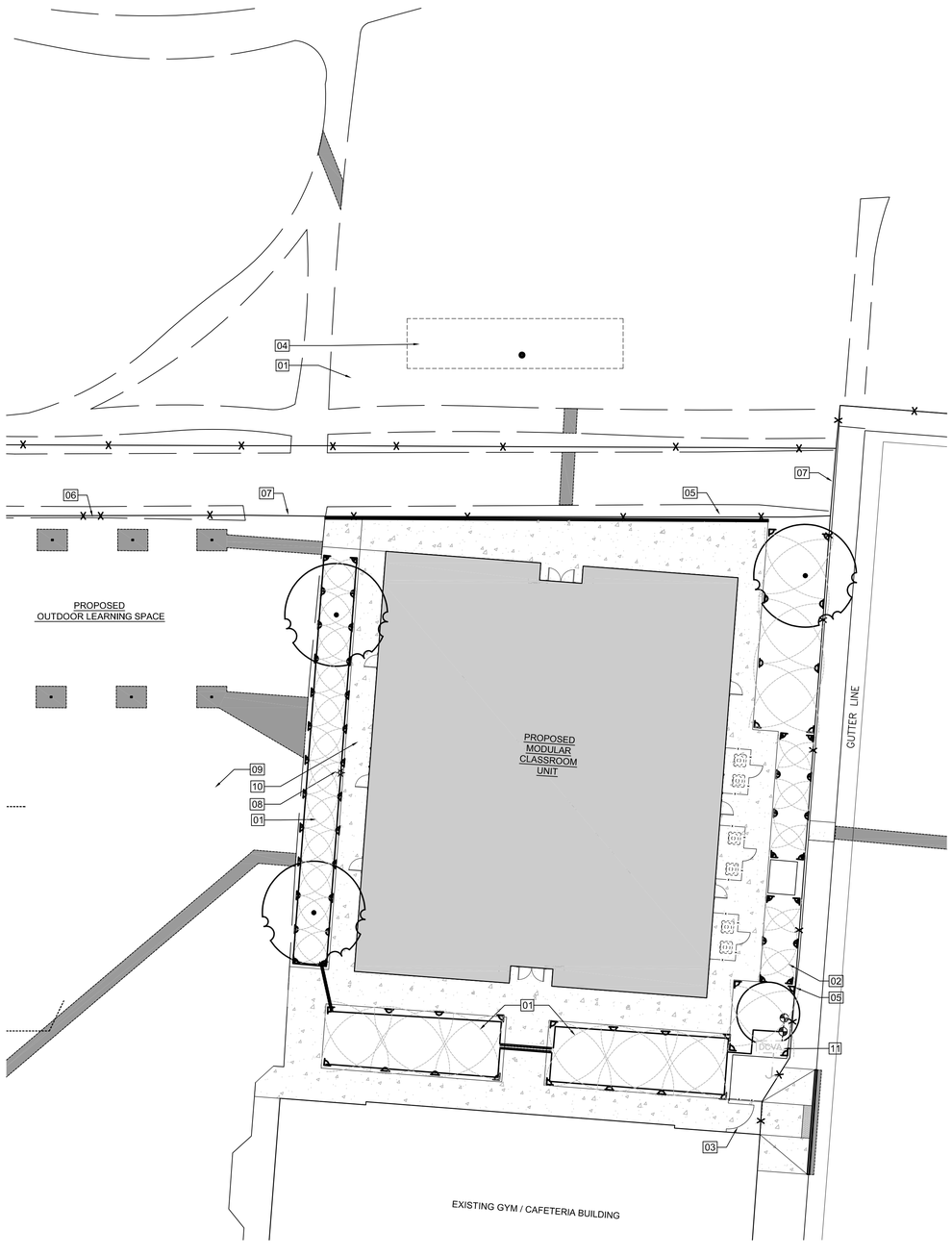

1 IRRIGATION PLAN

1" = 16'-0"

NORTH

IRRIGATION LEGEND

SYMBOL	RADIUS	ARC	GPM	PSI	MODEL
	15'	90°	.92	30	Rain Bird 15 Series MPR Nozzle
	15'	180°	1.85	30	Rain Bird 15 Series MPR Nozzle
	8'	90°	0.29	30	Rain Bird RD-S-P30-NP w/ 8 Series HE-VAN Nozzle
	8'	180°	0.59	30	Rain Bird RD-S-P30-NP w/ 8 Series HE-VAN Nozzle
	—	—	—	—	HUNTER ICV GLOBE VALVE w/ FLOW CONTROL.

SHEET NOTES:

1. IRRIGATION WILL BE AN AUTOMATIC SYSTEM AND WILL UTILIZE THE EXISTING MAIN LINE CONNECTIONS, VALVES, WIRE, AND BACKFLOW PREVENTION DEVICE OF THE ORIGINAL IRRIGATION SYSTEM WHEN POSSIBLE. IT IS THE CONTRACTORS RESPONSIBILITY TO ASSESS THE EXISTING IRRIGATION SYSTEM FOR ADAPTATION.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH GRADE DIFFERENCES, WALL/HARDSCAPE LOCATIONS, ETC. TO COORDINATE WORK FOR THE INSTALLATION OF IRRIGATION PIPE SLEEVES UNDER PAVEMENT.
3. CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF SUFFICIENTLY SIZED SLEEVES FOR CONTROL WIRES AND NON-PRESSURE LATERAL LINE PIPING UNDER PAVED AREAS, IN ADDITION TO CONTROL WIRES AND LATERAL LINE PIPING.
4. SELECT THE MOST APPROPRIATE PATTERN NOZZLE TO FIT THE SITE CONDITIONS AND ADJUST THE FLOW CONTROL TO OBTAIN OPTIMUM SPRINKLER HEAD PRESSURE.
5. SET SPRINKLER HEADS PERPENDICULAR TO FINISH GRADE AT ALL IRRIGATED AREAS.
6. PREVENT OVERSPRAY ONTO WALKS, ROADWAYS, WALLS, FENCES AND BUILDINGS.
7. IRRIGATION RECONFIGURED ACCORDING TO DISTRICT DURING CONSTRUCTION.

KEYNOTES:

01	(N) SEEDED LAWN. PREPARE SOIL AND SEED ALL AREAS IMPACTED BY CONSTRUCTION UNLESS OTHERWISE NOTED.
02	(N) PLANTED AREA WITH SHRUBS, TREES, AND GROUNDCOVERS
03	(N) PANIC GATE, SEE DETAIL 2/G2.02
04	(N) UNDERGROUND STORMWATER SYSTEM, SEE CIVIL
05	(E) CHAIN LINK FENCE
06	(E) PEDESTRIAN GATE
07	(E) VEHICLE GATE
08	(E) LIGHT POST
09	(E) ASPHALT PLAYGROUND
10	(N) CONCRETE SIDEWALK, SEE CIVIL
11	(E) IRRIGATION DOUBLE CHECK VALVE ASSEMBLY

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REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6028
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.29.23
Job	22-012
Drawn By	JKA
Checked By	
Scale	AS NOTED

100% CD

Drawing Title
IRRIGATION PLAN

Drawing No.
L2

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PROJECT GENERAL NOTES

1. THIS PROJECT IS A MODULAR BUILDING WITH COMPONENTS THAT ARE FACTORY INSTALLED BY THE MODULAR BUILDING MANUFACTURER, "MODERN BUILDING SYSTEMS" (MODERN). THROUGHOUT THE MECHANICAL SHEETS, THE TERM "FACTORY-INSTALLED" REFERS TO COMPONENTS PROVIDED BY MODERN IN THE FINISHED SPACES AND THE SUBROOF OR ENCLOSED CEILING SPACE (SEE THE MODERN BUILDING SYSTEM DRAWING SET). THE MECHANICAL CONTRACTOR SHALL CONNECT TO THE FACTORY-INSTALLED COMPONENTS WHERE CALLED OUR IN THE MECHANICAL DRAWINGS AND OTHER THAN THE FACTORY-INSTALLED COMPONENTS BY MODERN, THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO CONSTRUCT A COMPLETE, OPERATIONAL HVAC SYSTEM FOR THE ENTIRE PROJECT AS SHOWN ON THESE DRAWINGS, INCLUDING ALL NECESSARY FEES AND PERMITS.
2. CONTRACTOR SHALL PROVIDE SYSTEM TEST AND BALANCE ACCORDING TO THE AIR FLOWS SHOWN ON THE M-SHEETS FROM THE MODERN BUILDING SYSTEMS DRAWING SET.
3. THE ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE MOST RECENTLY ADOPTED BUILDING CODE, MECHANICAL CODE, PLUMBING CODE, ELECTRICAL CODE, AND ALL OTHER APPLICABLE CITY, COUNTY, STATE, AND FEDERAL CODES AND REGULATIONS IN EFFECT AT THE DATE OF THE BID. CONFORM TO ANY CODES, RULES, REGULATIONS AND REQUIREMENTS THAT THE PROJECT OWNER HAS. WHEREVER THE REQUIREMENTS OF THE SPECIFICATIONS OR DRAWINGS EXCEED THOSE OF THE ITEMS ABOVE, THE REQUIREMENTS OF THE SPECIFICATIONS OR DRAWINGS SHALL GOVERN.
4. WHERE THE MECHANICAL WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO, OR WILL INTERFERE WITH, WORK OF OTHER TRADES, THE CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT PRIOR TO COMMENCING WORK. IF THE CONTRACTOR INSTALLS HIS/HER WORK BEFORE COORDINATING WITH OTHER TRADES, SO AS TO CAUSE ANY INTERFERENCE WITH WORK OF OTHER TRADES, THE CONTRACTOR SHALL MAKE THE NECESSARY CHANGES IN HIS/HER WORK TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.
5. THE DRAWINGS SHOW THE GENERAL DESIGN, ARRANGEMENTS AND THE EXTENT OF THE SYSTEM. IT SHALL BE THE WORK OF THE CONTRACTOR TO MAKE SUCH SLIGHT ALTERATIONS AS MAY BE NECESSARY TO MAKE THE SYSTEM COMPLETE AND OPERATIONAL IN ACCORDANCE WITH THE DESIGN INTENT. MAJOR DEVIATIONS SUCH AS CHANGES IN COMPONENT SIZES, WEIGHTS, QUANTITIES, OR MATERIAL REQUIRE PRIOR APPROVAL BY THE CONSULTING ENGINEER.
6. CONTRACTORS AND SUB-CONTRACTORS SHALL CAREFULLY REVIEW THE CONSTRUCTION DOCUMENTS. INFORMATION REGARDING THE COMPLETE WORK IS DISPERSED THROUGHOUT THE DOCUMENT SET AND CANNOT BE ACCURATELY DETERMINED WITHOUT REFERENCE TO THE COMPLETE DOCUMENT SET.
7. THE WORKING DRAWINGS ARE DIAGRAMMATIC. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW NECESSARY FOR THE COMPLETE INSTALLATION IN THE SPACE PROVIDED. ALL LOCATIONS FOR HVAC EQUIPMENT AND PIPING SHALL BE CHECKED AND COORDINATED WITH THE ARCHITECTURAL, MECHANICAL, STRUCTURAL AND ELECTRICAL DRAWINGS.
8. THE DRAWINGS AND SPECIFICATIONS HAVE BEEN PREPARED TO SUPPLEMENT EACH OTHER AND THEY SHALL BE INTERPRETED AS AN INTEGRAL UNIT WITH THE ITEMS SHOWN ON ONE AND NOT THE OTHER BEING FURNISHED AND INSTALLED AS THOUGH SHOWN AND CALLED OUT IN BOTH.
9. DETAILS: THE CONTRACTOR IS RESPONSIBLE TO REVIEW AND USE WHERE APPROPRIATE ALL OF THE MECHANICAL DETAILS SHOWN ON THE DRAWINGS. DETAILS MAY OR MAY NOT BE CALLED OUT ON THE DRAWINGS WITH SYMBOLS OR KEYED NOTES. ANY CHANGES RESULTING FROM FAILURE TO INSTALL THE MECHANICAL SYSTEM WITHOUT USING THE INCLUDED DETAILS IS THE RESPONSIBILITY OF THE CONTRACTOR.
10. SHEET METAL DUCT SIZES SHOWN ARE NET CLEAR INSIDE DIMENSIONS. WHEN INTERNAL INSULATION IS REQUIRED, DUCT SIZE SHALL BE INCREASED TO PROVIDE NET CLEAR DIMENSIONS INDICATED.
11. CONTRACTOR SHALL INSTALL EXPOSED DUCTWORK IN A NEAT AND CLEAN MANNER AND UTILIZE SPIRAL DUCTWORK WHERE POSSIBLE. SCRATCHED OR DENTED DUCTWORK SHALL BE REPLACED. THE ARCHITECT AND/OR ENGINEER SHALL BE THE FINAL JUDGE OF ACCEPTANCE.
12. PROVIDE LOCKING-TYPE TAMPER-RESISTANT CAPS FOR ALL REFRIGERANT CIRCUIT ACCESS PORTS LOCATED OUTDOORS.
13. DUCTWORK INSULATION:
    - A. ALL SUPPLY AND RETURN AIR DUCTS IN UNCONDITIONED SPACES AND PLENUMS (ABOVE CEILINGS, WITHIN CHASES, SHAFTS, OR MECHANICAL ROOMS) AND WITHIN THE BUILDING ENVELOPE SHALL BE INSULATED WITH 2" THICK FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 1-1/2" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 6.
    - B. ALL OUTSIDE AIR DUCTS IN UNCONDITIONED SPACES AND PLENUMS (ABOVE CEILINGS, WITHIN CHASES, SHAFTS, OR MECHANICAL ROOMS) AND WITHIN THE BUILDING ENVELOPE SHALL BE INSULATED WITH 1-1/2" THICK, 3/4 LB. DENSITY, FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 1/2" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 1.9.
    - C. ALL SUPPLY AND RETURN AIR DUCTS IN VENTED SPACES (ATTICS, CRAWLSPACES, VENTED MECHANICAL ROOMS) OUTSIDE THE BUILDING ENVELOPE SHALL BE INSULATED WITH 3" THICK FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 2" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 8.0.
    - D. PROVIDE 1" THICK (MINIMUM) INTERNAL SOUND ATTENUATING INSULATION MINIMUM 10' UPSTREAM AND DOWNSTREAM OF AIR HANDLING EQUIPMENT. JOHNS MANVILLE LINACOUSTIC RC, OR EQUAL.
13. PROVIDE FLEXIBLE DUCT CONNECTORS WHERE DUCTS CONNECT TO AIR HANDLING EQUIPMENT.
14. ANY PART OF THIS INSTALLATION THAT FAILS, IS UNFIT, OR BECOMES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
15. ALL EQUIPMENT SHALL PROVIDE THE SCHEDULED PERFORMANCE AT THE SITE ALTITUDE. ALL MANUFACTURERS' SUBMITTAL DATA SHEETS SHALL SHOW PERFORMANCE AT SITE ALTITUDE.
16. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, VALVES, DAMPERS, AND OTHER DEVICES AND ACCESSORIES REQUIRED FOR A COMPLETE, WORKABLE INSTALLATION.
17. ALL MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING MUST BE SEISMICALLY BRACED FOR THE SITE SPECIFIC SEISMIC DESIGN CATEGORY AND SEISMIC USE GROUP, IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE OSSC, OMSC, ASHRAE, AND SMACNA. COORDINATE SITE SPECIFIC SEISMIC REQUIREMENTS WITH STRUCTURAL ENGINEER AND/OR ARCHITECT. PROVIDE SEISMIC PRODUCTS BY AMBER-BOOTH OR MASON INDUSTRIES. CONTRACTOR MANUFACTURED SEISMIC BRACING/RESTRAINT METHODS ARE NOT ACCEPTABLE. PROVIDE A SIGNED AND STAMPED LETTER FROM A PROFESSIONAL ENGINEER CERTIFYING THAT THE SUPPLIED PRODUCTS ARE CORRECT FOR THE APPLICATION AND THAT THE INSTALLATION IS IN COMPLIANCE WITH ALL APPLICABLE CODES.
18. TEST THE OPERATION OF MECHANICAL SYSTEMS AND EQUIPMENT FOR COMPLIANCE WITH CONTRACT CONDITIONS. MEASURE AIR QUANTITIES WITH CALIBRATED DEVICES CAPABLE OF MEASURING AIR QUANTITIES ON A CONTINUOUS BASIS AND DISPLAYING THAT QUANTITY ON A READILY ACCESSIBLE DISPLAY DEVICE. ADJUST ALL DAMPERS, DRIVES, MOTORS, AND OTHER ADJUSTABLE ITEMS TO DELIVER DESIGN QUANTITIES IN ACCORDANCE WITH NEBB PROCEDURAL STANDARDS (1983) OR AABC NATIONAL STANDARDS (1989). PROVIDE ALL NECESSARY BELTS, SHEAVES, ETC. PROVIDE BALANCE REPORT TO OWNER AND ENGINEER.
19. PROPERLY LUBRICATE ALL PIECES OF EQUIPMENT BEFORE TURNING THE SYSTEM OVER TO THE OWNER.
20. TWO OPERATING AND MAINTENANCE MANUALS SHALL BE PROVIDED IN HARD BACK LOOSE LEAF BINDERS. MANUALS SHALL CONTAIN PRODUCT CUT SHEETS AND OPERATING AND MAINTENANCE INSTRUCTIONS ON ALL EQUIPMENT, ACCESSORIES, FIXTURES, VALVES, ETC., PROVIDED FOR THE PROJECT. PROVIDE LIST OF EQUIPMENT WITH ALL NAMEPLATE DATA INCLUDING TAG #, MODEL NUMBER, SERIAL NUMBER, AND NAME OF LOCAL REPLACEMENT PARTS SUPPLIER.
21. UPON COMPLETION OF THE WORK, REMOVE ALL SURPLUS MATERIALS AND RUBBISH. MAKE ALL REQUIRED PATCHING AND REPAIRS OF OTHER TRADES' WORK DAMAGED BY THE MECHANICAL CONTRACTOR, AND LEAVE THE PREMISES IN A CLEAN, ORDERLY CONDITION.
22. THE MECHANICAL CONTRACTOR SHALL OPERATE THE SYSTEM AND DEMONSTRATE ALL ASPECTS TO THE ENGINEER AND/OR OWNER, TO PROVE ITS OPERATION. ALL FILTERS USED DURING CONSTRUCTION SHALL BE REPLACED PRIOR TO THE TEST RUN PERIOD.
23. A MINIMUM OF TWO (2) HOURS OF O&M INSTRUCTIONS SHALL BE PROVIDED FOR EQUIPMENT AND CONTROL SYSTEMS. A SIGNED STATEMENT FROM THE OWNER'S REPRESENTATIVE SHALL ACKNOWLEDGE SUCH TRAINING. A FOUR (4) HOUR FOLLOW-UP SESSION SHALL BE PROVIDED NOT SOONER THAN 30 DAYS NOR LATER THAN 90 DAYS FOLLOWING THE EIGHT HOUR SESSION.
24. THE MECHANICAL CONTRACTOR SHALL GUARANTEE THE HVAC SYSTEM FOR A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.
25. THE CONTRACTOR SHALL, DURING CONSTRUCTION, MAINTAIN A SET OF AS-BUILT REDLINED RECORD DRAWINGS AT THE PROJECT SITE. ALL CHANGES IN LAYOUT, ROUTING, EQUIPMENT, COMPONENTS, AND ACCESSORIES SHALL BE RECORDED. THE CONTRACTOR IS RESPONSIBLE FOR CONVERTING THE CONSTRUCTION REDLINE DRAWINGS INTO "AS BUILT" DRAWINGS USING AUTOCAD BACKGROUNDS PROVIDED BY THE ENGINEER. IF THE CONTRACTOR DOES NOT HAVE AUTOCAD DRAFTING CAPABILITIES, THE CONTRACTOR SHALL HIRE THE ENGINEER TO PRODUCE THE "AS BUILT" DRAWINGS FROM HIS FIELD REDLINES. COMPLETED AUTOCAD "AS BUILTS" SHALL BE GIVEN TO THE ARCHITECT/ENGINEER AFTER THE FINAL INSPECTION.

GENERAL SYMBOLS

- R — REFRIGERANT PIPING
- NG — NATURAL GAS PIPING
- CHWS — CHILLED WATER SUPPLY
- CHWR — CHILLED WATER RETURN
- CD — CONDENSATE DRAIN PIPING
- HWS — HOT WATER SUPPLY
- HWR — HOT WATER RETURN
- DIRECTION OF FLOW
- CHANGE IN SIZE
- PIPE DOWN
- PIPE UP
- TEE DOWN
- TEE UP
- CAP
- PIPE UNION
- GATE VALVE
- BALL VALVE
- PRESSURE GAUGE
- TEMPERATURE GAUGE GAUGE
- PRESSURE REDUCING VALVE
- PRESSURE & TEMPERATURE GAUGE PORT
- BALANCING VALVE
- PUMP
- GLOBE VALVE
- CHECK VALVE
- SAFETY RELIEF VALVE
- TWO WAY CONTROL VALVE
- THREE WAY CONTROL VALVE
- STRAINER

GENERAL SYMBOLS

- (C) — CAP FOR FUTURE
- POINT OF NEW CONNECTION
- REVISION NUMBER
- XX — POINT OF CONTINUATION
- XX / XX — EQUIPMENT TAG, EQUIPMENT NUMBER
- 1 / – — SECTION (LETTER) OR DETAIL (NUMERICAL) DESIGNATION, SHEET NUMBER
- 1 / – — SECTION DESIGNATION, SHEET NUMBER
- GPM | X" — PIPE SIZE AND FLOW TAG
- GENERAL BREAK
- LINE BREAK
- ON DEMOLITION PLANS, INDICATES ITEMS TO BE REMOVED
- 1 — KEYED NOTES
- (E) — EXISTING
- (F) — FUTURE

HVAC SYMBOLS

- DUCT WITH INTERNAL ACOUSTICAL INSULATION
- AD — ACCESS DOOR
- VOLUME DAMPER
- FSD — COMBINATION FIRE / SMOKE DAMPER
- FD — FIRE DAMPER
- FD, M — VERTICAL FIRE DAMPER
- M — MOTORIZED DAMPER
- BD — BACKDRAFT DAMPER
- OPPOSED BLADE DAMPER
- PARALLEL BLADE DAMPER
- FLEXIBLE DUCT CONNECTION
- FLEXIBLE DUCT
- DIRECTION OF AIRFLOW
- SUPPLY DIFFUSER
- RETURN GRILLE
- EXHAUST GRILLE
- PRESSURE RELIEF GRILLE
- WALL OR DUCT REGISTER OR GRILLE
- or — LINEAR DIFFUSER
- FILTER
- AD — CEILING ACCESS DOOR
- T — TEMPERATURE GAUGE
- P — PRESSURE GAUGE
- XX / XXX, (F) — OUTLET / INLET TAG; AIRFLOW, CFM; PREFIX (F) INDICATES A FIRE RATED GRILLE, REGISTER, OR DIFFUSER
- H — HUMIDISTAT OR HUMIDITY SENSOR
- T — THERMOSTAT OR TEMP SENSOR
- SD — DUCT SMOKE DETECTOR
- CO2 — CARBON DIOXIDE SENSOR

DUCT SYMBOLS

- SA — SUPPLY AIR
- RA — RETURN AIR
- OSA — OUTSIDE AIR
- EA — EXHAUST/RELIEF AIR
- 12x12 — RECTANGULAR DUCT FIRST DIMENSION IS WIDTH IN PLAN VIEW, SECOND DIMENSION IS HEIGHT. ALL GIVEN IN INCHES
- 12"Ø — ROUND DUCT DIAMETER
- 48x18Ø — FLAT OVAL DUCT
- SUPPLY DUCT UP OR SECTION
- SUPPLY DUCT DOWN OR SECTION AWAY
- RETURN OR OSA DUCT UP OR SECTION
- RETURN OR OSA DUCT DOWN OR SECTION
- EXHAUST DUCT UP OR SECTION
- EXHAUST DUCT DOWN OR SECTION
- TRANSITION
- SQR / RND — SQUARE TO ROUND TRANSITION
- FLANGED TAKEOFF (RECTANGULAR DUCT)
- LATERAL HIGH EFFICIENCY TAKE-OFF FITTING W / VD (SQR TO RND TAKEOFF FROM RECTANGULAR MAIN)
- CONICAL 90° TAKE-OFF (ROUND / OVAL DUCT)
- 45° LATERAL TAKE-OFF (ROUND / OVAL DUCT)
- R — DUCT SLOPE UP (RISE)
- D — DUCT SLOPE DOWN (DROP)
- END CAP
- RECTANGULAR MITERED ELBOW W/ TURNING VANES
- RECTANGULAR TEE - 90° MITERED ELBOWS W/ TURNING VANES
- R, D or W — 90° OR 45° LONG RADIUS ELBOW, R=1.5 DIA OR WIDTH (ROUND OR RECTANGULAR DUCT)

ABBREVIATIONS

ACH	AIR CHANGES PER HOUR
AD	ACCESS DOOR
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
ARCH	ARCHITECT OR ARCHITECTURAL
BD	BACKDRAFT DAMPER
BLDG	BUILDING
BM	BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STEEL
BTU	BRITISH THERMAL UNIT
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CONSTR	CONSTRUCTION
CV	CONSTRAINT VOLUME
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVATION
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
°F	FAHRENHEIT
FD	FIRE DAMPER
FLR	FLOOR
FPM	FEET PER MINUTE
FSD	COMBINATION FIRE / SMOKE DAMPER
GALV	GALVANIZED STEEL
GC	GENERAL CONTRACTOR
GM	GAS METER
GPM	GALLONS PER MINUTE
GRD	GRILLES, REGISTERS, DIFFUSERS
HEPA	HIGH EFFICIENCY PARTICULATE AIR
HP	HORSEPOWER
HVAC	HEATING, VENTING, AND CONDITIONING
HPW	HEAT PUMP WATER
HPWR	HEAT PUMP WATER RETURN
HPWS	HEAT PUMP WATER SUPPLY
LB(S)	POUND, POUNDS
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MBS	MODERN BUILDING SYSTEMS
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
NC	NORMALLY CLOSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OA/OSA	OUTSIDE AIR
OMSC	2022 OREGON MECHANICAL SPECIALTY CODE
OSSC	2022 OREGON STRUCTURAL SPECIALTY CODE
PBD	PARALLEL BLADE DAMPER
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RECT	RECTANGULAR
RPM	REVOLUTIONS PER MINUTE
REQ'D	REQUIRED
SA	SUPPLY AIR
SCFM	STANDARD CUBIC FEET PER MINUTE
SF/SQ FT	SQUARE FEET
SIM	SIMILAR
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPEC	SPECIFICATION OR SPECIFIED
SS	STAINLESS STEEL
STD	STANDARD
T	THERMOSTAT
TA	TRANSFER AIR
TEMP	TEMPERATURE
TOS	TOP OF STEEL
TYP	TYPICAL
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB
W/	WITH
WG	WATER GAUGE

SHEET LIST

M1.01 MECHANICAL LEGEND AND GENERAL NOTES
M2.01 MECHANICAL PLAN
M3.01 MECHANICAL SCHEDULES AND DETAILS

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

inSIGHT CONSULTING ENGINEERS
3732 CHERRY LANE
MEDFORD, OR 97504
C. 563-272-1364

REGISTERED PROFESSIONAL ENGINEER
95573PE
OREGON
NOV. 12, 2015
AARON M. MUELLER
EXPIRES: 12/31/24

Revision	Date

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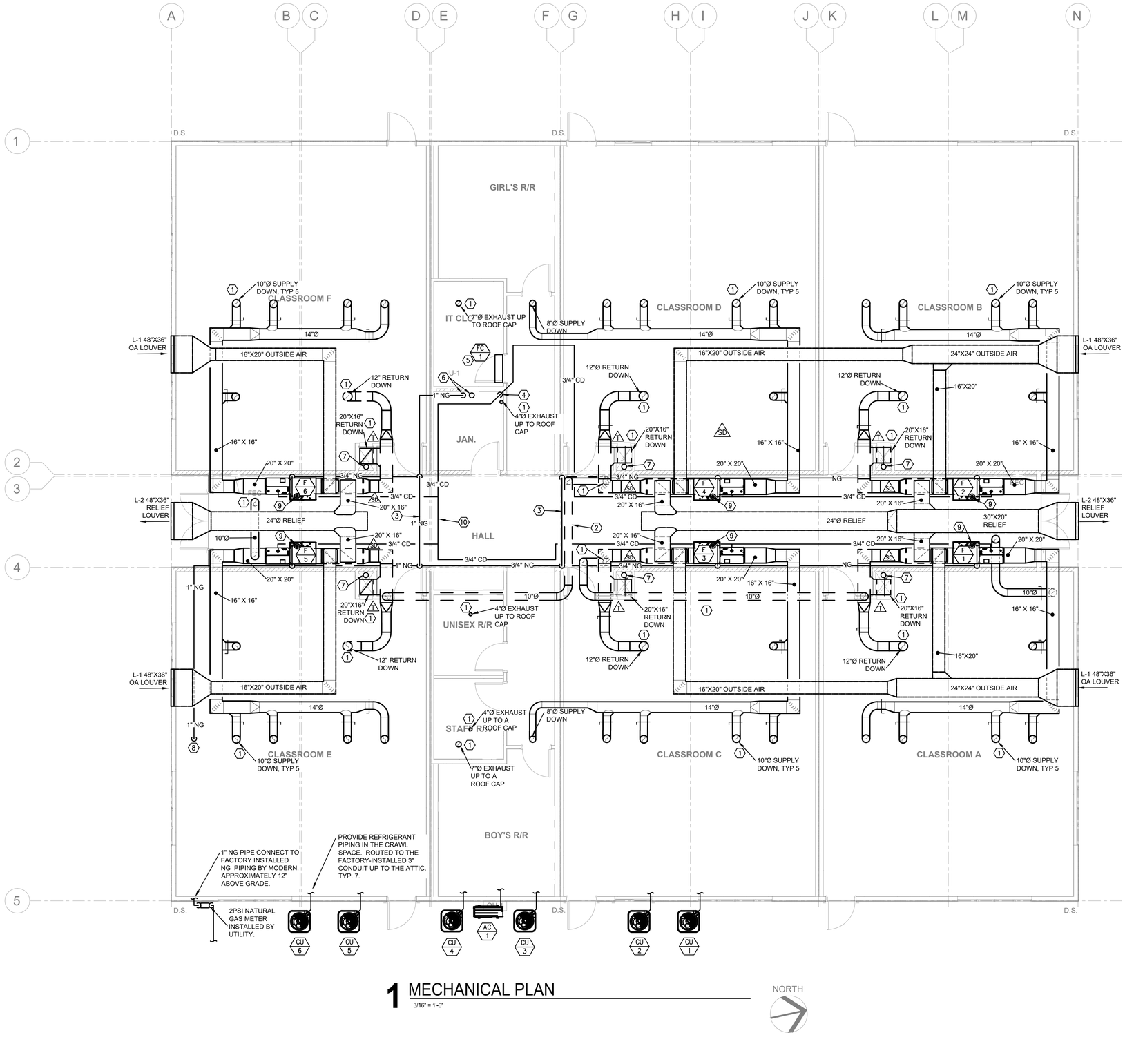
Drawing Title
MECHANICAL LEGEND AND GENERAL NOTES

Drawing No.
M1.01



1 MECHANICAL PLAN

3/16" = 1'-0"

NORTH

SHEET NOTES

A. UNLESS OTHERWISE NOTED, ALL MECHANICAL SYSTEMS SHOWN ON THIS DRAWING SHALL BE INSTALLED IN THE ATTIC.

B. THE MODULAR BUILDING MANUFACTURER (MODERN) IS PROVIDING MANY FACTORY-INSTALLED HVAC COMPONENTS IN THE FINISHED AREAS AND IN THE SUB-ROOF TO MINIMIZE IMPACT TO FINISHES DURING FIELD INSTALLATION. THESE FACTORY-INSTALLED COMPONENTS INCLUDE:
- B.A. GRILLES AND DIFFUSERS.
- B.B. INSULATED DUCTWORK IN THE SUB-ATTIC AND WALL CHASES.
- B.C. CONDUITS THROUGH THE FINISHED WALLS FOR USE BY THE MECHANICAL CONTRACTOR TO FIELD-INSTALL REFRIGERANT PIPING AND THERMOSTAT WIRING.
- B.D. CONDENSATE PIPING DOWN TO THE MOP SINK.
- B.E. EXHAUST FANS AND EXHAUST DUCTWORK.
- B.F. WATER HEATER CONCENTRIC VENTING.

C. HVAC CONTRACTOR SHALL INSULATE WITH A MINIMUM 3" ON RETURN, SUPPLY, AND OUTSIDE AIR DUCTWORK. EXHAUST DUCTS SHALL HAVE 3" INSULATION FROM EXTERIOR LOUVER TO MOTORIZED DAMPER.

D. THE FIRST 10' OF SUPPLY AND RETURN DUCTS AT EACH FURNACE SHALL HAVE 1" SOUND LINER. DUCT SIZES SHOWN ARE THE INSIDE CLEAR DIMENSION.

E. PROVIDE NATURAL GAS WITH A GAS REGULATOR FOR EACH FURNACE, AND PROVIDE CONDENSATE DRAINS FROM EACH FURNACE TO AN INDIRECT WASTE.

F. PROVIDE RETURN AIR SMOKE DETECTORS FOR EACH UNIT.

G. FURNACES IN THE ATTIC SHALL BE SUSPENDED FROM THE STRUCTURE ABOVE. MECHANICAL CONTRACTOR SHALL PROVIDE ENGINEERED SEISMIC BRACING.

H. SEE MODERN BUILDING SYSTEMS DRAWING SET FOR AIRFLOWS. CONTRACTOR SHALL BALANCE THE SYSTEM ACCORDING TO THE AIRFLOWS LISTED ON THE MODERN BUILDING SYSTEM M SHEETS.

KEY NOTES

1. POINT OF CONNECTION WITH THE FACTORY-INSTALLED MODERN BUILDING SYSTEM DUCTS IN THE SUB-ROOF.
2. INSTALL DUCT AS HIGH AS POSSIBLE ACROSS THE MEZZANINE.
3. INSTALL NG PIPING ACROSS THE MEZZANINE AGAINST THE DRAFT STOP ABOVE THE ACCESS DOORWAY.
4. CONDENSATE DRAINS SHALL BE INSTALLED IN THE ATTIC WITH A MINIMUM 1/4" PER FOOT SLOPE. CONNECT TO THE 1" FACTORY-INSTALLED CONDENSATE PIPING THAT DRAINS TO THE MOP SINK IN THIS LOCATION.
5. INSTALL FC-1 ABOVE THE DOOR IN THE IT CLOSET. ROUTE REFRIGERANT PIPING DOWN FROM THE ATTIC THROUGH THE FACTORY INSTALLED CONDUIT PROVIDED BY MODERN. INSTALL GRAVITY CONDENSATE DRAIN TO THE ADJACENT MOP SINK.
6. PROVIDE 3"/5" WATER HEATER CONCENTRIC VENT THROUGH THE ROOF TO ROOF CAP. PROVIDE 1" NG PIPING. CONNECT, IN THIS LOCATION, TO FACTORY-INSTALLED CONCENTRIC VENT AND NG PIPING FOR THE WATER HEATER (BY MODERN).
7. 3" FACTORY-INSTALLED CONDUIT FOR USE BY THE MECHANICAL CONTRACTOR TO ROUTE REFRIGERANT LINES THROUGH THE FINISHED SPACE.
8. 1" NG PIPING SHALL CONNECT WITH THE FACTORY-INSTALLED PIPING IN THE SUBROOF BY MODERN.
9. PROVIDE FLUE AND COMBUSTION AIR FOR UP THROUGH THE ROOF WITH A CONCENTRIC VENT.
10. WHERE CONDENSATE DRAINS ARE INSTALLED BELOW DOORWAYS THROUGH THE DRAFTSTOP, ROUTE CONDENSATE PIPING ALONG FLOOR, DROP INTO SUB ROOF AS REQUIRED TO MINIMIZE TRIP HAZARDS.

1' 2' 4'

SCALE 3/16"=1'

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MECHANICAL PLAN

Drawing No.

M2.01

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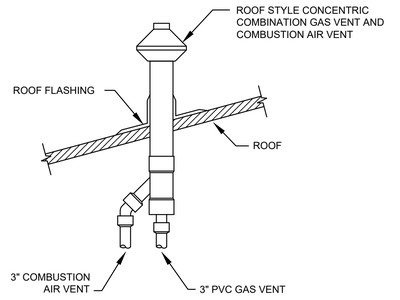


2 CONCENTRIC ROOF VENT
NTS

SPLIT SYSTEM SCHEDULE: DX COOLING WITH FURNACE

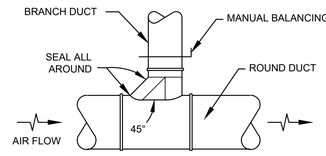
FURNACE/ COIL TAG	COND UNIT TAG	TYPE	AIR FLOW (CFM)	MIN. OUTSIDE AIR (CFM)	ESP (IN)	FURNACE							AIR CONDITIONING								MANUFACTURER	FURNACE MODEL	COIL MODEL	CONDENSING UNIT MODEL	NOTES
						HEATING FUEL	HEATING CAPACITY		% AFUE	ELECTRICAL			REFRIG-ERANT	NOMINAL CAPACITY (TONS CLG)	COOLING CAPACITY		MIN. SEER	ELECTRICAL								
							INPUT (MBH)	OUTPUT (MBH)		VOLTS	PHASE	MOCP			TOTAL (BTUH)	SENS. (BTUH)		VOLTS	PHASE	MCA	MOCP					
F-1	CU-1	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
F-2	CU-2	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
F-3	CU-3	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
F-4	CU-4	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
F-5	CU-5	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
F-6	CU-6	HORIZONTAL	1,600	220	0.9	N.G.	60	58	96.0	120	1	15	R410A	4.0	48,000	46,000	14	208/230	3	18	30	TRANE	S9X2B060U	4TXCB006	4TTA4048A3	1
NOTES:	1. PROVIDE WITH 7-DAY COMMUNICATING PROGRAMMABLE THERMOSTAT WITH C02 SENSOR, FREEZESTAT, CONCENTRIC VENT KITS, RETURN AIR SMOKE DETECTOR, CONDENSATE NEUTRELIZERS, COMPRESSOR ANTI-SHORT TIMER, HARD START KIT, HORIZONTAL FILTER KIT, STAINLESS STEEL HEAT EXCHANGERS.																								
	2. PROVIDE WITH BUILT-UP LOW-LEAK ECONOMIZER, INCLUDING DAMPERS, ACTUATORS, TEMPERATURE SENSOR, CONTROLLER WITH FAULT DETECTION DIAGNOSTICS, OUTSIDE AIR TEMPERATURE SENSOR. WHEN NOT IN ECONOMIZER MODE THR CONTROLLER SHALL OPERATE IN DEMAND CONTROL VENTILATION MODE MODULATING THE OA DAMPER BETWEEN THE MINIMUM SCHEDULED OUTSIDE AIR AND 600CFM OF OUTSIED AIR BASED ON THE CO2 PPM (800 PPM OF CO2 SHALL BE THE BASELINE CONDITION TO BEGIN DCV).																								

DIFFUSER AND GRILLE SCHEDULE

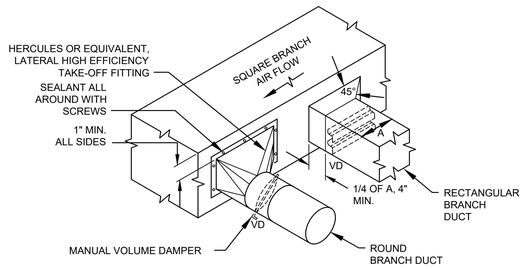
TAG	TYPE	INLET SIZE	MFGR	MODEL	NOTES
L-1	OUTSIDE AIR	48x36	GREENHECK	ESP-435	1
L-2	RELIEF	48x36	GREENHECK	ESP-435	1
NOTES:	1. PROVIDE WITH BIRD SCREEN AND GRAVITY BACKDRAFT DAMPER.				

DUCT-LESS SPLIT SYSTEM SCHEDULE

TAG	TYPE	BTU	ELECTRICAL				SEER	MANUFACTURER	MODEL	NOTES
			VOLTS	PHASE	MCA	MOCP				
FC-1	FAN COIL - WALL MOUNT	24,000	208-230	1	1.0	25	21.4	MITSUBISHI	PKA-A24LA	1
AC-1	COOLING-ONLY CONDENSER	24,000	208-230	1	19.0			MITSUBISHI	PUY-A24NKA7	
NOTES:	1. PROVIDE 24V, WALL MOUNT THERMOSTAT AND WIND BAFFLE FOR LOW-AMBIENT COOLING.									



1 ROUND COMBINATION TEE
NTS



4 LOW PRESSURE SQUARE AND ROUND BRANCH TAKE-OFF
NTS

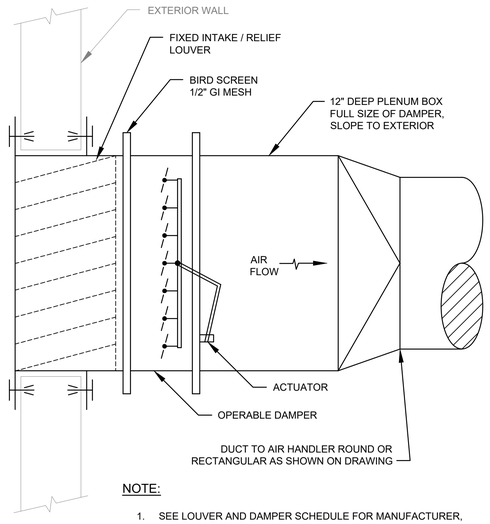
OUTSIDE AIR SCHEDULE

SYSTEM TAG	ZONE	SPACE TYPE	AREA SQ.FT. (Az)	ZONE POP. (Pz)	CFM/ PERSON (Rp)	CFM/ SQFT (Ra)	Pz*Rp	Az*Ra	EFFECTIVE-NESS (Ez)	ZONE OA (Voz)	AIRFLOW TO ZONE		PRIMARY OA FRACTION (Zp)	CODE EXHAUST		DESIGN EXHAUST CFM
											PRIMARY (Vpz)	MIN (Vpzm)		CFM/ SQ.FT.	CFM/ROOM OR /FIXTURE	
F-1, 5	Zone 1	CLASSROOMS (AGE 9 PLUS)	980	34.3	10	0.12	343	117.6	1	461	1,200	1,200	1200.00	0.00	0	0
	Zone 2	CORRIDORS	370	0	0	0.06	0	22.2	0.8	28	400	400	400.00	0.00	0	0
		TOTALS:	1,350	34.3							1,600	1,600				50
		SYSTEM POPULATION (Ps)	30													
		DIVERSITY (D)	0.9													
		UNCORRECTED OSA (Vou)	440													
		MAX Zp	1200.00													
		VENT EFF. (Ev)	0.30													
		MIN. OUTSIDE AIR (Vot), CFM. NOTE 3.	150													
F-3	Zone 1	CLASSROOMS (AGE 9 PLUS)	920	32.2	10	0.12	322	110.4	1	432	1,100	1,100	0.39	0.00	0	0
	Zone 2	TOILET - PUBLIC	190	0	0	0	0	0	0.8	0	200	200	NA	0.00	70	200
	Zone 3	TOILET - PUBLIC	65	0	0	0	0	0	0.8	0	100	100	NA	0.00	70	100
	Zone 4	TOILET - PUBLIC	65	0	0	0	0	0	0.8	0	100	100	NA	0.00	70	100
	Zone 5	CORRIDORS	100	0	0	0.06	0	6	0.8	8	100	100	0.08	0.00	0	0
		TOTALS:	1,340	32.2							1,600	1,600				400
		SYSTEM POPULATION (Ps)	30													
		DIVERSITY (D)	0.9													
		UNCORRECTED OSA (Vou)	416													
		MAX Zp	0.39													
		VENT EFF. (Ev)	0.76													
		MIN. OUTSIDE AIR (Vot), CFM. NOTE 3.	150													
F4	Zone 1	CLASSROOMS (AGE 9 PLUS)	920	32.2	10	0.12	322	110.4	1	432	1,100	1,100	0.39	0.00	0	0
	Zone 2	CORRIDORS	100	0	0	0.06	0	6	0.8	8	100	100	0.08	0.00	0	0
	Zone 3	JANITOR CLOSET, TRASH ROOM, RECYC	65	0	0	0	0	0	0.8	0	200	200	NA	1.00	0	70
	Zone 4	TOILET - PUBLIC	190	0	0	0	0	0	0.8	0	200	200	NA	0.00	70	200
		TOTALS:	1,275	32.2							1,600	1,600				270
		SYSTEM POPULATION (Ps)	30													
		DIVERSITY (D)	0.9													
		UNCORRECTED OSA (Vou)	416													
		MAX Zp	0.39													
		VENT EFF. (Ev)	0.76													
		MIN. OUTSIDE AIR (Vot), CFM. NOTE 3.	150													

NOTES:
1. PER 2022 OMSC CHAPTER 4
2. FOR CONSTANT VOLUME SYSTEMS, Vpz = Vpzm
3. THIS IS THE CODE MINIMUM OSA VOLUME ALLOWED WITH DEMAND CONTROLLED VENTILATION PER OMSC 403.3.1.3. CO2 CONCENTRATION IN THE SPACE SHALL CAUSE THE OUTSIDE AIR DAMPER TO MODULATE TO INCREASE OUTSIDE AIR AS REQUIRED.

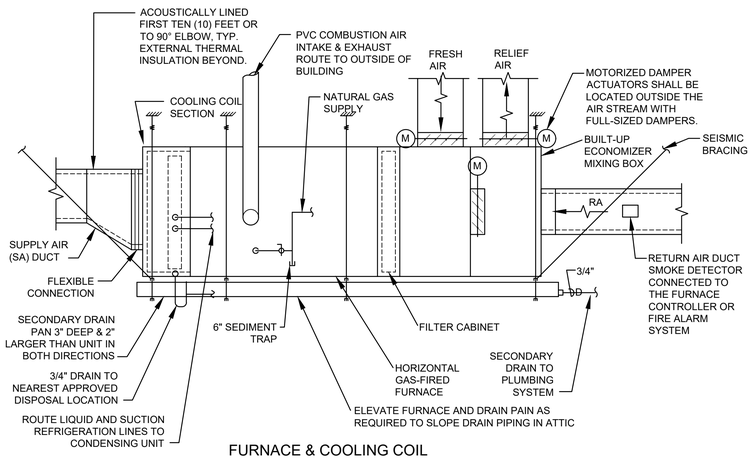
SINGLE ZONE OUTSIDE AIR SCHEDULE

SYSTEM TAG	SPACE TYPE	AREA SQ.FT. (Az)	ZONE POP. (Pz)	CFM/ PERSON (Rp)	CFM/ SQFT (Ra)	Pz*Rp	Az*Ra	EFFECTIVENESS (Ez)	SYSTEM OUTDOOR AIR (Vot)	MINIMUM OUTDOOR AIR, NOTE 2.
F-2, 6	CLASSROOMS (AGE 9 PLUS)	920	32.2	10	0.12	322	110	1	430	110
NOTE:	1. Vot = Voz = SYSTEM MINIMUM OUTDOOR AIRFLOW RATE FOR SINGLE ZONE SYSTEMS PER ASHRAE 62.1 SECTION 6.2.3.									
	2. THIS IS THE CODE MINIMUM OSA VOLUME ALLOWED WITH DEMAND CONTROLLED VENTILATION PER OMSC 403.3.1.3. CO2 CONCENTRATION IN THE SPACE SHALL CAUSE THE OUTSIDE AIR DAMPER TO MODULATE TO INCREASE OUTSIDE AIR AS REQUIRED.									

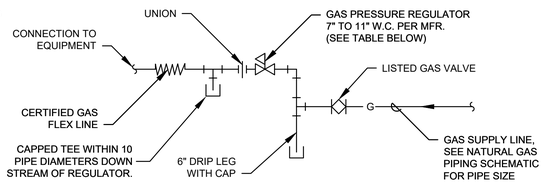


NOTE:
1. SEE LOUVER AND DAMPER SCHEDULE FOR MANUFACTURER, MODEL AND SIZES.

SECTION - TYPICAL AT OUTSIDE AIR INTAKE/RELIEF LOUVER AND DAMPER
5
NTS



FURNACE & COOLING COIL DETAIL - HORIZONTAL
3
NTS



2 PSI PIPING MAXITROL MODEL	MAX. CAPACITY BTU/HR	PIPE SIZE	INDOOR INSTALLED VENTING
325-3L	140,000	1/2"	12A09 VENT LIMITER

NATURAL GAS HOOK-UP TO EQUIPMENT
6
NTS

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Drawing Title
MECHANICAL SCHEDULES AND DETAILS

Drawing No.

M3.01

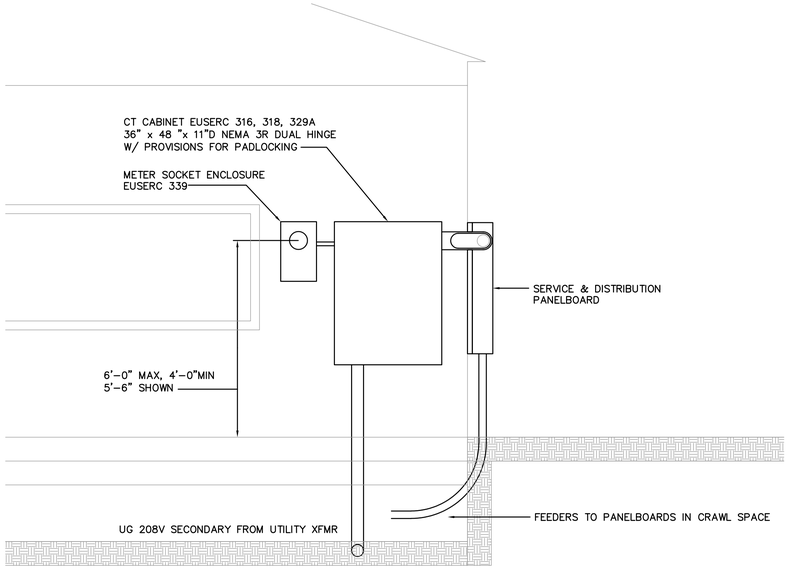
ELECTRICAL GENERAL NOTES

SEE DIVISION 26 SPECIFICATIONS FOR EXPANDED REQUIREMENTS.

1. WORK INCLUDES INSTALLATION OF ALL ELECTRICAL SYSTEMS COMPLETE AND OPERATIONAL TO THE SATISFACTION OF THE OWNER AS LIMITED BY THE CONTRACT DOCUMENTS.
2. ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2023 EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA 70) WITH OREGON AMENDMENTS (2023 OESC), NATIONAL ELECTRICAL SAFETY CODE (ANSI IEEE C2) AND ALL LOCAL RULES AND REGULATIONS.
3. CONFORM TO DIVISION 1 SPECIFICATIONS SECTIONS REGARDING PERMITS.
4. VISIT THE JOB SITE AND VERIFY ALL EXISTING CONDITIONS AND THE EXTENT OF REMOVAL, RELOCATION, RECONNECTION AND/OR NEW WORK PRIOR TO BIDDING. BID SUBMISSION SHALL BE CONSIDERED AS EVIDENCE OF SITE INSPECTION AND RESOLUTION OF ALL DISCREPANCIES AND QUESTIONS. NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK MADE NECESSARY BY FAILURE TO VISIT THE SITE.
5. SUBMIT SHOP DRAWINGS TO THE ARCHITECT FOR ALL LUMINAIRES, EQUIPMENT AND DEVICES COVERED BY THIS CONTRACT FOR APPROVAL PRIOR TO ORDERING. SHOP DRAWINGS SHALL BEAR THE CONTRACTOR'S STAMP AND SIGNATURE INDICATING THEY HAVE BEEN CHECKED AND ARE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS. SHOP DRAWINGS NOT BEARING CONTRACTOR APPROVAL WILL BE RETURNED WITHOUT REVIEW.
6. SHOP DRAWINGS ARE INTENDED TO SHOW UNDERSTANDING OF, AND COMPLIANCE WITH, THE CONTRACT DOCUMENTS. CAD FILES OF THE PROJECT DOCUMENTS WILL NOT BE AVAILABLE FOR USE AS SHOP DRAWINGS WITHOUT PRIOR CLEARANCE AND ACCEPTANCE OF ELECTRONIC MEDIA RELEASE FORM.
7. SHOULD PROJECT CONDITIONS, INCLUDING CONDITIONS UNCOVERED BY DEMOLITION OR CHANGES TO OTHER TRADES, REQUIRE REARRANGEMENT OF WORK, MARK SUCH CHANGES ON AS-BUILT DRAWINGS. IF PROJECT CONDITIONS REQUIRE UNSPECIFIED MATERIALS OR METHODS, SUBMIT REQUEST FOR INFORMATION (RFI) TO THE ARCHITECT WITH DRAWINGS SHOWING THE PROPOSED ALTERNATIVE MATERIALS OR METHODS. DO NOT PROCEED WITH THE WORK UNTIL APPROVAL IS OBTAINED. RFIs SUBMITTED WITHOUT PROPOSED SOLUTIONS WILL BE RETURNED WITHOUT REVIEW. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION BETWEEN TRADES SHALL NOT BE CONSIDERED REASON FOR EXTRA COST.
8. OBTAIN AND REVIEW PRODUCT DATA. SHOP DRAWINGS AND INSTALLATION INSTRUCTIONS FOR OWNER-FURNISHED EQUIPMENT, AND EQUIPMENT FURNISHED BY OTHER TRADES. VERIFY ELECTRICAL REQUIREMENTS OF EQUIPMENT ACTUALLY PROVIDED PRIOR TO ROUGH-IN.
9. PROVIDE RECORD DOCUMENTS AT THE CLOSE OF CONSTRUCTION. INCLUDE OPERATIONS AND MAINTENANCE MANUALS FOR ALL EQUIPMENT, AND COPIES OF WARRANTIES, TEST RECORDS AND CERTIFICATIONS. INCLUDE AS-BUILT DRAWINGS: SHOW ALL CHANGES MADE PER PROJECT CONDITIONS, LOCATIONS OF ALL DISTRIBUTION APPARATUS, PULL AND JUNCTION BOXES, AND ROUTING OF CONDUITS 2" AND LARGER.
10. ALL FEEDERS AND EXPOSED BRANCH CIRCUITS SHALL BE IN CONDUIT. ALL CONDUIT IN FINISHED AREAS SHALL BE CONCEALED; USE SURFACE METAL RACEWAY IN EXISTING FINISHED AREAS WHERE CONDUIT CANNOT BE CONCEALED. ALL CONDUIT IN UNFINISHED AREAS MAY BE EXPOSED. MINIMUM CONDUIT SIZE IS 0.5 INCH. EMT AND FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL INTERIOR APPLICATIONS. EMT AND RIGID GALVANIZED STEEL CONDUIT SHALL BE USED FOR ALL EXPOSED EXTERIOR LOCATIONS. CONDUIT IN OR UNDER THE SLAB SHALL BE SCHEDULE 40 PVC. ALL BURIED CONDUIT NOT UNDER A SLAB SHALL BE SCHEDULE 40 PVC.
11. FITTINGS FOR EMT CONDUIT SHALL BE STEEL SET SCREW OR COMPRESSION TYPE. DIE-CAST FITTINGS ARE PROHIBITED. FITTINGS FOR RGS CONDUIT SHALL BE GALVANIZED MALLEABLE IRON. FITTINGS FOR PVC CONDUIT SHALL BE SCHEDULE 40 PVC.
12. CONDUIT SIZES INDICATED ON THE DRAWINGS MAY BE PURPOSELY OVERSIZED FOR FUTURE CONDUCTORS OR TO AVOID EXCESS CONDUIT HEATING. CONDUIT SIZES NOT SHOWN ON THE DRAWINGS SHALL BE SIZED BY THE CONTRACTOR BASED ON THE NUMBER OF CONDUCTORS TO BE INSTALLED, IN ACCORDANCE WITH NFPA 70.
13. PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT INDICATED ON PLANS. SIZING OF BOXES SHALL BE PER NFPA 70.
14. ALL PENETRATIONS THROUGH FIRE RATED SLABS, FLOORS, WALLS AND CEILINGS SHALL BE SEALED TO MAINTAIN THE INTEGRITY OF THE FIRE RATING, USING A U.L. LISTED FIRE RATED SYSTEM.
15. OBTAIN APPROVAL FROM THE ARCHITECT BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS OR FIRE RATED WALLS OR CEILINGS.
16. ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER, 600 VOLT INSULATION TYPE XHHW. ALL CONDUCTORS SMALLER THAN #8 SHALL BE SOLID OR STRANDED COPPER, 600 VOLT INSULATION TYPE THHN/THWN.
17. PROVIDE A GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ALL FEEDERS AND BRANCH CIRCUITS, INCLUDING SWITCH LEGS. SIZE GROUNDING CONDUCTOR PER NFPA 70, TABLE 250-122.
18. ALL PANELBOARDS SHALL HAVE COPPER BUSSES INCLUDING GROUND BUS, AND BOLT-ON CIRCUIT BREAKERS. VOLTAGE, AMPERE AND MINIMUM A.I.C. RATINGS ARE SHOWN ON DIAGRAMS AND SCHEDULES.
MANUFACTURERS: SIEMENS-ITE, GENERAL ELECTRIC, CUTLER-HAMMER, SQUARE D.
19. PROVIDE TYPEWRITTEN CIRCUIT DIRECTORIES IN NEW PANELBOARDS TO ACCURATELY REFLECT THE CIRCUITING AS ACTUALLY INSTALLED. THE CIRCUIT DIRECTORIES SHALL IDENTIFY THE SOURCE OF POWER PER NEC 408.4(B).

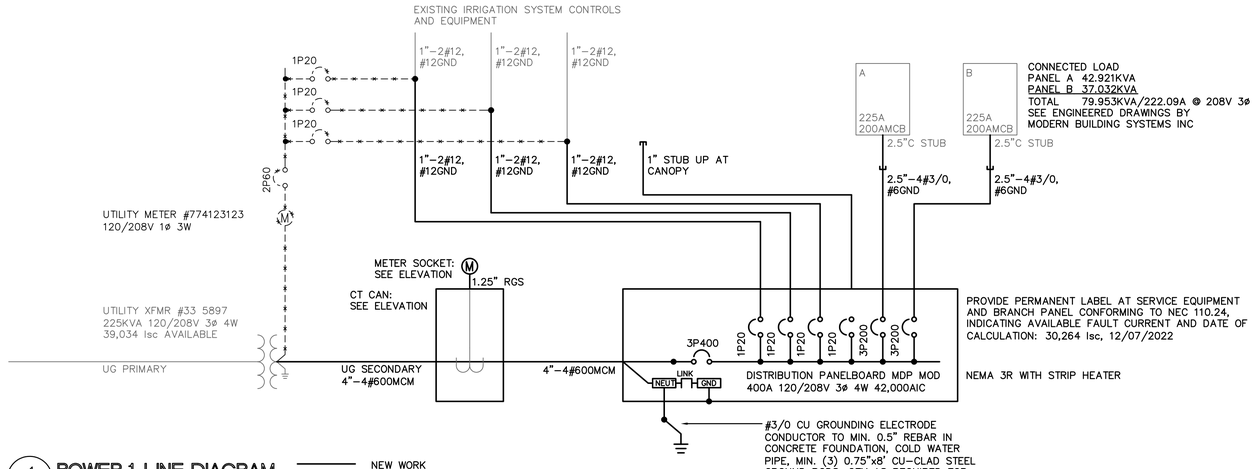
ELECTRICAL LEGEND

———	NEW WORK
———	EXISTING OR BY OTHERS
—*—*—	EXISTING TO BE REMOVED
	PANELBOARD, 120/208V 3ø 4 WIRE
(J)	JUNCTION BOX, SIZE PER N.E.C.
(E)	MAKE CONNECTION TO EQUIPMENT FURNISHED BY OWNER OR UNDER ANOTHER DIVISION: CONFORM TO SECTION 260575
C.O.	CONDUIT ONLY, WITH PULL WIRE
I.D.F.	INTERMEDIATE DISTRIBUTION FRAME
O.H.	OVERHEAD
P.B.B.	PRIMARY BONDING BUSBAR
R.B.B.	RACK BONDING BUSBAR
T.B.C.	TELECOMMUNICATIONS BONDING CONDUCTOR
T.E.B.C.	TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR
U.G.	UNDERGROUND
U.N.O.	UNLESS NOTED OTHERWISE
W.P.	WEATHERPROOF



2 E0.01 **METER ELEVATION** 1/2" = 1'-0"

1/2"=1'-0" scale 1' 0 1' 2' 3' 4' 5' feet



1 E0.01 **POWER 1-LINE DIAGRAM** SCHEMATIC

——— NEW WORK
——— EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
—*—*— EXISTING TO BE REMOVED

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

Douglas Engineering Pacific Inc.
415 Williamson Way, Suite 7
Ashland OR 97520

541-482-3938
808-528-4228

www.douglasengineering.com

REGISTERED PROFESSIONAL ENGINEER 16 OREGON JULY 20, 1993 DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title

Electrical Legends and Notes

Drawing No.

E0.01

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FIRE ALARM NOTES

1 PROVIDE A NEW MANUAL AND AUTOMATIC FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72; CONNECT TO OR INTEGRATE AS A SUB-SYSTEM INTO THE EXISTING ADJACENT MANUAL AND AUTOMATIC FIRE ALARM SYSTEM. SEE SYSTEM INTEGRATION NOTES 5a, 5b, THIS SHEET. TEST FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72 AND LOCAL FIRE DEPARTMENT REQUIREMENTS.

2. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED ENGINEERED SYSTEMS DISTRIBUTOR FOR SPECIFIED SYSTEM WITH 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF PROJECT.

3. SUBMITTALS: PROVIDE PRODUCT DATA, CALCULATIONS, AND COMPLETE RISER DIAGRAM AND LAYOUT DRAWINGS SHOWING ALL INTERCONNECT WIRING AND EQUIPMENT.

4. PROVIDE BATTERY CAPACITY SUFFICIENT TO OPERATE SYSTEM IN SUPERVISORY MODE FOR 24 HRS FOLLOWED BY ALARM MODE FOR 5 MINUTES.

5. MANUFACTURER: SILENT KNIGHT

6. FIRE ALARM PANEL: MICROPROCESSOR-CONTROLLED, POWER-LIMITED, ELECTRONICALLY-SUPERVISED, ANALOG ADDRESSABLE WITH MULTIPLEXED DATA TRANSMISSION AND SUPERVISORY, ALARM, CONTROL AND ANNUNCIATOR FUNCTIONS, FIELD PROGRAMMABLE AND EXPANDABLE BY MODULES, LCD ALPHANUMERIC DISPLAY. SEE SYSTEM INTEGRATION NOTES 5a, 5b, THIS SHEET. INCLUDE DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT) UNDER OPTION B.

7. AUDIBLE-VISIBLE INDICATING APPLIANCE: HIGH PERFORMANCE HORN, 85DBA AT 10' WITH VISIBLE STROBE AND FLASHER, RED LETTERED "FIRE" ON WHITE LENS, SYNCHRONIZING TYPE. CANDELAS NOTED.

8. AUDIBLE INDICATING APPLIANCE: HIGH PERFORMANCE HORN, 85DBA AT 10' .

9. VISUAL INDICATING APPLIANCE: VISIBLE STROBE AND FLASHER, RED LETTERED "FIRE" ON WHITE LENS, CANDELAS NOTED, SYNCHRONIZING TYPE.

10. MANUAL PULL STATION: ADDRESSABLE DOUBLE ACTION TYPE WITH KEY RESET, SEMI-FLUSH MOUNTED.

11. SMOKE DETECTOR: ADDRESSABLE ANALOG PHOTOELECTRIC TYPE WITH TWO LED INDICATORS, TWIST-LOCK BASE.

12. HEAT DETECTOR: ADDRESSABLE COMBINATION FIXED TEMPERATURE/RATE OF RISE COMPENSATED TYPE WITH TWO LED INDICATORS, TWIST-LOCK BASE.

13. DUCT SMOKE DETECTOR: ADDRESSABLE ANALOG PHOTOELECTRIC TYPE WITH SAMPLING TUBES EXTENDING WIDTH OF DUCT, LED INDICATOR, DUCT-MOUNTED HOUSING.

14. MONITOR MODULE: ADDRESSABLE MODULE TO CONNECT A SUPERVISED SIGNALLING LINE CIRCUIT TO NORMALLY-OPEN CONTACTS ON CONVENTIONAL DEVICES; MOUNTS TO 4" SQUARE BOX.

15. CONTROL MODULE: ADDRESSABLE MODULE TO CONNECT A SUPERVISED SIGNALLING LINE CIRCUIT TO NORMALLY-OPEN CONTACTS ON CONVENTIONAL DEVICES; MOUNTS TO 4" SQUARE BOX.

16. LOCKDOWN/POLICE CALL BUTTON: STI #SS24A1LD-EN SERIES W/ LETTERS "POLICE", INCLUDE ADDRESSABLE MONITOR MODULE IN BACKBOX.

17. FIRE ALARM CABLE SHALL BE UL LISTED FOR USE WITH THE SYSTEM INSTALLED. ALL FIRE ALARM CABLE SHALL BE IN CONDUIT OR FREE IN ACCESSIBLE CEILING USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY NEEDED EXPOSED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

18. PROVIDE LINE-GROUND SURGE PROTECTION FOR SIGNALING LINE CIRCUITS ENTERING BUILDINGS FROM THE EXTERIOR. 20KA SURGE CURRENT RATING, 5A MAX CONTINUOUS CURRENT, 200kbps - 2Mbps DATA RATE. DITEK SURGE PROTECTION # DTK-2MHLPB SERIES W/ ACCESSORIES OR APPROVED EQUAL.

FIRE ALARM LEGEND

- (?) SMOKE DETECTOR, CEILING MOUNTED
- [P] MANUAL PULL STATION, MOUNTED +48" TO TOP
- [L] LOCKDOWN/POLICE CALL BUTTON, MOUNTED +48" TO TOP
- AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- VISIBLE INDICATING APPLIANCE, MOUNTED AT +80", OR AT 6" BELOW CEILING, WHICHEVER IS LOWER
- AUDIBLE & VISIBLE INDICATING APPLIANCE, MOUNTED AT +80", OR AT 6" BELOW CEILING, WHICHEVER IS LOWER
- AUDIBLE INDICATING APPLIANCE, CEILING MOUNTED
- VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- AUDIBLE & VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- [M] [C] MONITOR OR CONTROL MODULE

INTERCOM/PA SYSTEM NOTES

1. EXTEND THE EXISTING CAMPUS INTERCOM/PUBLIC ADDRESS SYSTEM IN ACCORDANCE WITH NFPA 70.
2. MANUFACTURER: BOGEN
3. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED DISTRIBUTOR FOR SPECIFIED SYSTEMS WITH MIN. 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF THE PROJECT.
4. SUBMITTALS: PROVIDE COMPLETE SYSTEM DESIGNS INCLUDING CERTIFICATIONS, PRODUCT DATA, PLANS, SCHEDULES, DETAILS, AND WIRING DIAGRAMS SHOWING ALL EQUIPMENT, DEVICES AND INTERCONNECT WIRING. INCLUDE A CABLE IDENTIFICATION SYSTEM.
5. INTERCOM/PA SYSTEM CABLE SHALL BE AS DETERMINED BY SYSTEM VENDOR. CABLE SHALL BE IN CONDUIT OR FREE IN ACCESIBLE CEILING SPACE USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

INTERCOM/PA SYSTEM LEGEND

- (S)ICF INTERCOM SPEAKER, FLUSH CEILING OR FLUSH WALL MOUNTED AT +84" U.N.O; PROVIDE (1) CABLE TO EQUIPMENT IN IDF.
- (S)ICS INTERCOM SPEAKER, SURFACE CEILING OR SURFACE WALL MOUNTED AT +84" U.N.O.; PROVIDE (1) CABLE TO EQUIPMENT IN IDF.
- (S)PF PAGING SPEAKER, FLUSH CEILING OR FLUSH WALL MOUNTED AT +84" U.N.O.; PROVIDE COMMON CABLE FOR ALL PAGING SPEAKERS TO EQUIPMENT IN IDF.
- (S)PS PAGING SPEAKER, SURFACE CEILING OR SURFACE WALL MOUNTED AT +84" U.N.O;. PROVIDE COMMON CABLE FOR ALL PAGING SPEAKERS TO EQUIPMENT IN IDF.
- (H) OUTDOOR HORN, SURFACE WALL MOUNTED AT +96"; PROVIDE COMMON CABLE FOR ALL OUTDOOR HORNS TO EQUIPMENT IN IDF ROOM.
- [B] IP CALL SWITCH, SURFACE WALL MOUNTED AT +48" U.N.O.; PROVIDE (1) CABLE TO INTERCOM SPEAKER IN SAME ROOM.

INTRUSION DETECTION NOTES

1. EXTEND THE EXISTING CAMPUS INTRUSION DETECTION AND VIDEO SURVEILLANCE SYSTEMS IN ACCORDANCE WITH NFPA 70.
2. SYSTEM MANUFACTURER: SONITROL.
3. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED DISTRIBUTOR FOR SPECIFIED SYSTEMS WITH MIN. 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF THE PROJECT.
4. SUBMITTALS: PROVIDE COMPLETE SYSTEM DESIGNS INCLUDING CERTIFICATIONS, PRODUCT DATA, PLANS, SCHEDULES, DETAILS, AND WIRING DIAGRAMS SHOWING ALL EQUIPMENT, DEVICES AND INTERCONNECT WIRING. INCLUDE A CABLE IDENTIFICATION SYSTEM.
5. INCLUDE ALL SOFTWARE, PROGRAMMING, TESTING, LICENSING FOR FUNCTIONING SYSTEMS
6. POWER & CONTROL CABLE: AS DETERMINED BY SYSTEM VENDOR.
7. NETWORK CABLE: AS DETERMINED BY SYSTEM VENDOR.
8. CABLE SHALL BE IN OR CONDUIT OR FREE IN ACCESSIBLE CEILING SPACE USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

INTRUSION DETECTION LEGEND

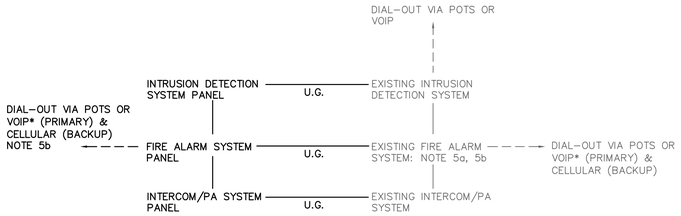
- (K) INTRUSION DETECTION KEYPAD, WALL MOUNTED AT +42" TO CENTER: PROVIDE CABLE TO INTRUSION DETECTION CONTROL PANEL.
- (M) MAGNETIC DOOR CONTACT (POSITION SENSOR): PROVIDE CABLE TO INTRUSION DETECTION CONTROL PANEL.

CCTV NOTES

1. VIDEO SURVEILANCE SYSTEM EQUIPMENT IS OWNER-FURNISHED, OWNER-INSTALLED.
2. SYSTEM MANUFACTURER: VERKADA.
3. CABLE SHALL BE IN OR CONDUIT OR FREE IN ACCESSIBLE CEILING SPACE USING J-HOOKS.MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

CCTV LEGEND

- IP CAMERA, WALL OR CEILING MOUNTED W/ INDOOR OR OUTDOOR DOME AS REQUIRED: PROVIDE (1) CAT 6 CABLE TO EQUIPMENT IN IDF. MOUNT EXTERIOR CAMERAS AT +12'



INTEGRATION OF LOW VOLTAGE SYSTEMS

SCHEMATIC

* NFPA 72 NOW ALLOWS VOIP VS POTS FOR DIAL-OUT CONDITIONS: THE CABLED CONNECTION MUST BE TO A PUBLIC SWITCHED TELEPHONE NETWORK (PSTN) USING MANAGED FACILITIES-BASED VOICE NETWORKS (MFVN) OPERATED BY THE TELEPHONE SERVICE PROVIDER, FOR RELIABILITY. THE SERVICE PROVIDER FACILITIES MUST HAVE MINIMUM 8-HOUR STANDBY POWER.

1. INTERCOM/PA SYSTEM WILL ACCEPT INPUT FROM THE TELEPHONE SYSTEM.
2. INTERCOM/PA SYSTEM WILL BE USED FOR MASS NOTIFICATION DURING A LOCKDOWN EVENT.
3. FIRE ALARM SYSTEM WILL OVERRIDE THE INTERCOM/PA SYSTEM UNDER FIRE ALARM CONDITION.
4. FIRE ALARM SYSTEM WILL MONITOR THE INTRUSION DETECTION SYSTEM AS A SUPERVISORY CONDITION.

5a OPTION A) NETWORK THE NEW FIRE ALARM PANEL TO A NEW SILENT KNIGHT MULTIPLEXED ADDRESSABLE SYSTEM WITH NETWORK CAPABILITIES LOCATED IN THE MID-CAMPUS OFFICE BUILDING. SEE SITE PLAN DRAWINGS. USE THE EXISTING UNDERGROUND TELECOMMUNICATIONS CONDUITS LINKING BUILDINGS. THE NEW PANEL SHALL FUNCTION AS AN EXTENSION OF THE MAIN SYSTEM.

5b OPTION B) PROVIDE DACT AND DIAL-OUT. CONNECT THE NEW FIRE ALARM SUB-PANEL TO THE EXISTING SILENT KNIGHT 5808 MULTIPLEXED ADDRESSABLE SYSTEM LOCATED IN THE WEST CAMPUS MAIN ELECTRICAL ROOM, WITH MONITOR AND CONTROL CIRCUITS. SEE SITE PLAN DRAWINGS. USE THE EXISTING UNDERGROUND TELECOMMUNICATIONS CONDUITS LINKING BUILDINGS. THE SYSTEMS SHALL MONITOR EACH OTHER'S STATUS AS SUPERVISORY CONDITIONS.

TELECOMMUNICATIONS GROUNDING NOTES

1. GROUNDING: PROVIDE A COMPLETE TELECOMMUNICATIONS GROUNDING SYSTEM CONFORMING TO ANSI-J-STD-607-A.
2. PROVIDE A COPPER PRIMARY BONDING BUSBAR (PBB) AT THE IDF WITH A #3/0 COPPER TELECOMMUNICATIONS BONDING CONDUCTOR (TBC) TO THE BUILDING ELECTRICAL SERVICE GROUND. PROVIDE 3' COIL OF SPARE CONDUCTOR AT PBB
3. BOND THE EQUIPMENT RACK WITH A #2/0 COPPER TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR (TEBC) TO THE PBB.
3. BOND CABLE TRAY, AND RACEWAY ENTERING THE IDF, WITH A #6 COPPER TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR (TEBC) TO THE PBB.

TELEPHONE/LAN NOTES

1. INSTALL TELECOMMUNICATIONS CABLING SYSTEM IN ACCORDANCE WITH NFPA 70 AND APPLICABLE TIA/EIA AND UL GUIDELINES.
2. SYSTEM DESIGNER AND INSTALLER: LICENSED TELECOMMUNICATIONS CONTRACTOR WITH MINIMUM 15 YEARS EXPERIENCE, REGISTERED AS CABLING SYSTEM INSTALLERS, NICET TECHNICIAN LEVEL IV.
3. SUBMITTALS: PROVIDE PRODUCT DATA, CALCULATIONS, AND COMPLETE RISER DIAGRAM AND LAYOUT DRAWINGS SHOWING ALL INTERCONNECT WIRING AND EQUIPMENT. INCLUDE A CABLE IDENTIFICATION SYSTEM.
4. GROUNDING, RACKS, CABLE TRAY, DEVICES, CABLE AND PATCH PANELS ARE CONTRACTOR-FURNISHED, CONTRACTOR-INSTALLED INCLUDING CABLE TERMINATIONS.
5. TELEPHONE/LAN EQUIPMENT (SWITCHES, SERVERS, ROUTERS) IS OWNER-FURNISHED, OWNER-INSTALLED. CONNECTIONS FROM PATCH PANELS TO EQUIPMENT WILL BE BY OWNER.
6. POWER SUPPLIES, CONDUIT AND BACKBOXES ARE FURNISHED AND INSTALLED AS PART OF THE MODULAR BUILDING.
7. EQUIPMENT RACK: 2-POST RACK, FLOOR MOUNTED, 7'H x 19"W x 6"D, 45U. TRIPP LITE # SR2POST WITH # SRCABLERING VRT CABLE MANAGERS
8. CABLE LADDER IN IDF ROOM: 12" WIDE x 1,5" DEEP WITH CROSS MEMBERS AT 12" INTERVALS. TRIPP LITE # SRCABLELADDER WITH #SRLADDERATTACH
9. PROVIDE LIU AND PATCH PANELS IN THE EQUIPMENT RACK FOR TERMINATION OF FIBER OPTIC AND COPPER NETWORK CABLE.
9. PROVIDE 12-STRAND SINGLE MODE FIBER OPTIC CABLE FROM THE IDF IN THE ADJACENT GYM BUILDING TO THE NEW IDF. INSTALL FIBER OPTIC CABLE IN INNERDUCT.
10. PROVIDE INNERDUCT IN EACH UNDERGROUND BACKBONE CONDUIT.
11. TELEPHONE/LAN CABLE SHALL BE IN CONDUIT OR IN J-HOOKS IN ACCESSIBLE CEILING SPACE. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. PROVIDE ADDITIONAL CONDUIT WHERE REQUIRED TO PROTECT WIRING.
12. PENETRATIONS THROUGH WALLS: USE GRS CONDUIT OR EMT, SIZE AND QUANTITY AS INDICATED ON PLANS.
13. CONDUIT PENETRATIONS THROUGH FIRE-RATED WALLS AND SLABS: SEAL TO MAINTAIN THE INTEGRITY OF THE FIRE RATING, USING A UL LISTED FIRE RATED SYSTEM.
14. CONDUIT PENETRATIONS THROUGH SEISMIC GAPS: TRANSITION FROM GRS CONDUIT OR EMT TO LIQUIDTIGHT FLEXIBLE CONDUIT; PROVIDE SUFFICIENT SLACK CONDUIT AND CABLE TO ALLOW FOR MOVEMENT.

TELEPHONE/LAN LEGEND

- ▽# TEL/DATA OUTLET AT +17" TO CENTERLINE U.N.O.: PROVIDE # OF RJ45-A JACKS AND CAT 6A CABLES TO IDF AS INDICATED
- ▽# TEL/DATA OUTLET, CEILING MOUNTED: PROVIDE # OF RJ45-A JACKS AND CAT 6A CABLES TO IDF AS INDICATED
- ▽ HDMI OUTLET AT +17" TO CENTERLINE U.N.O.: PROVIDE CLASS 2 CAT 3 8K 60Hz HDMI CABLE WITH TYPE A CONNECTORS BETWEEN OUTLETS IN EACH CLASSROOM AS INDICATED ON PLANS
- 2-POST RACK, FLOOR MOUNTED

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2830 Maple Court
White City, OR 97503

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REGISTERED PROFESSIONAL ENGINEER 16
OREGON
JULY 20, 1993
DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title

Electrical Legends and Notes

Drawing No.

E0.02

Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2022\22501 Table Rock Elementary School Modular Classroom\22501 e legends and notes.dwg Mar 25, 2023 - 9:28am

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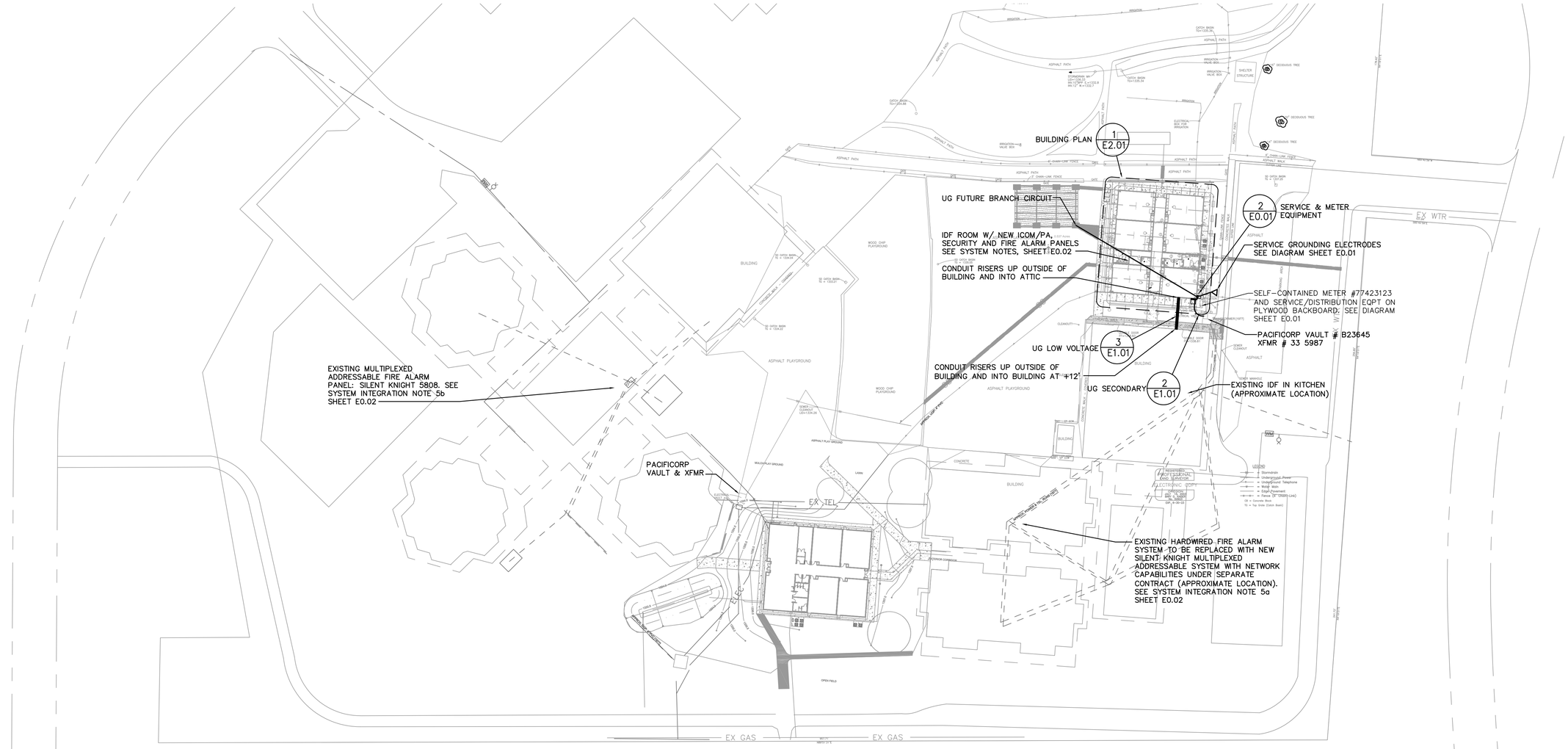
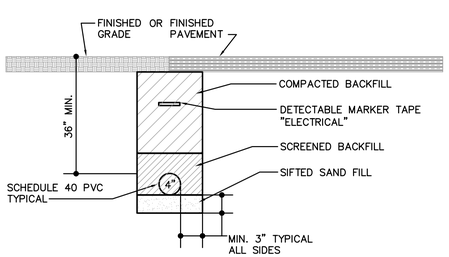


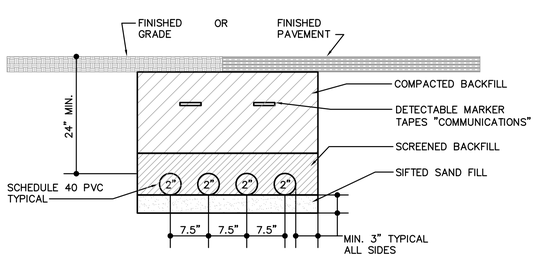
1 E1.01 **SITE PLAN - ELECTRICAL**
1" = 50'-0"

NEW WORK
EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
EXISTING TO BE REMOVED

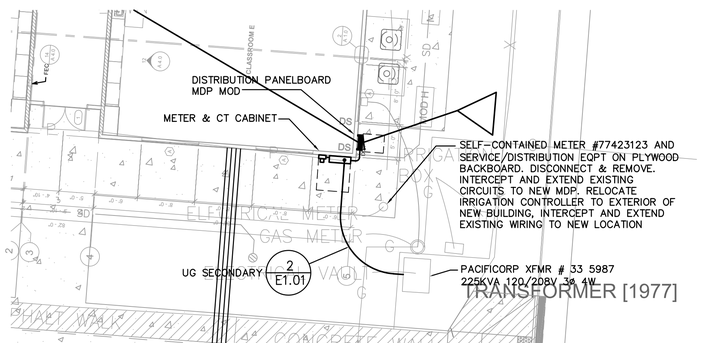
1"=50'-0" 50' 25' 0 50' 100' scale feet



2 E1.01 **SECONDARY POWER DUCT BANK SECTION**
NO SCALE



3 E1.01 **LOW VOLTAGE DUCT BANK SECTION**
NO SCALE OWNER IT, INTERCOM/PA, SECURITY, FIRE ALARM



4 E1.01 **ENLARGED SITE PLAN**
1" = 10'-0"

1"=10'-0" 10' 5' 0 10' 20' scale feet

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

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REGISTERED PROFESSIONAL ENGINEER
OREGON
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EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title
Site Plan - Electrical

Drawing No.
E1.01

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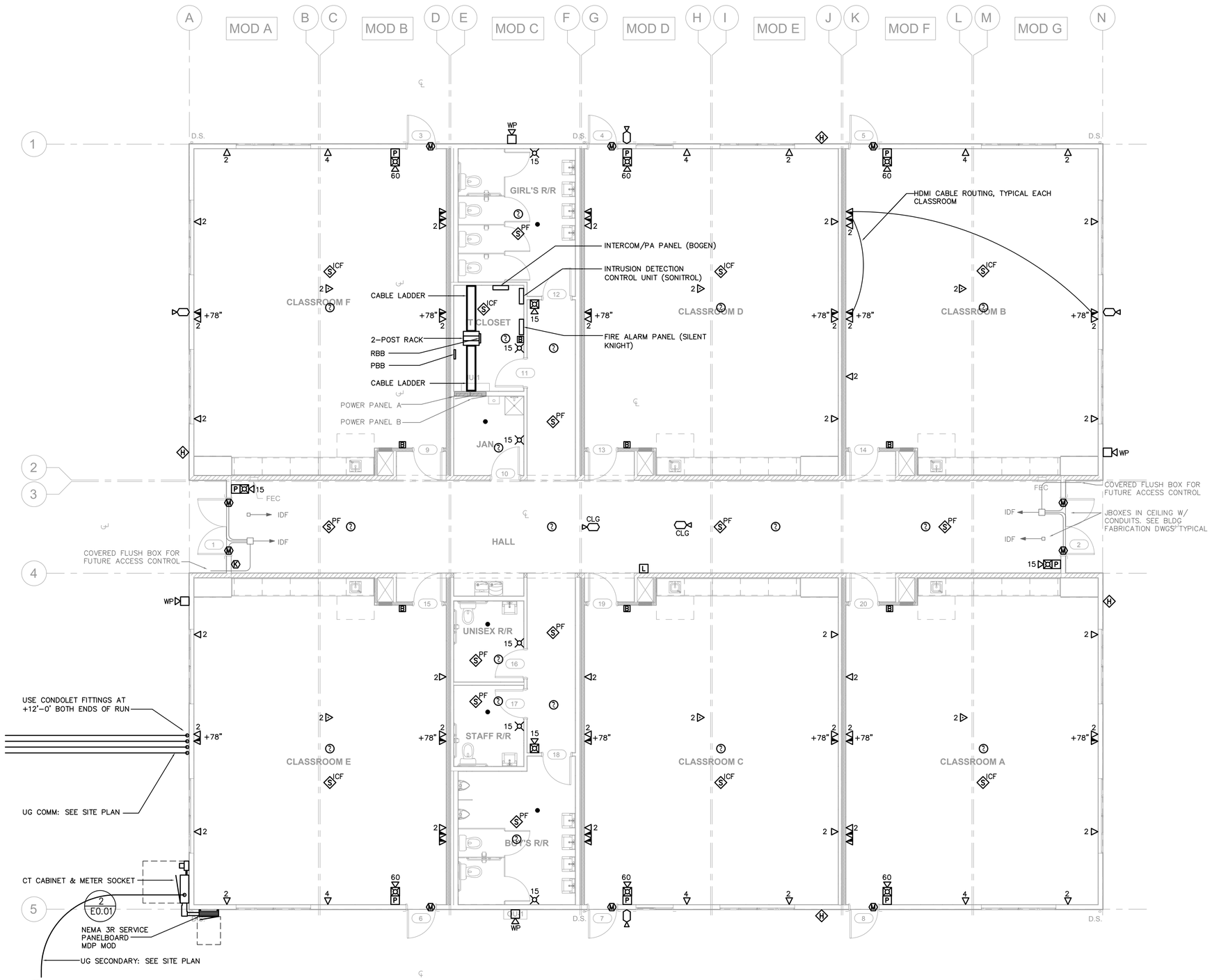

1 E2.01 **FLOOR PLAN - ELECTRICAL**
3/16" = 1'-0"

NEW WORK
EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
EXISTING TO BE REMOVED

3/16"=1'-0" scale 2' 0 2' 4' 6' 8' 10' feet

POWER SYSTEM NOTES

1. MODULAR UNIT POWER PANELS HAVE CONDUIT STUBS DOWN TO THE CRAWLSPACE BELOW THE BUILDING. CONNECT POWER FEEDERS FROM MDP MOD TO TO THE MODULAR UNIT POWER PANELS USING THE STUBS PROVIDED.
2. INTERIOR AND EXTERIOR POWER DEVICES, EQUIPMENT CONNECTIONS AND RELATED WIRING ARE INSTALLED COMPLETE, ARE NOT SHOWN, AND ARE NOT TO BE MODIFIED.
3. INTERIOR AND EXTERIOR LIGHTING, CONTROLS AND RELATED WIRING ARE INSTALLED COMPLETE, ARE NOT SHOWN, AND ARE NOT TO BE MODIFIED.

LOW VOLTAGE SYSTEM NOTES

1. MODULAR UNIT IS PROVIDED WITH BACKBOXES AND RACEWAY TO CEILING SPACE FOR WALL-MOUNTED LOW VOLTAGE SYSTEM DEVICES.
2. SEE SHEET E0.01 FOR IT INFRASTRUCTURE NOTES, TEL/LAN LEGEND AND NOTES.
3. SEE SHEET E0.02 FOR INTERCOM/PA, SECURITY AND FIRE ALARM SYSTEMS LEGENDS AND NOTES.

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

Douglas Engineering Pacific Inc.
415 Williamson Way, Suite 7
Ashland OR 97520
541-482-3938
808-528-4228
www.douglasengineering.com

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 29, 1983
DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title
Floor Plan - Electrical

Drawing No.
E2.01

Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2023\2501 Table Rock Elementary School Modular Classroom\2501r e buildings.dwg Mar 23, 2023 - 4:29pm

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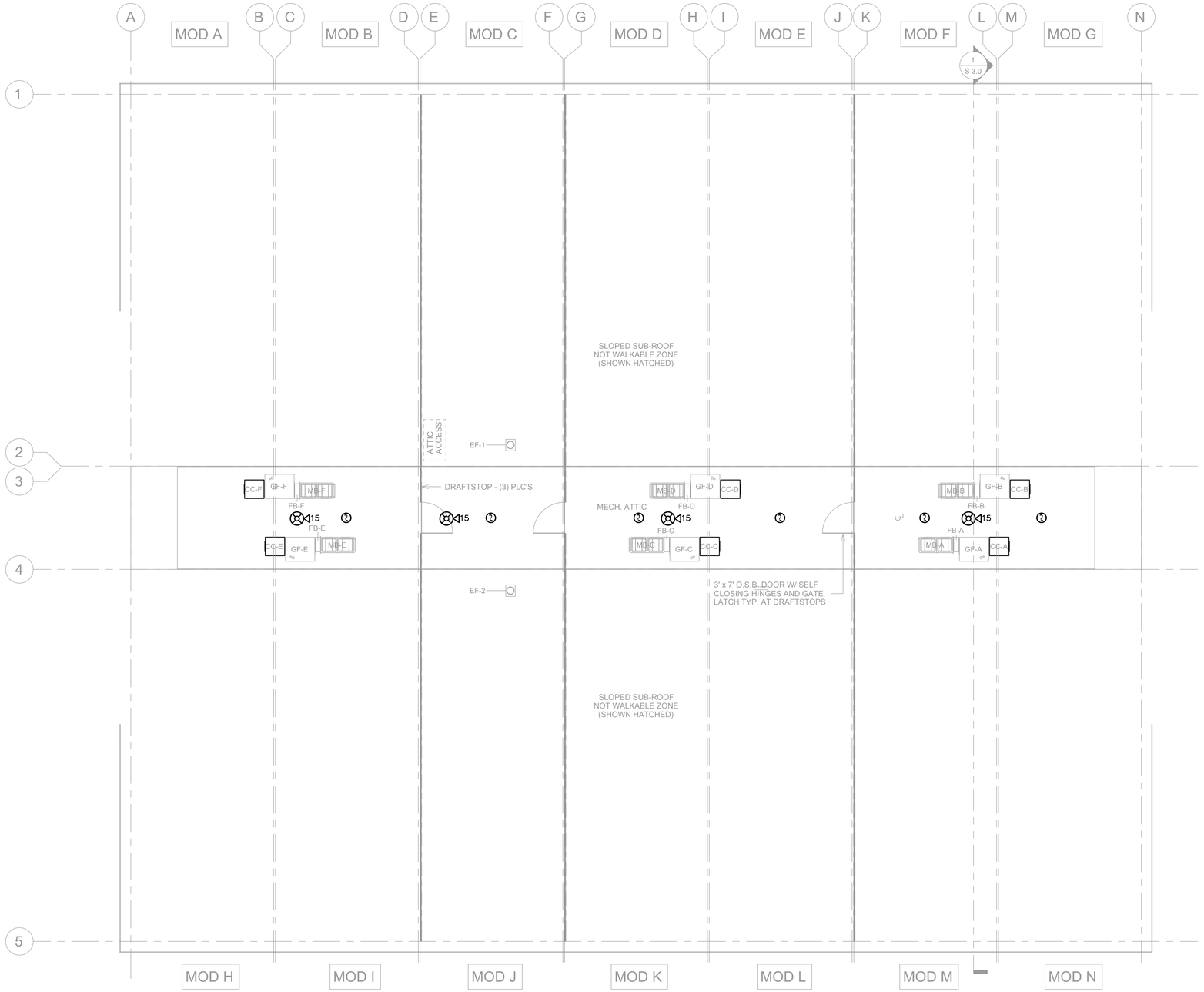

1 E2.02 **ATTIC PLAN - ELECTRICAL**
3/16" = 1'-0"

NEW WORK
EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
EXISTING TO BE REMOVED

3/16"=1'-0" scale 2' 0 2' 4' 6' 8' 10' feet

POWER SYSTEM NOTES

1. MODULAR UNIT POWER PANELS HAVE CONDUIT STUBS DOWN TO THE CRAWLSPACE BELOW THE BUILDING. CONNECT POWER FEEDERS FROM THE SERVICE EQUIPMENT TO TO THE MODULAR UNIT POWER PANELS USING THE STUBS PROVIDED.
2. INTERIOR AND EXTERIOR POWER DEVICES, EQUIPMENT CONNECTIONS AND RELATED WIRING ARE INSTALLED COMPLETE, ARE NOT SHOWN, AND ARE NOT TO BE MODIFIED.
3. INTERIOR AND EXTERIOR LIGHTING, CONTROLS AND RELATED WIRING ARE INSTALLED COMPLETE, ARE NOT SHOWN, AND ARE NOT TO BE MODIFIED.

LOW VOLTAGE SYSTEM NOTES

1. MODULAR UNIT IS PROVIDED WITH BACKBOXES AND RACEWAY TO CEILING SPACE FOR TEL/DATA OUTLETS.
2. SEE SHEET E0.01 FOR IT INFRASTRUCTURE NOTES, TEL/LAN LEGEND AND NOTES.
3. SEE SHEET E0.02 FOR INTERCOM/PA, SECURITY AND FIRE ALARM SYSTEMS LEGENDS AND NOTES.
4. SEE MODERN BUILDING SYSTEMS ELECTRICAL DRAWING, SHEET E1.0, FOR 120VAC DOOR HARDWARE POWER AT DOORS 1 & 2.

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REGISTERED PROFESSIONAL ENGINEER
16
OREGON
JULY 20, 1993
DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title
Attic Plan - Electrical

Drawing No.
E2.02

Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2022\22501 Table Rock Elementary School Modular Classroom\22501 e building.dwg Mar 23, 2023 - 9:27am

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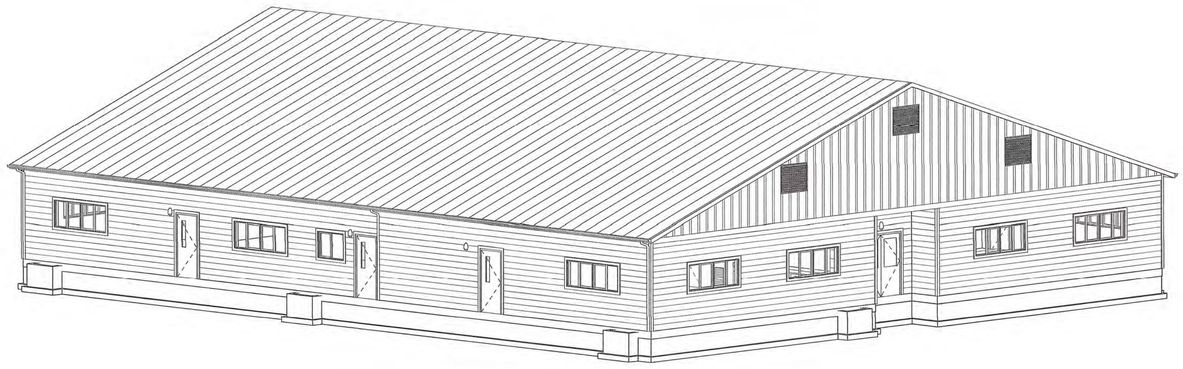
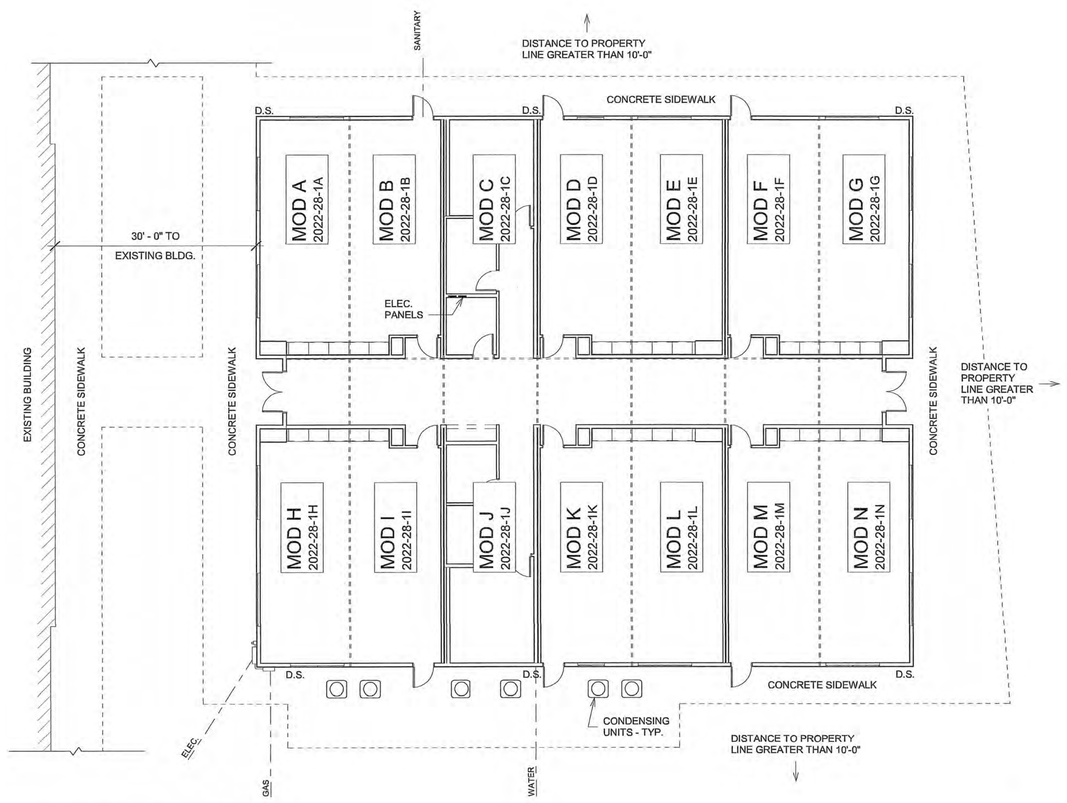
EAGLE POINT SD II

98' x 82' MODULAR CLASSROOM





BUILDING TO BE CRANE SET

1 SITE LAYOUT
3/32" = 1'-0"

GENERAL NOTES

1. THE TERM IBC SHALL APPLY TO THE CURRENT EDITION OF THE INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE STATES OF OREGON AND WASHINGTON. FOR PROJECTS IN ALL OTHER STATES IT SHALL APPLY TO THE CURRENT EDITION OF THE UBC OR IBC AS ADOPTED BY THAT STATE.
2. ALL CONTROLS AND HARDWARE SHALL BE ACCESSIBLE TO PERSONS WITH DISABILITIES.
3. WHERE REQUIRED, PORTABLE FIRE EXTINGUISHERS SHALL BE INSTALLED IN ACCORDANCE WITH OFC/IFC SECTION 906
4. PER WAC 296-150F-0605, TOILET FACILITIES IN AN ADJACENT FACILITY SHALL BE NOTED ON THE PLAN SUBMITTAL AND THAT THE REQUIREMENTS OF IBC CHAPTER 29, SECTION 2902.1 AND SECTION 2902.2 OF THE STATE BUILDING CODE MUST BE VERIFIED BY THE LOCAL JURISDICTION BUILDING OFFICIAL AND SHOWN ON THE NLEA.

   PER OAR 918-674-0015, REQUIRED TOILET FACILITIES MAY BE LOCATED IN AN ADJACENT FACILITY PER IBC CHAPTER 29, SECTION 2902.3.3 AND THE LOCAL JURISDICTION BUILDING OFFICIAL SHALL VERIFY THAT ADEQUATE FACILITIES ARE AVAILABLE BASED ON THE OVERALL OCCUPANT LOAD OF THE ENTIRE COMPLEX.
5. IF APPLICABLE, FIRE ALARM SYSTEM TO BE FIELD INSTALLED (BY OTHERS) PER OSSC/IBC SECTION 907.2.3, GROUP E. SEE ELECTRICAL PLAN FOR DEVICE LOCATIONS. FIRE ALARM INSPECTION AND APPROVAL PER LOCAL AUTHORITY HAVING JURISDICTION.
6. IF APPLICABLE, FIRE SAFETY AND EVACUATION PLANS SHALL BE PROVIDED BY OWNER PRIOR TO CERTIFICATE OF OCCUPANCY PER OFC/IFC SECTION 403
7. AN ACCESSIBLE ROUTE SHALL BE PROVIDED TO THE BUILDING AREA AS REQUIRED IN OSSC/IBC SECTION 1104
8. WHERE FLOOR LIVE LOAD EXCEEDS 50 PSF, A DURABLE SIGN SHALL BE CONSPICUOUSLY POSTED BY THE OWNER IN THE PART OF THE BUILDING WHERE THIS INCREASED FLOOR LIVE LOAD OCCURS PER OSSC/IBC SECTION 106.1

TYPICAL SYMBOLS LEGEND

- NORTH ARROW
- ELEVATION BUBBLE (1 Ref / A101)
- SECTION BUBBLE (1 / A101 SIM)
- DETAIL BUBBLE (1 / A101 SIM)
- DETAIL CALLOUT (1 / A101 SIM)
- GRID BUBBLE (0)
- ELEVATION LEVEL (Name Elevation)
- MODULE TAG (MOD A)
- WALL TAG (1i)
- DOOR TAG (101)
- WINDOW TAG (1i)
- REVISION TAG (1)
- CENTERLINE (℄)
- KEYNOTE (1)

SHEET INDEX

Sht. No.	Sheet Name	Current Rev.	Rev. Issued By
A 0.0	COVER SHEET		
A 0.1	FIRE & LIFE SAFETY PLAN		
A 1.0	FLOOR PLAN		
A 1.1	FLOOR PLAN - ATTIC		
A 1.2	ENLARGED PLANS & DETAILS		
A 1.3	REFLECTED CEILING PLAN		
A 2.0	EXTERIOR ELEVATIONS		
A 2.1	EXTERIOR ELEVATIONS		
A 3.0	FINISH NOTES & SCHEDULES		
A 4.0	INTERIOR ELEVATIONS		
S 1.0	FOUNDATION PLAN & NOTES		
S 1.1	FOUNDATION DETAILS		
S 2.0	FLR FRAMING PLANS & DETAILS		
S 2.1	SUB-ROOF FRAMING PLAN		
S 2.2	ROOF FRAMING PLAN		
S 3.0	BUILDING SECTIONS		
S 4.0	DETAILS		
S 4.1	DETAILS		
E 0.1	ELEC. PANELS & LOAD CALCS		
E 1.0	ELECTRICAL PLAN		
E 1.1	ELEC. & LIGHTING PLAN - ATTIC		
E 2.0	LIGHTING PLAN		
M 1.0	HVAC PLAN		
P 0.1	PLUMBING PLAN & NOTES		
P 1.0	PLUMBING SCHEMATICS		

SUPPLEMENTAL DRAWING INDEX

Sht. No.	*Sheet Name*	Dwgs By
M1.01	MECHANICAL LEGEND AND GENERAL NOTES	INSIGHT CONSULTING ENG.
M2.01	MECHANICAL PLAN	INSIGHT CONSULTING ENG.
M3.01	MECHANICAL SCHEDULES AND DETAILS	INSIGHT CONSULTING ENG.

ENERGY CODE NOTES

1. OREGON ENERGY COMPLIANCE IS PROVIDED PER OEESC AND ASHRAE 4.2.1.1(a)
2. ALL BUILDING THERMAL ENVELOPE INSULATION SHALL BE MARKED IN ACCORDANCE WITH ASHRAE 5.8.1.1 AND DOCUMENTED PER ASHRAE 5.8.1.11
3. WALL AND FLOOR INSULATION SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. FLOOR CAVITY INSULATION SHALL REMAIN IN CONTACT WITH UNDERSIDE OF FLOOR SHEATHING PER ASHRAE 5.8.1.5
4. PENETRATIONS OF THE AIR BARRIER SHALL BE CAULKED, GASKETED OR SEALED PER ASHRAE 5.4.3.1.2
5. OREGON AIR BARRIER COMPLIANCE: ALL AIR BARRIER MATERIALS SHALL BE ASTM E2178 RATED AS LISTED IN ASHRAE TABLE 5.8.3.1 FOOTNOTE (a) ITEMS 1-13
6. ALL FENESTRATION ASSEMBLIES SHALL BE LABELED BY THE MANUFACTURER PER ASHRAE 5.8.2.2
7. AIR ECONOMIZER SHALL BE CAPABLE OF PROVIDING 100% OUTSIDE AIR PER ASHRAE 6.5.1.1.1
8. ECONOMIZER HIGH-LIMIT SHUTOFF CONTROL IS ELECTRONIC ENTHALPY PER MANUFACTURER'S SPECIFICATIONS, ASHRAE 6.5.1.1.3
9. MECHANICAL VENTILATION SYSTEM SHALL HAVE THE CAPABILITY TO REDUCE THE OUTSIDE AIR SUPPLY TO THE MINIMUM REQUIRED PER ASHRAE 6.5.3.2.1 AND 6.5.3.7(a)
10. OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL BE RATED PER ASHRAE TABLE 6.4.3.4.3 TO INCLUDE CLASS I MOTORIZED DAMPERS WITH MAXIMUM AIR LEAKAGE RATE OF 10 CFM/FT² (GRAVITY BACK-DRAFT DAMPER MAY BE USED FOR RESTROOM EXHAUST FANS WHEN AIR FLOW IS LESS THAN 300 CFM)
11. COMPLIANCE WITH ASHRAE 5.4.3.3 VESTIBULES TO BE PER OEESC E301.2(b)

SYSTEM COMMISSIONING NOTES

1. PRIOR TO CONSTRUCTION, A COMMISSIONING PLAN SHALL BE DEVELOPED TO INSURE PROPER INSTALLATION AND TESTING OF BUILDING SYSTEMS AS FOLLOWS:

A.) MECHANICAL SYSTEM PER ASHRAE 6.9.2 — NOT REQUIRED (EXCEPTION #2, PER ASHRAE 4.2.5.2)
SERVICE WATER HEATING PER ASHRAE 7.9.2 — NOT REQUIRED (EXCEPTION #2, PER ASHRAE 4.2.5.2)
LIGHTING AND CONTROLS PER ASHRAE 9.9.2 — NOT REQUIRED (EXCEPTION #2, PER ASHRAE 4.2.5.2)
OTHER EQUIPMENT CONTROLS PER ASHRAE 10.9.2 — NOT REQUIRED (EXCEPTION #2, PER ASHRAE 4.2.5.2)

ABBREVIATIONS

A.B.	ANCHOR BOLT	FD	FLOOR DRAIN	MAX.	MAXIMUM	SC	SOLID CORE
ADJ.	ADJUSTABLE	FDN	FOUNDATION	MDO	MEDIUM DENSITY OVERLAY	SF	STOREFRONT
A.F.F.	ABOVE FINISH FLOOR	F.E.	FIRE EXTINGUISHER	MECH.	MECHANICAL	SH	SINGLE HUNG
AL	ALUMINUM	F.E.C.	FIRE EXTINGUISHER CABINET	MFR.	MANUFACTURER	SHT.	SHEET
BA	BRONZE ANODIZED	FGL	FIBERGLASS	MIN.	MINIMUM	SHTG.	SHEATHING
BD.	BOARD	FLR.	FLOOR	MISC.	MISCELLANEOUS	SIM.	SIMILAR
BLK.	BLOCK	FIN.	FINISH	M.L.	MARRIAGE LINE	SIMP.	SIMPSON
B.O.	BOTTOM OF	F.O.FIN.	FACE OF FINISH	MOD	MODULE	SQ.	SQUARE
BOT.	BOTTOM	F.O.FRM	FACE OF FRAMING	MPL	MAPLE	S.S.	STAINLESS STEEL
BRCH	BIRCH	FRT	FIRE-RESISTANT TREATED	MTL.	METAL	STN.	STAIN
BV.	BOTTOM VENT	FS	FLOOR SINK	MV	MIXING VALVE	STRUCT.	STRUCTURAL
CDR.	CEDAR	FTAO	FORCE TRANSFER AROUND OPENINGS	N.I.C.	NOT IN CONTRACT	TIM.	TIMELY
CJ	CONTROL JOINT	GA.	GAUGE	NOM.	NOMINAL	TMP	TEMPERED SAFETY GLAZING
CL	CENTERLINE	GALV.	GALVANIZED	NRW	NARROW (LITE)	T.O.	TOP OF
CLG.	CEILING	G.C.C.	GENERAL CONTRACTOR COORDINATE (NOT BY MODERN - SITE INSTALLED)	NTS	NOT TO SCALE	TTP	TAPE, TEXTURE & PAINT
CLR.	CLEAR			OBS	OBSCURE	TYP.	TYPICAL
CMU	CONCRETE MASONRY UNIT	GLB	GLULAM BEAM	O.C.	ON CENTER	U.N.O.	UNLESS NOTED OTHERWISE
C.O.	CLEAN OUT	GYP.	GYPSUM	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED	UR	URINAL
CONC.	CONCRETE	HB	HOSE BIB	OFOI	OWNER FURNISHED OWNER INSTALLED	VCT	VINYL COMPOSITION TILE
CONT.	CONTINUOUS	HC	HOLLOW CORE	OPP.	OPPOSITE	V.C.	VINYL COATED
CPT	CARPET	HF	HEM FIR	OSA	OUTSIDE AIR	VWS	VINYL WRAP SURROUND
DBL.	DOUBLE	HM	HOLLOW METAL	O.S.B.	ORIENTED STRAND BOARD	W/	WITH
DF	DRINKING FOUNTAIN	HSS	HOLLOW STRUCTURAL SECTION	OVHG	OVERHANG	WC	WATER CLOSET
DIA.	DIAMETER	INFO.	INFORMATION	PD	PUNCH & DIMPLE	WD.	WOOD
DIM.	DIMENSION	INSUL.	INSULATION	PF	PREFINISHED	WH	WATER HEATER
DS	DOWNSPOUT	INT.	INTERIOR	PLAM	PLASTIC LAMINATE		
DTL	DETAIL	KD	KNOCK DOWN	PLCS	PLACES		
DW	DISHWASHER	L	LONG	PLYWD	PLYWOOD		
EA.	EACH	LAV	LAVATORY	PNT	PAINT		
ELEC.	ELECTRICAL	LH	LEFT HAND	P.T.	PRESSURE TREATED		
ELEV.	ELEVATIONS	LHOS	LEFT HAND OUT SWING	REFRIG.	REFRIGERATOR		
EQUIP.	EQUIPMENT	LVL	LAMINATED VENEER LUMBER	REQ'D	REQUIRED		
EXIST.	EXISTING			RH	RIGHT HAND		
EXT.	EXTERIOR			RHOS	RIGHT HAND OUT SWING		
E.W.	EACH WAY			R.O.	ROUGH OPENING		

DESIGN PROFESSIONAL

KENNETH A RASMUSSEN P.E.
MODERN BUILDING SYSTEMS, INC.
9493 PORTER RD. SE AUMSVILLE, OR 97325
503-749-4949
kenr@modernbuildingsystems.com

3/29/23
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 10, 2015
KENNETH A RASMUSSEN
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 749-4949 FAX: (503) 749-4900
P.O. BOX 110, 9493 PORTER ROAD, AUMSVILLE, OR 97325
CHECK OUT OUR WEB PAGE: www.modernbuildingsystems.com

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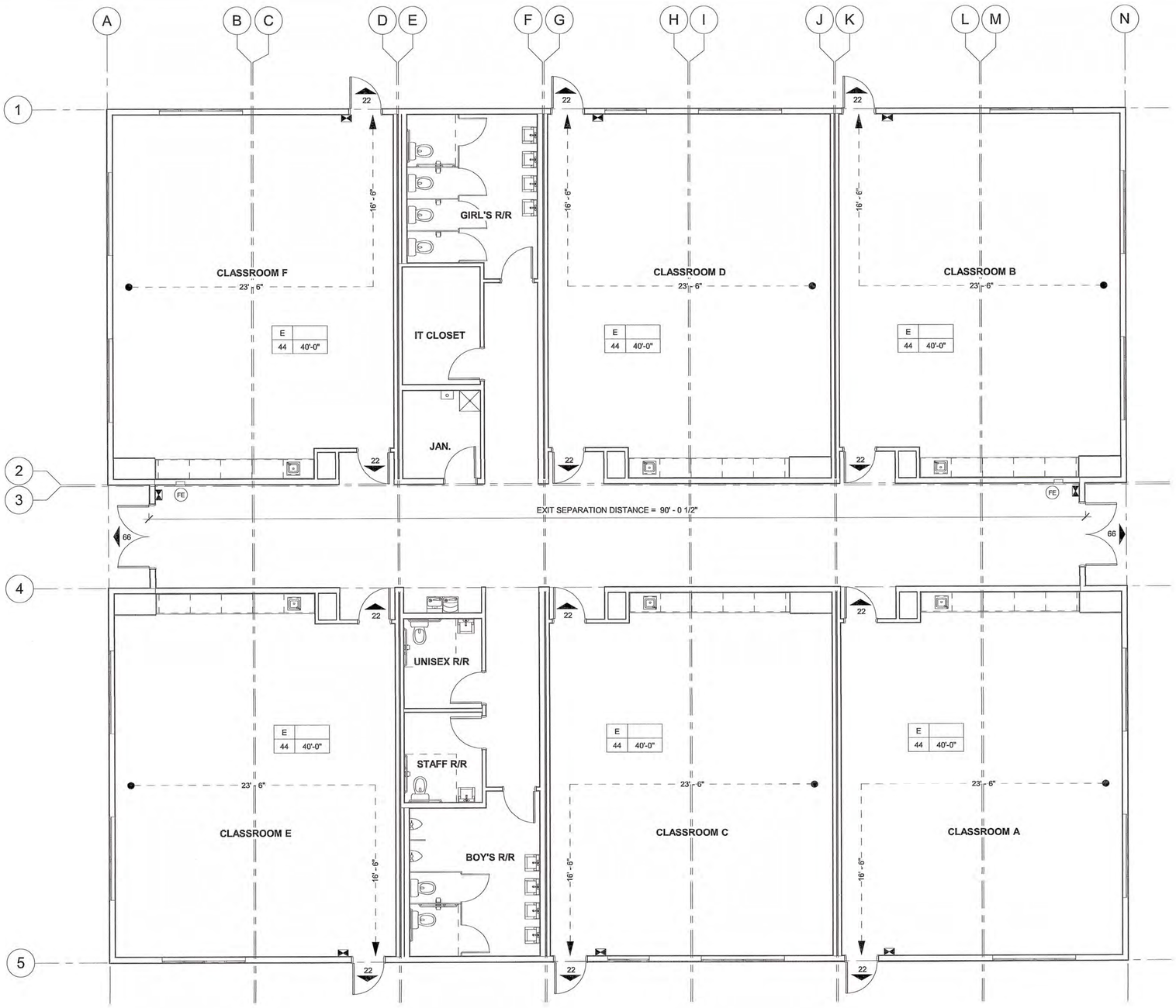
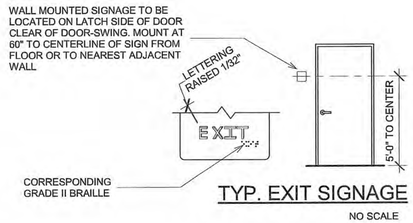
SHEET	COVER SHEET	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	A 0.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



1 FIRE & LIFE SAFETY PLAN
3/16" = 1'-0"



TYP. EXIT SIGNAGE
NO SCALE

2 SIGNAGE - EXIT
1" = 1'-0"

DESIGN CRITERIA

GENERAL:	
CONSTRUCTION TYPE	VB (NON-SPRINKLERED)
OCCUPANCY GROUP (OSSC CH. 3)	E (PRIMARY/ELEMENTARY SCHOOL)
BUILDING AREA / STORIES (OSSC TABLE 504.4, 506.2)	ALLOWABLE: 9,500 SQ. FT. / (1) STORY ACTUAL: 7,942 SQ. FT. / (1) STORY
DISTANCE TO PROPERTY LINE OR ASSUMED PROPERTY LINE	NORTH: 10' MIN.
	SOUTH: 10' MIN.
	EAST: 10' MIN.
	WEST: 10' MIN.
EXTERIOR WALL RATING (OSSC TABLE 602)	FIRE SEPARATION DISTANCE 10' OR GREATER, NO RATING REQUIRED
OCCUPANCY LOAD (OSSC TABLE 1004.5)	266 OCCUPANTS, SEE SUMMARY ON SHEET A 0.1
FIRE RESISTIVE RATING REQUIREMENTS	NONE REQUIRED
ATTIC DRAFTSTOPPING (OSSC SEC. 718.4)	REQUIRED, SEE A 1.1, S 2.1, & S 2.2 FOR LOCATIONS
NUMBER OF EXITS (OSSC SEC. 1006)	REQUIRED: (2), PROVIDED: (2)
COMMON PATH OF EGRESS (OSSC TABLE 1006.2.1)	ALLOWABLE: 75 FEET W/O FIRE SPRINKLERS, ACTUAL: SEE PLAN
TWO EXITS OR EXIT ACCESS DOORWAYS (OSSC SEC. 1007)	ALLOWABLE EXIT SEPARATION DISTANCE NOT LESS THEN 1/2 DIAGONAL DISTANCE (IBC 1007.1.1), DIAGONAL DISTANCE = 125'-2" / 2 = 62'-7", ACTUAL EXIT SEPARATION DISTANCE = 90'-0"
EXIT ACCESS TRAVEL DISTANCE (OSSC TABLE 1006.3.3(2), 1017.2)	ALLOWABLE: 200 FEET W/O FIRE SPRINKLERS, ACTUAL: SEE PLAN
CORRIDOR CONSTRUCTION (OSSC SEC. 1020 & TABLE 1020.1)	FIRE RATING NOT REQUIRED, EXCEPTION #1
CORRIDOR WIDTH (OSSC TABLE 1020.2)	REQUIRED: 72" MINIMUM, ACTUAL: 120"
ELECTRICAL:	
ELECTRICAL SERVICE LOAD	400A / 120/208V / 3 PH. 83.6 kVA
MECHANICAL:	
VENTILATION OCCUPANCY LOAD (IMC TABLE 403.3.1.1)	204 OCCUPANTS (SEE MECHANICAL DRAWINGS BY INSIGHT CONSULTING ENG.)
CLIMATE ZONE	4C
HEATING	GAS FURNACE
AIR-CONDITIONING	YES
PLUMBING:	
PLUMBING OCCUPANCY LOAD (OSSC TABLE 1004.5, 2902.1)	266 (133 MALE / 133 FEMALE)
PLUMBING FIXTURES REQUIRED (OSSC TABLE 2902.1)	WC: (6); LAV: (6); DRINKING FOUNTAIN: (1)
PLUMBING FIXTURES PROVIDED	WC: (8); LAV: (10); DRINKING FOUNTAIN: (2)
QUANTITY OF PLUMBING FIXTURES	34
STRUCTURAL:	
REQUIRED SPECIAL INSPECTIONS	SUSPENDED CEILING W/ BERC CLIPS
ROOF SNOW LOAD	25 PSF
FLOOR LIVE LOAD	50 PSF, 100 PSF
WIND LOAD	Lambda = 1.00 Vult = 120 MPH (Vasd = 93 MPH) 3 SECOND GUST - EXP. B
SEISMIC	BEARING WALL SYSTEM: S_S = 0.611, F_a = 1.312 S_{DS} = 0.534, RISK CATEGORY III I_e = 1.25, SEISMIC DESIGN CATEGORY D, SITE CLASS D

THIS SET OF PLANS PREPARED AND SUBMITTED FOR APPROVAL UNDER THE FOLLOWING CODES:

BUILDING	2019 OSSC
MECHANICAL	2019 OMSC
FIRE	2019 OFC
PLUMBING	2021 OPSC
ELECTRICAL	2021 OESC
ENERGY	2021 OEESC/ASHRAE 90.1-2019
ACCESSIBILITY	ICC A117.1-2009

OCCUPANT LOAD SCHEDULE

Name	Function Of Space	Area	Load Factor	Occupant Load
CLASSROOM A	EDUCATIONAL	883 SF	20	44
CLASSROOM B	EDUCATIONAL	883 SF	20	44
CLASSROOM C	EDUCATIONAL	889 SF	20	44
CLASSROOM D	EDUCATIONAL	889 SF	20	44
CLASSROOM E	EDUCATIONAL	883 SF	20	44
CLASSROOM F	EDUCATIONAL	883 SF	20	44
Total				266

FIRE AND LIFE SAFETY SYMBOLS LEGEND

OCC. GROUP → X | X'-X" ← COMMON PATH DISTANCE
OCC. LOAD → X | X'-X" ← EXIT ACCESS DISTANCE

10 EXIT LOAD

PATH OF EGRESS

EGRESS START POINT

EGRESS DIRECTION

FE FIRE EXTINGUISHER (BY MODERN SUBCONTRACTOR)

EXIT SIGNAGE, SEE DETAIL 2 / A 0.1

FIRE AND LIFE SAFETY PLAN NOTES

1. FIRE DEPARTMENT KEY BOX AND LOCATION TO BE PROVIDED BY OTHERS
2. FIRE EXTINGUISHERS TO BE 5LB 2:A, 10:BC
3. BUILDING ADDRESS IDENTIFICATION AND LOCATION TO BE PROVIDED AND MAINTAINED BY OTHERS

3/29/23
REGISTERED PROFESSIONAL ENGINEER
OREGON
JUSTIN A. RASMUSSEN
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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MODERN BUILDING SYSTEMS
MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 749-4949 FAX: (503) 749-4950
P.O. BOX 110, 9450 PORTER ROAD, AUMSVILLE, OR 97325
OFFICE@MODERNBUILDINGSYSTEMS.COM WEB PAGE: WWW.MODERNBUILDINGSYSTEMS.COM
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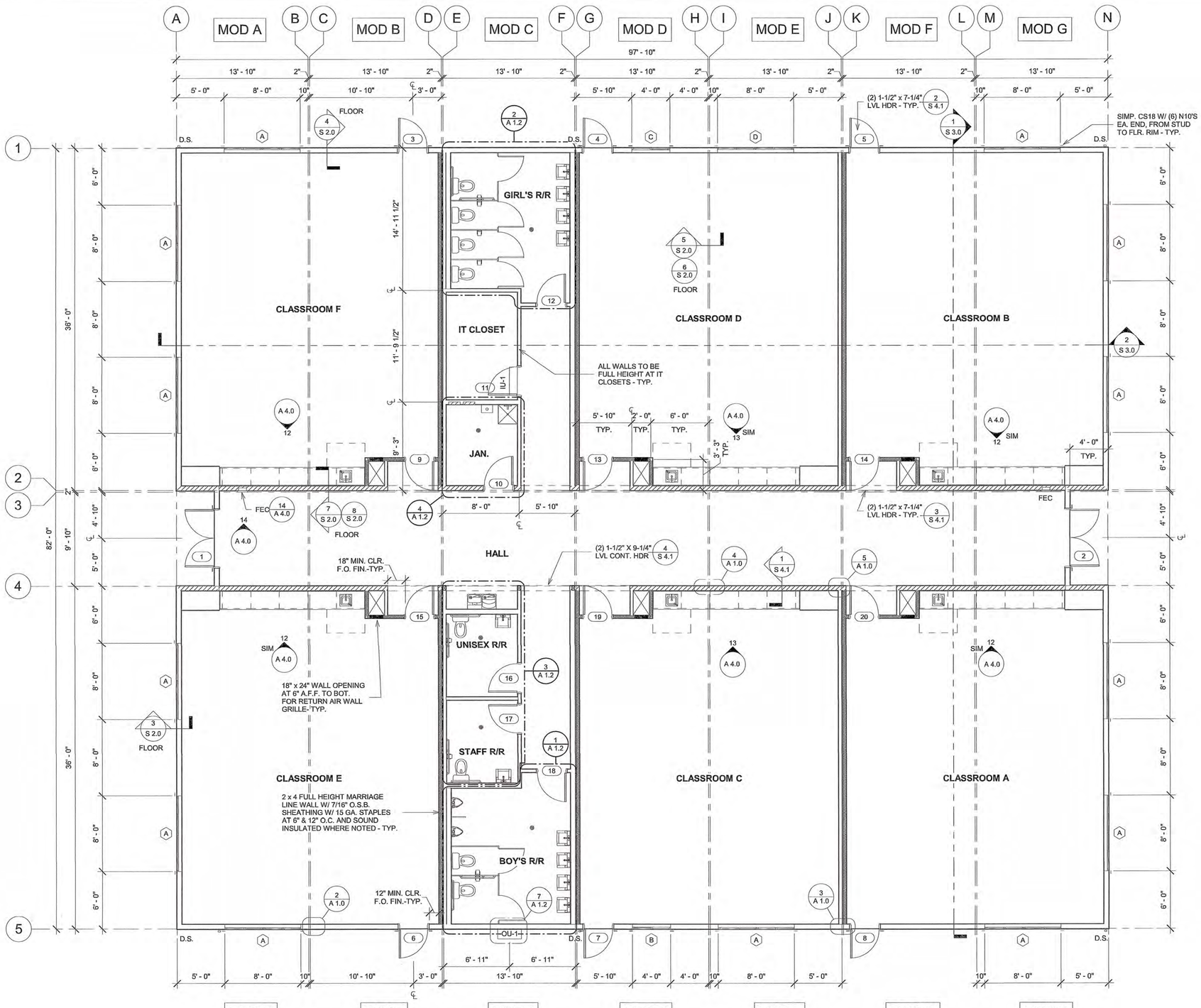
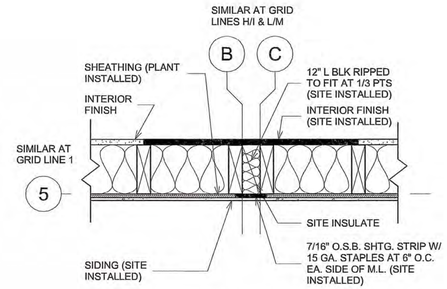
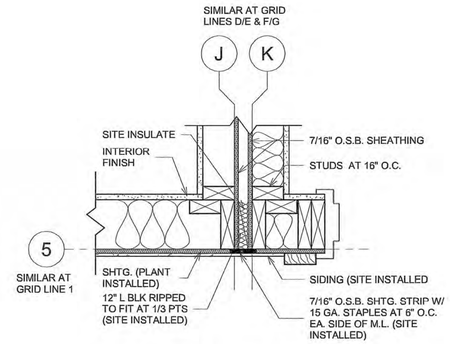
SHEET	FIRE & LIFE SAFETY PLAN	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	A 0.1
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023



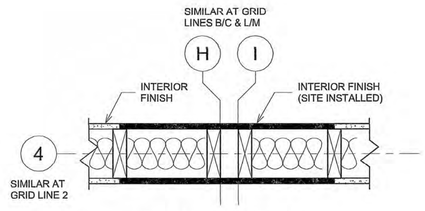
1 FLOOR PLAN
3/16" = 1'-0"



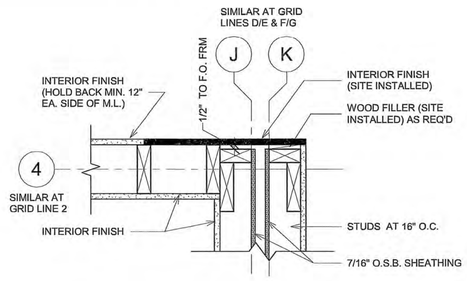
2 WALL - EXT. MARRIAGE
1 1/2" = 1'-0"



3 WALL - EXT. MARRIAGE AT PARTITION
1 1/2" = 1'-0"



4 WALL - INT. MARRIAGE
1 1/2" = 1'-0"



5 WALL - INT. MARRIAGE AT PARTITION
1 1/2" = 1'-0"

FLOOR PLAN WALL LEGEND

	2 x 6 EXTERIOR WALLS (U.N.O.) / 2 x 4 INTERIOR WALLS (U.N.O.)
	2 x 6 INTERIOR FULL HEIGHT LOAD BEARING WALLS WITH SOUND INSULATION PER SHEET A3.0
	2 x 4 INTERIOR FULL HEIGHT WALLS WITH SOUND INSULATION PER SHEET A3.0

FIRE BLOCKING SHALL BE PROVIDED IN CONCEALED SPACES OF STUD WALLS AND PARTITIONS, INCLUDING FURRED SPACES, AND PARALLEL ROWS OF STUDS OR STAGGERED STUDS. VERTICALLY AT CEILING AND FLOOR LEVELS, AND HORIZONTALLY AT INTERVALS NOT EXCEEDING TEN FEET.

FLOOR JOIST LAYOUT STARTED FROM GRIDS '1' AND '3'. SEE SHEET S 2.0 FOR PLUMBING BLOCK-OUT LOCATIONS

REV.	DESCRIPTION	DATE	BY

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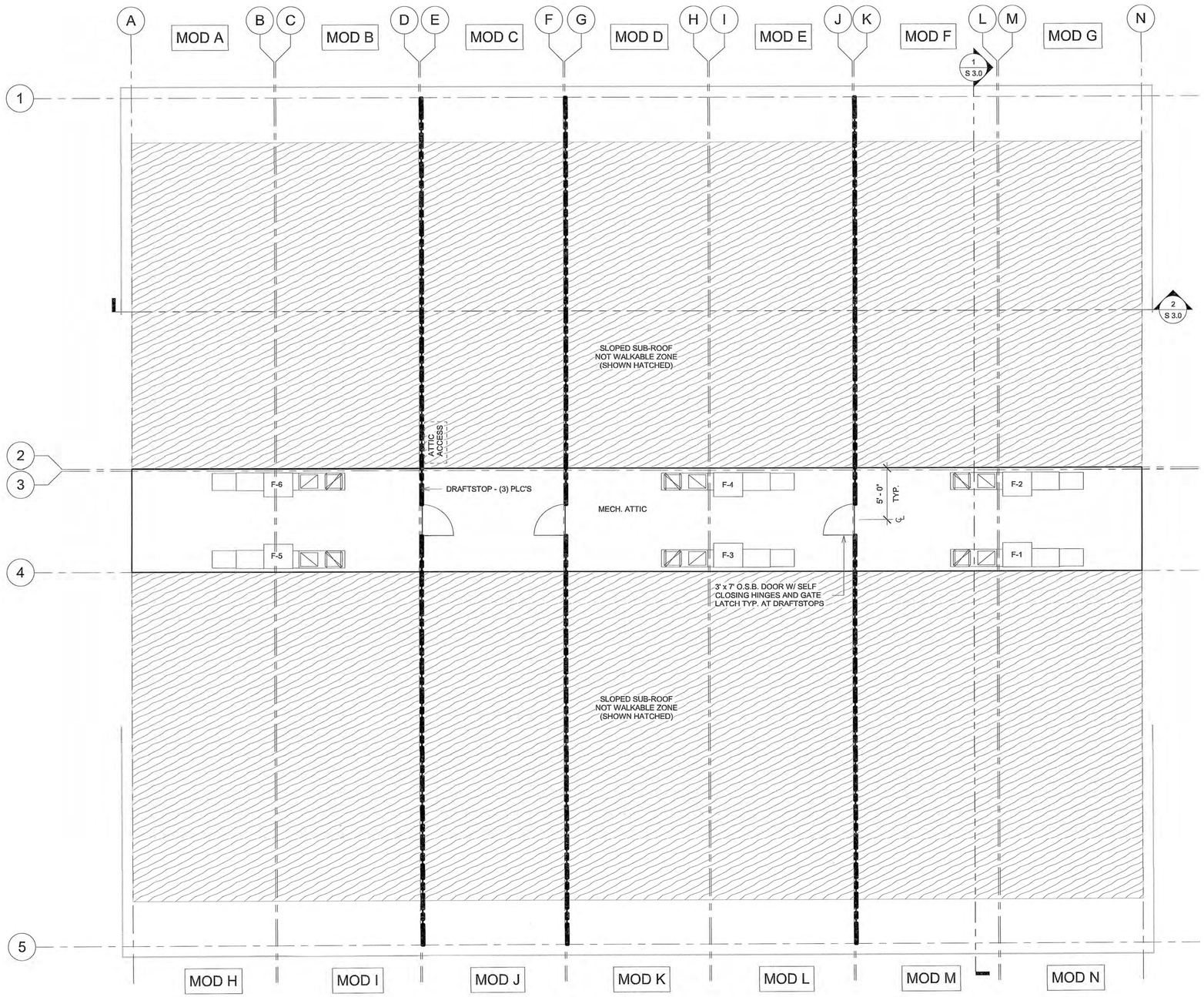
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 15, 2008
BRIAN A. JAMISON
3/24/23
EXPIRES: 12/31/24

SHEET FLOOR PLAN
PROJ. 98' x 82' MODULAR CLASSROOM
EAGLE POINT SD II
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503

JOB# 2022-LB-28
SHEET # A 1.0
DRW BJ
DATE 3/29/2023



1 FLOOR PLAN - ATTIC
3/16" = 1'-0"

3/29/23
REGISTERED PROFESSIONAL ENGINEER
OREGON
JUL 10, 1998
KEITH A. RAS MUSSEN
EXPIRES: 12/31/24

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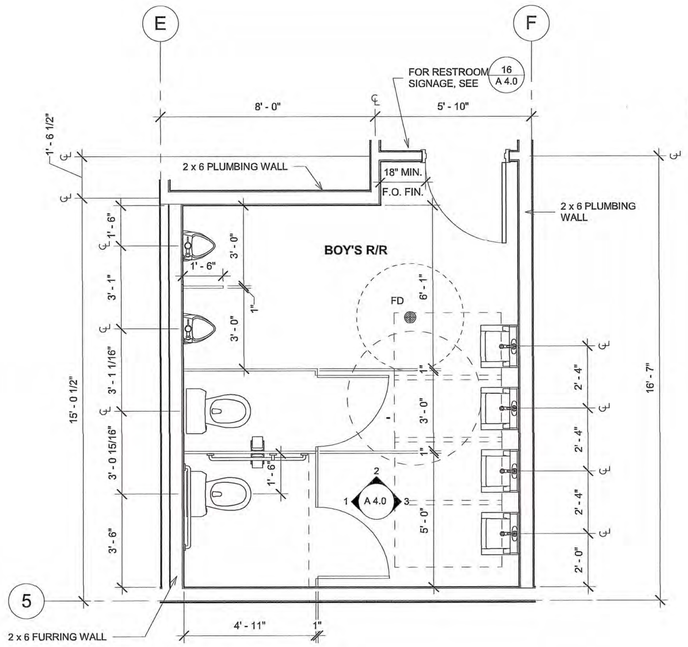
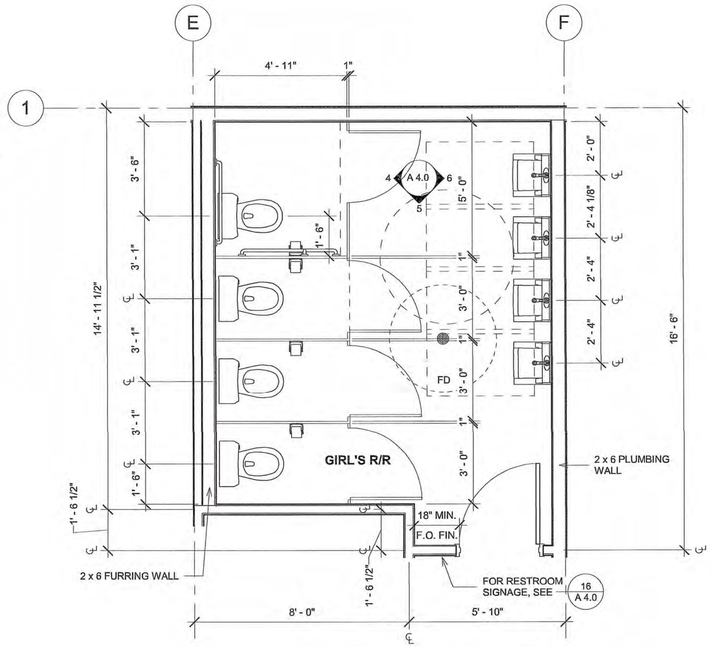
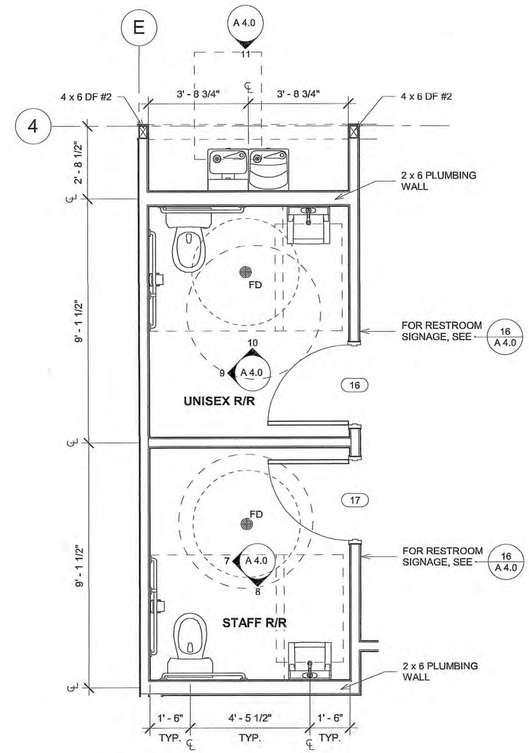
SHEET FLOOR PLAN - ATTIC
PROJ. 98' x 82' MODULAR CLASSROOM
EAGLE POINT SD II
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503
DRW BJ
JOB# 2022-LB-28
SHEET # A 1.1
DATE 3/29/2023



1 ENLARGED PLAN - BOY'S R/R
3/8" = 1'-0"



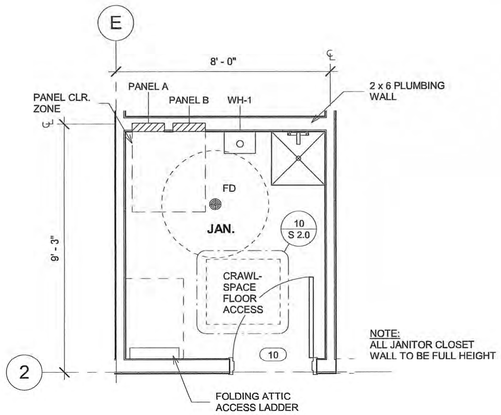
2 ENLARGED PLAN - GIRL'S R/R
3/8" = 1'-0"



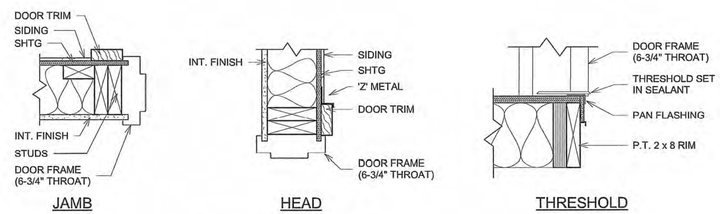
3 ENLARGED PLAN - STAFF & UNISEX R/R
3/8" = 1'-0"

ENLARGED PLAN NOTES

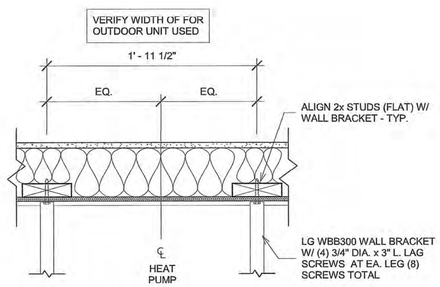
1. PLUMBING FIXTURE AND PARTITION DIMENSIONS ARE FROM FACE OF FINISH (U.N.O.)
2. SLOPE FLOOR 4'-0" DIA. AROUND FLOOR DRAIN, MIN. 1/16" SLOPE. ADD 2x (FLAT) BLOCK AT ALL EDGES - TYP.



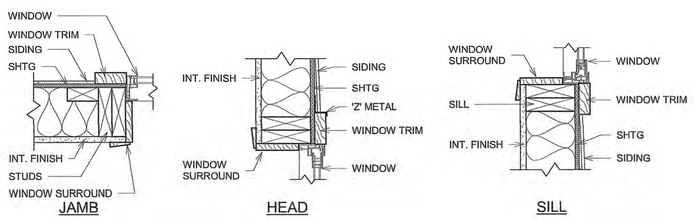
4 ENLARGED PLAN - JAN.
3/8" = 1'-0"



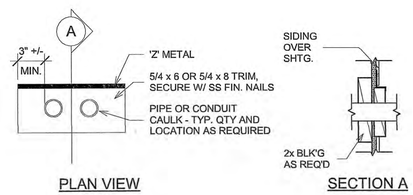
5 DOOR - EXTERIOR DETAILS
1 1/2" = 1'-0"



7 WALL - HEAT PUMP MOUNTING
1 1/2" = 1'-0"



6 WINDOW - EXTERIOR DETAILS
1 1/2" = 1'-0"



8 WALL - EXT. PENETRATION
1 1/2" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 2013
BRIAN A. JAMES
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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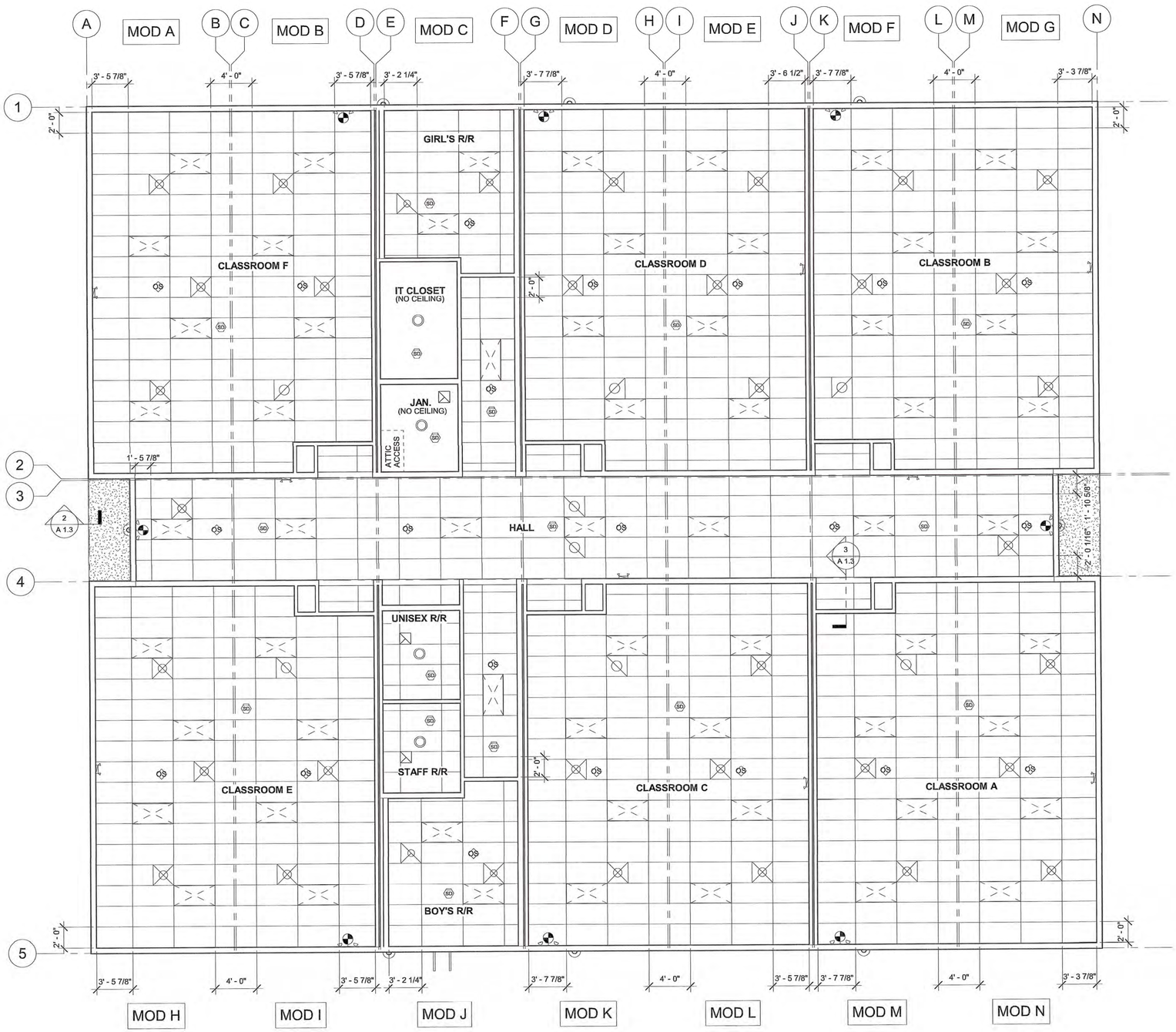
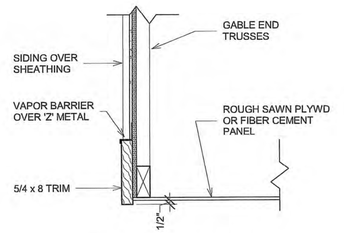
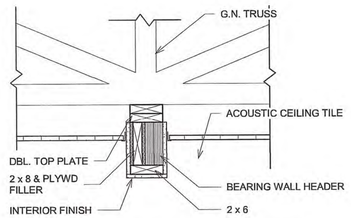
SHEET ENLARGED PLANS & DETAILS
JOB# 2022-LB-28
PROJ. 98' x 82' MODULAR CLASSROOM
EAGLE POINT SD II
SHEET # A 1.2
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503
DRW BJ
DATE 3/29/2023



1 REFLECTED CEILING PLAN
3/16" = 1'-0"



2 SOFFIT - ENTRY ALCOVE
1 1/2" = 1'-0"



3 BEARING WALL HEADER AT ALCOVES
1" = 1'-0"

REFLECTED CEILING PLAN NOTES

1. DIMENSIONS TO FLOOR, WALLS AND CEILING ARE TO FACE OF FINISH (U.N.O.)

REFLECTED CEILING SYMBOLS LEGEND	
SYMBOL	DESCRIPTION
	2' x 4' LED LAY-IN FIXTURE
	SURFACE MOUNT FIXTURE
	EXTERIOR WALL MOUNTED LIGHT FIXTURE
	EXIT LIGHT
	EMERGENCY LIGHT
	OCCUPANCY SENSOR
	LAY-IN SUPPLY DIFFUSER
	LAY-IN RETURN GRILLE
	EXHAUST FAN
SD	SMOKE DETECTOR

REV.	DESCRIPTION	DATE	BY

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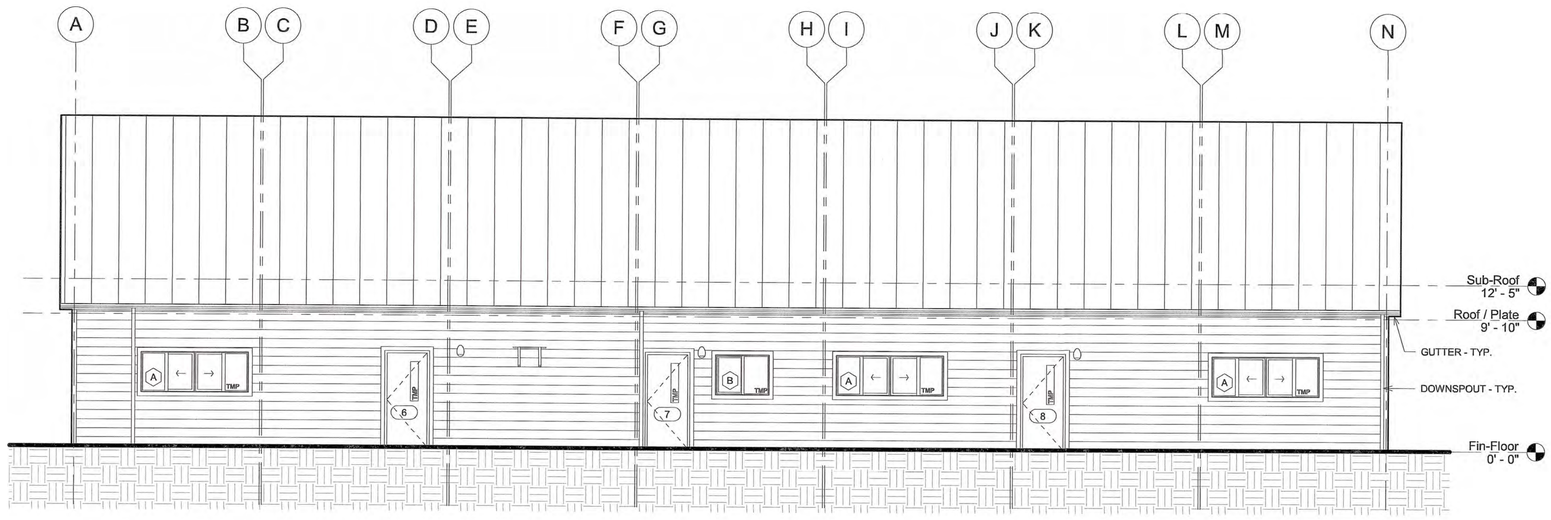
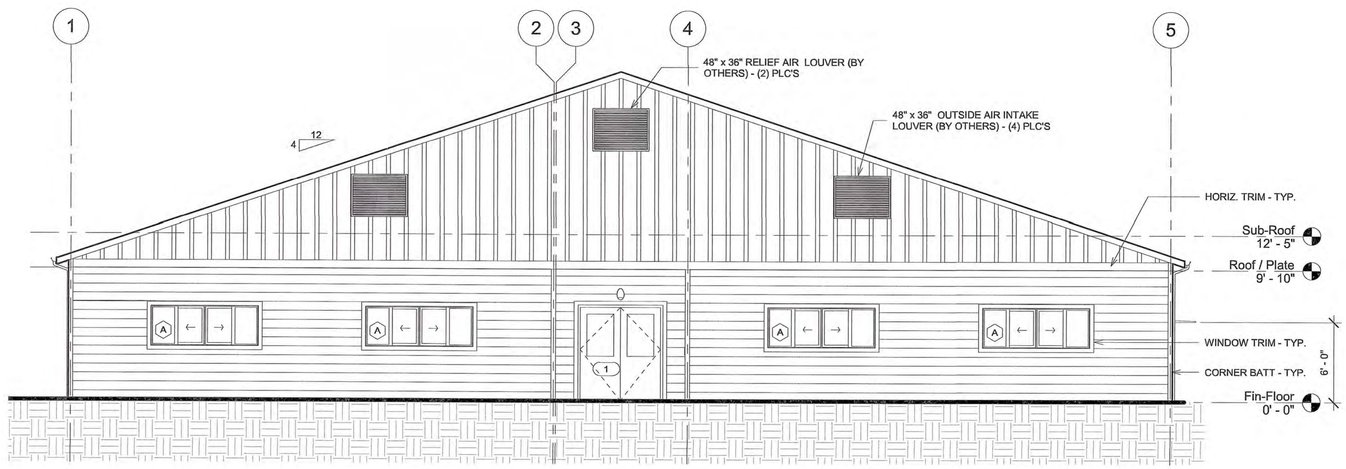
REGISTERED PROFESSIONAL ENGINEER
OREGON
EXPIRES: 12/31/24

SHEET	REFLECTED CEILING PLAN	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	A 1.3
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



1 EAST ELEVATION
3/16" = 1'-0"



2 SOUTH ELEVATION
3/16" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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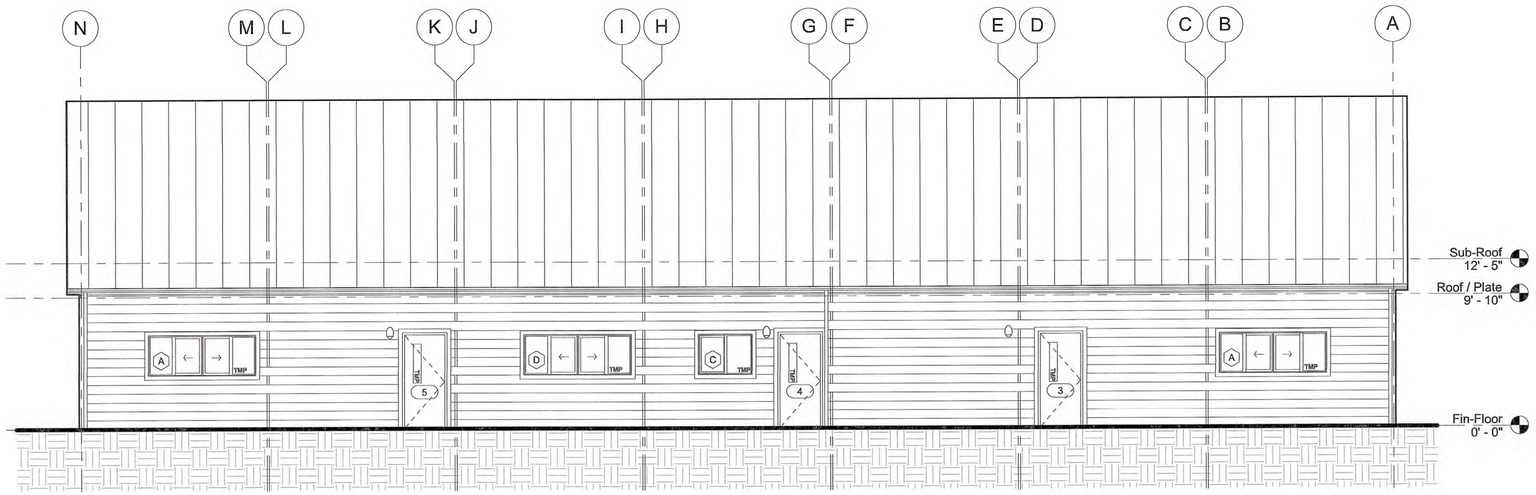
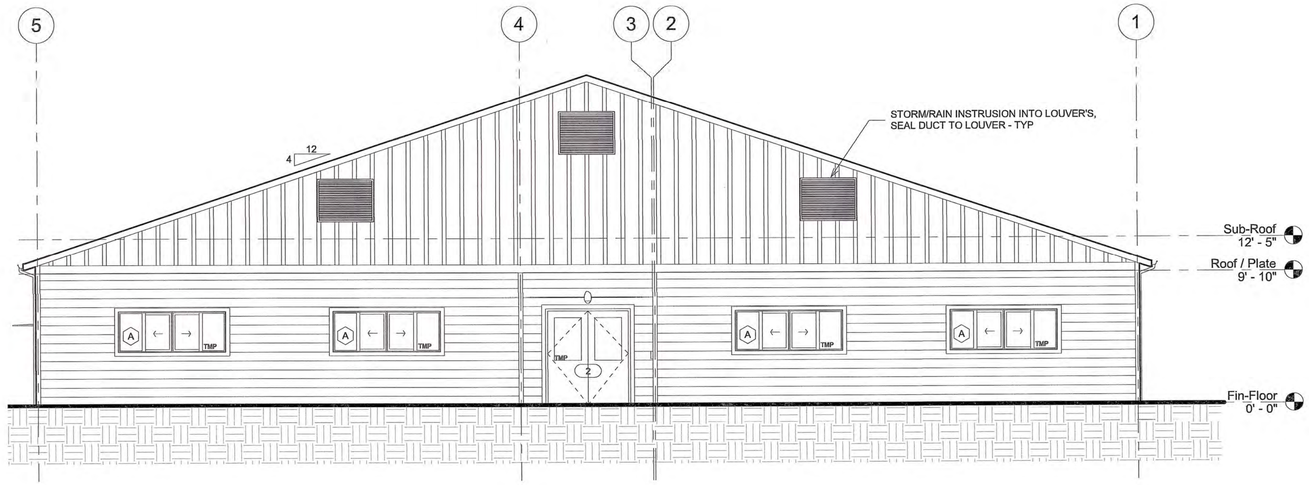
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 2007
BRIAN K. JOHNSON
EXPIRES: 12/31/24

3/29/23

SHEET EXTERIOR ELEVATIONS		JOB# 2022-LB-28
PROJ. 98' x 82' MODULAR CLASSROOM EAGLE POINT SD II		SHEET # A 2.0
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



1 WEST ELEVATION
3/16" = 1'-0"



2 NORTH ELEVATION
3/16" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 15, 1994
BRETT A. HASMANN
EXPIRES: 12/31/24

7/29/13

SHEET EXTERIOR ELEVATIONS		JOB# 2022-LB-28
PROJ. 98' x 82' MODULAR CLASSROOM EAGLE POINT SD II		SHEET # A 2.1
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023

FLOOR CONSTRUCTION

FINISH: SHEET VINYL AT RESTROOM, JANITOR AND IT, LVT AT BALANCE

HALL FLOOR MATERIAL SHALL NOT BE LESS THAN (CLASS II) CRITICAL FLUX PER 2019 OSSC SECTION 804.4.2

BASE: 6" VINYL AT RESTROOMS, JANITOR, 4" VINYL AT BALANCE

UNDERLAYMENT: 1/4" CCP THRU-OUT

SUBFLOOR: (2) LAYERS 23/32" APA RATED SHEATHING (24) (ACTS AS 1 PERM MAX. VAPOR BARRIER) (ACTS AS AIR BARRIER)

JOISTS: 2 x 8 DF #2 AT 16" O.C., (3) 2 x 8 DF #2 AT LOAD BEARING WALLS

RIM JOISTS: MURPHY LVL 3100 Fb - 2.0E, 1-1/2" W x 7-1/4" D (ESR-1387 AND ESR-2913)

OFFSET RIMS: P.T. 2 x 8 (U.N.O.)

INSULATION: R-30 U (FIBERGLASS BATTS)

BOTTOM CLOSURE: FS-25

EXTERIOR WALL CONSTRUCTION

PLATE HEIGHT: 9'-10"

SIDING: FIBER CEMENT LAP SIDING (CEDARMILL) W/ 8" EXPOSURE & FIBER CEMENT PANEL (CEDARMILL) W/ 1 x 3 BATTS AT 16" O.C. AT GABLES, OVER BARRIER WRAP (ACTS AS A WATER RESISTIVE BARRIER) (ACTS AS AIR BARRIER)

SHEATHING: 7/16" OSB (24/16)

STUDS: 2 x 6 DF STUD GRADE AT 16" O.C. (U.N.O.)

INSULATION: R-21 K (FIBERGLASS BATTS)

HEADERS TO BE (2) 2x W/ MIN. R-10 INSULATION BETWEEN. SEE DOOR AND WINDOW SCHEDULE FOR SIZE.

INTERIOR FINISH: 5/8" GYPSUM BOARD WITH TAPE, TEXTURE AND PAINT (TTP)

F.R.P. OVER WATER RESISTANT GYPSUM BOARD (ALL WALLS) AT RESTROOMS

SKIRT: NONE

INTERIOR WALL CONSTRUCTION

PLATE HEIGHT: 9'-10" AT LOAD BEARING, JANITORS CLOSET, IT CLOSET, MARRIAGE LINE AND INSULATED WALLS, 9'-1 1/8" AT BALANCE (U.N.O.)

STUDS: 2 x 4 HF STUD GRADE AT 16" O.C., 2 x 6 DF #2 AT 16" O.C. FOR LOAD BEARING WALLS

INSULATION: R-11 MINERAL WOOL (SOUND BATTS), WHERE INDICATED ON FLOOR PLAN

INTERIOR FINISH: 5/8" GYPSUM BOARD WITH TAPE, TEXTURE AND PAINT (TTP)

F.R.P. OVER WATER RESISTANT GYPSUM BOARD (ALL WALLS) AT RESTROOMS AND AT BOTH SIDES OF MOP SINK (2'-0" BEYOND EDGE) AT JANITOR

FINISH TO BE FULL HEIGHT AT JANITORS CLOSET, IT CLOSET WALLS WITH SOUND INSULATION (U.N.O.)

CEILING NOTES

CEILING HEIGHT: 7'-11" AT RESTROOMS, 9'-0" AT BALANCE

CEILING: SUSPENDED T-GRID W/ ACOUSTIC TILE

SUSPENDED T-GRID W/ ACOUSTIC TILE (REF: ESR-1308)

INSTALL ARMSTRONG 7301 HEAVY DUTY MAIN W/ 7/8" ANGLE AND BERC CLIPS

SPECIAL INSPECTION REQUIRED IN SEISMIC DESIGN CATEGORIES C, D, E AND F

SUB-ROOF CONSTRUCTION

SUB-ROOFING: FULLY ADHERED 45 MIL. EPDM OR TPO AT FLAT PART OF CHOP TRUSS AND ICE AND WATER SHIELD AT SLOPED OF CHOP TRUSS

SHEATHING: 15/32" CDX (32/16) AND CEDAR TEXTURE PANEL (NO GROOVES) FACE DOWN AT EXPOSED OVERHANGS. 7/16" OSB (24/16) AND 23/32" CDX (48/24) SUB-ROOFING

SOFFIT AT ENTRY ALCOVE: ROUGH SAWN PLYWOOD OR FIBER CEMENT PANEL

FRAMING: G.N. TRUSSES AT 24" O.C.

INSULATION: MIN. R-38 (CELLULOSE) W/ BOTTOM CLOSURE (ACTS AS 1 PERM MAX. VAPOR BARRIER) (ACTS AS AIR BARRIER)

OVERHANG: 12"

ROOF PITCH: 4 IN 12 AND 1/16 IN 12

ROOF CONSTRUCTION

ROOFING: 26 GA. STANDING SEAM METAL OVER (1) LAYER SYNTHETIC FELT (MIN. CLASS B), FASTENING PER MANUFACTURER INSTRUCTIONS

ICE AND WATER SHIELD OR MOP MIN. 2'-0" INSIDE WALL LINE AT EAVES

SHEATHING: 15/32" CDX (32/16) AND CEDAR TEXTURE PANEL (NO GROOVES FACE DOWN AT EXPOSED OVERHANGS (ACTS AS AIR BARRIER)

FRAMING: G.N. TRUSSES AT 24" O.C.

INSULATION: NONE

OVERHANG: 12"

ROOF PITCH: 4 IN 12

EXTERIOR NOTES

CORNER BATTS: 5/4 x 4 FIBER CEMENT OVER FULL HEIGHT 2" x 2" GALV. FLASHING W/ CAULK

FASCIA: 5/4 x 6 FIBER CEMENT

BARGE: 5/4 x 6 FIBER CEMENT

DOOR TRIM: 5/4 x 4 FIBER CEMENT

WINDOW TRIM: 5/4 x 4 FIBER CEMENT

VERT. TRIM: 5/4 x 3 FIBER CEMENT

HORIZ. TRIM: 5/4 x 8 FIBER CEMENT

WALL PENETRATIONS: SEE DETAIL 8/A1.2

GUTTERS: 5" STYLE A (PREFINISHED)

DOWNSPOUTS: 3" ROUND (PREFINISHED)

AREA SCHEDULE (Gross Building)

Area Type	No. Mods	Area
Gross Building Area	14	7942 SF

ROOF SCHEDULE

Description	Area
ROOF	8840 SF
SUB-ROOF	7178 SF

WALL SCHEDULE

Description	Length
CONCRETE STEM WALL	398' - 2"
EXTERIOR 2x6	373' - 11"
EXTERIOR GABLE WALL	164' - 6"
INTERIOR 2x4	506' - 5"
INTERIOR 2x6	303' - 0"
INTERIOR 2x (FLAT)	30' - 0"

DOOR ROUGH OPENING SCHEDULE

	EXTERIOR DOORS
A	METAL DOORS W/ HOLLOW METAL FRAME (WELDED) R.O. WIDTH CALL SIZE + 4-1/2" R.O. HEIGHT CALL SIZE + 2-1/8"
B	DBL. METAL DOORS W/ HOLLOW METAL FRAME (WELDED) R.O. WIDTH CALL SIZE + 4-1/2" R.O. HEIGHT CALL SIZE + 2-1/8"
C	STOREFRONT DOOR R.O. WIDTH SEE FRAME TYPES R.O. HEIGHT SEE FRAME TYPES
D	TIMELY SPLIT MEDIA DOOR R.O. WIDTH CALL SIZE + 1-1/4" R.O. HEIGHT CALL SIZE + 1"
E1	METAL DOOR W/ WOOD FRAME (PEASE AND STANLEY) (INSWING) R.O. WIDTH CALL SIZE + 2" R.O. HEIGHT CALL SIZE + 2"
E2	METAL DOOR W/ WOOD FRAME (PEASE AND STANLEY) (OUTSWING) R.O. WIDTH CALL SIZE + 2" R.O. HEIGHT CALL SIZE + 1-9/16"
F	METAL DOOR W/ METAL FRAME (FAST-FRAME) R.O. WIDTH CALL SIZE + 1-1/4" R.O. HEIGHT CALL SIZE + 1"
G	METAL DOOR W/ HOLLOW METAL FRAME (KNOCK-DOWN) R.O. WIDTH CALL SIZE + 2" R.O. HEIGHT CALL SIZE + 1"
H	DBL. METAL DOORS W/ HOLLOW METAL FRAME W/ SIDELIGHT (WELDED) R.O. WIDTH SEE FRAME TYPES R.O. HEIGHT SEE FRAME TYPES
	INTERIOR DOORS
1	HOLLOW / SOLID WOOD DOOR W/ WOOD FRAME R.O. WIDTH CALL SIZE + 2" R.O. HEIGHT CALL SIZE + 2-1/8"
2	TIMELY FRAME R.O. WIDTH CALL SIZE + 1-1/4" R.O. HEIGHT CALL SIZE + 1"
3	POCKET DOOR R.O. WIDTH 2x CALL SIZE + 2" R.O. HEIGHT CALL SIZE + 4"
4	BI-PASS DOOR R.O. WIDTH CALL SIZE R.O. HEIGHT CALL SIZE + 2-1/8"
5	BI-FOLD DOOR R.O. WIDTH CALL SIZE + 1/2" R.O. HEIGHT CALL SIZE + 3/4"
6	WOOD DOORS W/ HOLLOW METAL FRAME (WELDED) R.O. WIDTH CALL SIZE + 4-1/2" R.O. HEIGHT CALL SIZE + 2-1/8"
7	DBL. WOOD DOORS W/ HOLLOW METAL FRAME (WELDED) R.O. WIDTH SEE FRAME TYPES R.O. HEIGHT SEE FRAME TYPES

NOTE: ALL TRIMMER HEIGHTS = R.O. CALL SIZE MINUS 1-1/2"

FASTENING/SCHEDULE

MINIMUM NUMBER OF NAILS FOR WOOD MEMBERS (EXCEPT AS NOTED ON DRAWINGS)

	CONNECTION	NO. / SPACING
FLOOR	RIM JOIST TO FLOOR JOIST JOIST TO JOIST BLOCKING	3 PER JOIST 2 ROWS AT 12" O.C. 2 EACH END
WALL	STUDS TO PLATES - END NAIL STUDS TO PLATES - END NAIL BLOCKING JAMB STUD TO 4x HEADER JAMB STUD TO 2x HEADER STUD TO STUD (CRIPPLE, ETC.) UPPER TOP PLATE TO LOWER TOP PLATE BOTTOM PLATE TO FLOOR	2 EACH END AT 2 x 4 3 EACH END AT 2 x 6 2 EACH END MIN. 4 EACH END MIN. 2 EACH END 8" O.C. 2 EACH SIDE OF STUD 2 EACH SIDE OF STUD
ROOF	RIM JOIST TO RAFTER RIM JOIST TO TRUSS RAFTER TO RAFTER BLOCKING 2 x 4 LEDGER 2x BRACE TO RAFTER	3 PER RAFTER MIN. 2 PER TRUSS 2 ROWS AT 12" O.C. 2 EACH END 2 ROWS AT 6" O.C. 4 AT RAFTER

NOTES:
1. ALL FASTENERS ARE 12d (.131), USE HDG FASTENERS OR EQUAL AT P.T. MEMBERS
2. SUBSTITUTION OF CONNECTORS SPECIFIED IN THIS DRAWING SET IS ALLOWED FOR EQUAL OR BETTER CONNECTOR PRODUCTS

STANDARD SHEATHING FASTENING - U.N.O.

FROM ESR-1539 JULY 2022

	SPACING	TYPE	MIN. LENGTH
FLOOR SHEATHING (UNBLOCKED)			
23/32" CDX OR O.S.B. OR STURDI - FLOOR T&G	6" EDGE 8" FIELD	8d (.113) RING-SHANK	2-3/8"
FLOOR UNDERLAYMENT (GLUE AND STAGGER JOINTS)			
1/4" CCP	8" EDGE 8" FIELD	18 GA. STAPLE MIN. 1/4" CROWN	1"
WALL SHEATHING (ALL EDGES SUPPORTED)			
7/16" O.S.B.	6" EDGE 12" FIELD	15 GA. STAPLE MIN. 7/16" CROWN	2"
SUB-ROOF SHEATHING (UNBLOCKED)			
15/32" CDX	6" EDGE 8" FIELD	8d (.113) GALVANIZED	2-3/8"
SUB-ROOF SHEATHING AT MECH ATTIC (UNBLOCKED)			
23/32" CDX	6" EDGE 8" FIELD	8d (.113) GALVANIZED	2-3/8"
ROOF SHEATHING (UNBLOCKED)			
15/32" CDX	6" EDGE 8" FIELD	8d (.113) GALVANIZED	2-3/8"
SUB-ROOF SHEATHING (UNBLOCKED)			
7/16" O.S.B.	6" EDGE 8" FIELD	15 GA. STAPLE MIN. 7/16" CROWN	2"

DOOR SCHEDULE

Mark	Width	Height	Thickness	Door Swing	Core	Lite Size	Lite Glass	Face	Door Finish	Frame Type	Frame Finish	Throat	R.O. Type	Hdw Group	Door Header	Header Detail	U-Value	S.H.G.C.	V.T.	Remarks
1	6' - 0"	7' - 0"	1 3/4"	PAIR OUT	HM	HALF	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	B	1	(2) 1.5" x 9.25" LVL	2/S4.1	0.38	0.23	0.37	16 GA. FRAMES w/ 18 GA. DOORS, REMOVEABLE MULLION
2	6' - 0"	7' - 0"	1 3/4"	PAIR OUT	HM	HALF	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	B	1	(2) 1.5" x 9.25" LVL	2/S4.1	0.38	0.23	0.37	16 GA. FRAMES w/ 18 GA. DOORS, REMOVEABLE MULLION
3	3' - 0"	7' - 0"	1 3/4"	LHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
4	3' - 0"	7' - 0"	1 3/4"	LHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
5	3' - 0"	7' - 0"	1 3/4"	LHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
6	3' - 0"	7' - 0"	1 3/4"	RHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
7	3' - 0"	7' - 0"	1 3/4"	RHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
8	3' - 0"	7' - 0"	1 3/4"	RHOS	HM	NRW	CLR / TMP	HM	PT	HM/PD	PT	6 3/4"	A	2	(2) 2 x 8 DF #2	2/S4.1	0.50	0	0	16 GA. FRAMES w/ 18 GA. DOORS
9	3' - 0"	7' - 0"	1 3/4"	LH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				
10	3' - 0"	7' - 0"	1 3/4"	RH	SC	-	-	BRCH	PF	HM/PD	PT	6 3/4"	6	4	(2) 1.5" x 7.25" LVL	3/S4.1				
11	3' - 0"	7' - 0"	1 3/4"	LH	SC	-	-	BRCH	PF	HM/PD	PT	4 3/4"	6	5	-	-				
12	3' - 0"	7' - 0"	1 3/4"	RH	SC	-	-	BRCH	PF	HM/PD	PT	4 3/4"	6	6	-	-				
13	3' - 0"	7' - 0"	1 3/4"	RH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				
14	3' - 0"	7' - 0"	1 3/4"	RH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				
15	3' - 0"	7' - 0"	1 3/4"	RH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				
16	3' - 0"	7' - 0"	1 3/4"	LH	SC	-	-	BRCH	PF	HM/PD	PT	4 3/4"	6	7	-	-				
17	3' - 0"	7' - 0"	1 3/4"	RH	SC	-	-	BRCH	PF	HM/PD	PT	4 3/4"	6	8	-	-				
18	3' - 0"	7' - 0"	1 3/4"	LH	SC	-	-	BRCH	PF	HM/PD	PT	4 3/4"	6	6	-	-				
19	3' - 0"	7' - 0"	1 3/4"	LH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				
20	3' - 0"	7' - 0"	1 3/4"	LH	SC	HALF	CLR / TMP	BRCH	PF	HM/PD	PT	4 3/4"	6	3	-	-				

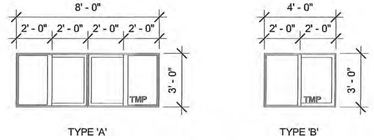
(3) 3'-0" x 7'-0" SELF-CLOSING DOOORS WITH AUTOMATIC LATCHES AT DRAFTSTOPS, SEE SHEET A 1.1

NOTES:
1. CAULK AND SEAL ALL EXTERIOR DOORS
2. ALL EXIT DOORS SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT (U.N.O.)
3. ALL DOOR LEADS 4-1/2" (U.N.O.)
4. ALL DOORS TO HAVE A OPENING FORCE NOT TO EXCEED 5 POUNDS
5. DOOR SURFACES WITHIN 10" OF THE FLOOR MEASURED VERTICALLY, SHALL BE SMOOTH SURFACE ON THE PUSH SIDE EXTENDING THE FULL WIDTH OF THE DOOR PER 2009 ICC A117.1 SECTION 404.2.9

WINDOW SCHEDULE

Mark	Count	Width	Height	Type	Frame	Glass	SHGC	U-VAL	VT	Air Leakage	Ext. Trim	Int. Trim	Window Header	T.O. R.O	Header Detail	Comments
A	14	8' - 0"	3' - 0"	OXXO	VINYL	DUAL / LOW E / TMP / ARGON	0.22	0.25	0.52	.18 CFM/SF	5/4 x 4	SEE NOTE #2	(2) 1.5" x 9.25" LVL	7' - 2 1/8"	2/S4.1	SEE WINDOW FRAME TYPES
B	2	4' - 0"	3' - 0"	XO	VINYL	DUAL / LOW E / TMP / ARGON	0.22	0.25	0.52	.18 CFM/SF	5/4 x 4	SEE NOTE #2	(2) 2 x 8 DF #2	7' - 2 1/8"	2/S4.1	SEE WINDOW FRAME TYPES

NOTES:
1. CAULK AND SEAL ALL EXTERIOR WINDOWS
2. INTERIOR TRIM TO BE PAINT GRADE WOOD SURROUND AND CASING (H130)



WINDOW FRAME TYPES
1/4" = 1'-0"

HARDWARE SCHEDULE

GROUP #1	GROUP #2	GROUP #3	GROUP #4
DOORS: 1, 2 (ENTRY/EXIT DOORS)	DOORS: 3, 4, 5, 6, 7, 8 (EXT. CLASSROOM)	DOORS: 9, 13, 14, 15, 19, 20 (CLASSROOM)	DOORS: 10 (JANITOR)
LEFT HAND OUT **HINGES:** CONT. HINGES: SELECT HINGE SL11 CL HD83" CONCEALED **PANIC/PULL:** RIM: VON DUPRIN QEL98EO US26D TRIM: VON DUPRIN 990NL US26D **CYLINDER:** SCHLAGE RIM CYLINDER 20-022C 626 **CLOSER:** LCN 4040XP **DOOR SWEEP:** NGP 200NA 36" **REMOVEABLE MULLION:** VON DUPRIN KR4954SP (KEYED) **MULLION CYLINDER:** SCHLAGE 20-001C 626 CYLINDER **RIGHT HAND OUT** **HINGES:** CONT. HINGES: SELECT HINGE SL11 CL HD83" CONCEALED **PANIC/PULL:** RIM: VON DUPRIN 98EO US26D TRIM: VON DUPRIN 990NL US26D **CYLINDER:** SCHLAGE RIM CYLINDER 20-022C 626 **CLOSER:** LCN 4040XP **KEYPAD:** (FOR FUTURE) (BY OTHERS) **WEATHER-STRIP:** PEMKO S88D SMOKE GASKETING **ADA THRESHOLD:** PEMKO 176A - 72" SADDLE THRESHOLD	**HINGES:** CONT. HINGES: SELECT HINGE SL11 CL HD83" CONCEALED **PANIC/PULL:** RIM: VON DUPRIN 98EO US26D TRIM: VON DUPRIN 99NL US26D **CYLINDER:** SCHLAGE RIM CYLINDER 20-022C 626 **CLOSER:** LCN 4040XP **WEATHER-STRIP:** PEMKO S88D SMOKE GASKETING **DOOR SWEEP:** NGP 200NA 36" **ADA THRESHOLD:** PEMKO 176A - 36" SADDLE THRESHOLD	**HINGES:** CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **PANIC/LEVER:** RIM: VON DUPRIN LD99L-2SI US26D TRIM: VON DUPRIN 996L US26D **RIM LOCK:** SCHLAGE XB11-979 626 **CYLINDER:** SCHLAGE CYLINDER 20-022C 626 **CLOSER:** LCN 4040XP **WALL STOP:** TAYMOR 25-4612SC **DOOR BUMPS:**	**HINGES:** CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **LEVERSET:** (ENTRANCE) SCHLAGE ND53PD 626 RHO **STRIKE:** (ANSI) SCHLAGE 10-025 626 **WALL STOP:** TAYMOR 25-4612SC **DOOR BUMPS:**
GROUP #5	GROUP #6	GROUP #7	GROUP #8
DOORS: 11 (IT ROOM)	DOORS: 12, 18 (BOY'S/GIRL'S RESTROOM)	DOORS: 16 (UNISEX R/R)	DOORS: 17 (STAFF RESTROOM)
HINGES: CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **LEVERSET:** (ENTRANCE) SCHLAGE ND80PD 626 RHO **STRIKE:** (ANSI) SCHLAGE 10-025 626 **STOPS:** WALL: TAYMOR 25-4612SC **DOOR BUMPS:**	**HINGES:** CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **PUSH/PULL:** PUSH: TRIMCO 1001-3 32D 4"x16" PULL: TRIMCO 1017-3 32D 4"x16" **CLOSER:** LCN 4040XP **WALL STOP:** TAYMOR 25-4612SC **DOOR BUMPS:**	**HINGES:** CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **LEVERSET:** (PRIVACY W/ INDICATOR) SCHLAGE L9456L 06A 626 L283-722 L583-363 **CYLINDER:** SCHLAGE CYLINDER 30-001C 626 **STRIKE:** (ANSI) SCHLAGE 10-025 626 **CLOSER:** LCN 4040XP **WALL STOP:** TAYMOR 25-4612SC **DOOR BUMPS:**	**HINGES:** CONT. HINGES: SELECT HINGE SL11CL HD83" CONCEALED **LEVERSET:** (PRIVACY) SCHLAGE AL40S SAT, 626 **STRIKE:** (ANSI) SCHLAGE 10-025 626 **WALL STOP:** TAYMOR 25-4612SC **DOOR BUMPS:**

REV.	DESCRIPTION	DATE	BY

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MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 749-4949 FAX: (503) 749-4950
P.O. BOX 116, 9493 PORTER ROAD, AUMSVILLE, OR 97325
CIRCLE EXIT CAR WEB PAGE: www.modernbuildingsystems.com
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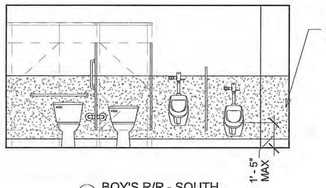
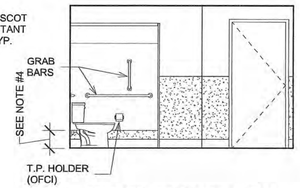
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 2004
BRIAN A. RASMUSSEN
EXPIRES: 12/31/24
3/29/23

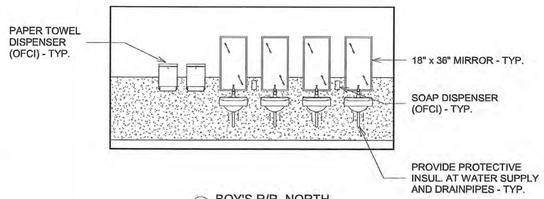
SHEET	FINISH NOTES & SCHEDULES
PROJ.	98' x 82' MODULAR CLASSROOM
	EAGLE POINT SD II
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503
DRW	BJ
JOB#	2022-LB-28
SHEET #	A 3.0
DATE	3/29/2023



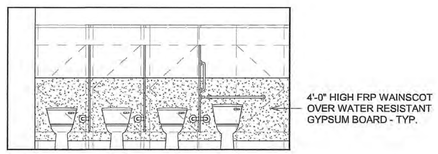
1 BOY'S R/R - SOUTH
1/4" = 1'-0"



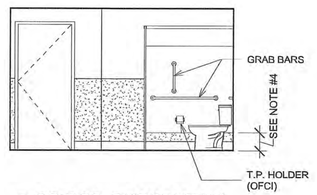
2 BOY'S R/R - WEST (ADA STALL)
1/4" = 1'-0"



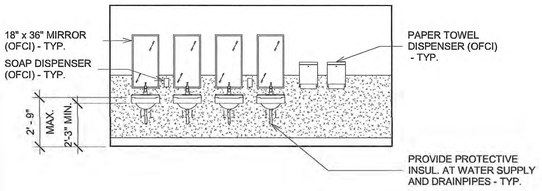
3 BOY'S R/R- NORTH
1/4" = 1'-0"



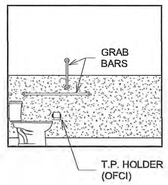
4 GIRL'S R/R - SOUTH
1/4" = 1'-0"



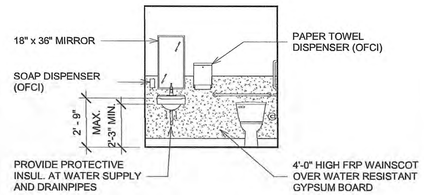
5 GIRL'S R/R - EAST (ADA STALL)
1/4" = 1'-0"



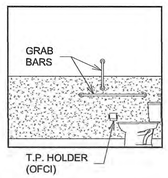
6 GIRL'S - NORTH
1/4" = 1'-0"



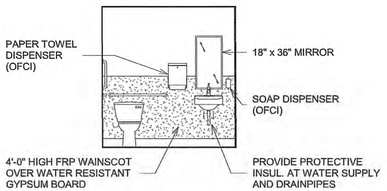
7 STAFF R/R - SOUTH
1/4" = 1'-0"



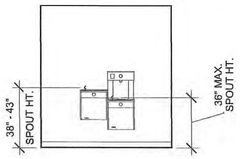
8 STAFF R/R - EAST
1/4" = 1'-0"



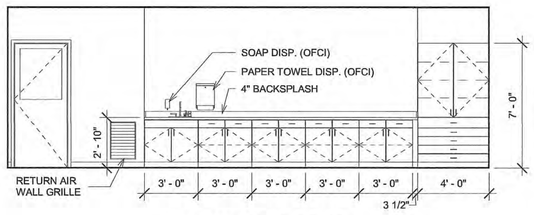
9 UNISEX R/R - SOUTH
1/4" = 1'-0"



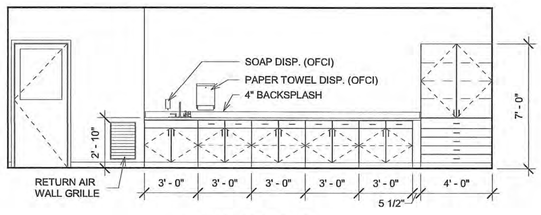
10 UNISEX R/R - WEST
1/4" = 1'-0"



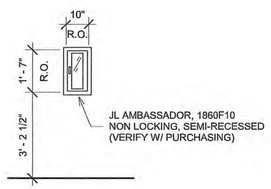
11 DRINKING FOUNTAIN
1/4" = 1'-0"



12 CLASSROOMS A, B, E, & F
1/4" = 1'-0"



13 CLASSROOMS C & D
1/4" = 1'-0"

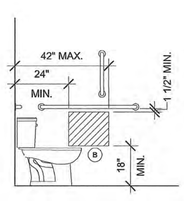


14 FEC - ELEVATION
3/8" = 1'-0"

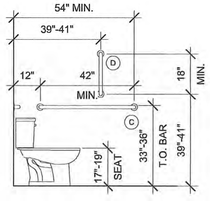
INTERIOR ELEVATION NOTES

1. DIMENSIONS TO FLOOR, WALLS AND CEILING ARE TO FACE OF FINISH (U.N.O.)
2. PROVIDE WOOD BLOCKING FOR ALL ACCESSORIES MOUNTED IN GYPSUM BOARD PARTITIONS. MAINTAIN INTEGRITY OF FIRE RATING WHERE ACCESSORIES ARE IN RATED WALLS.
3. SEE DETAILS ON SHEET A4.0 FOR ADA RESTROOM ACCESSORIES AND MOUNTING HEIGHTS.
4. MIN. 9" TOE CLEARANCE AT PARTITIONS. URINAL PARTITIONS MOUNTED WITH BOT. AT 12" FROM FINISHED FLOOR AND TOP AT NO MORE THAN 60" FROM FINISHED FLOOR AND NOT TO EXTEND FROM WALL MORE THAN 18"

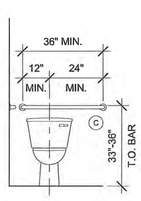
PROVIDE WOOD WALL BLOCKING AS NEEDED FOR ALL ACCESSORIES, PARTITIONS, PLUMBING FIXTURES, EQUIPMENT AND DOOR WALL STOPS



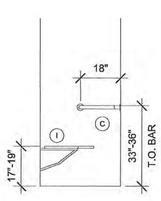
TOILET PAPER HOLDER



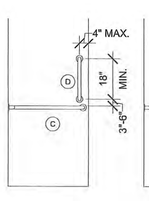
SIDE & VERTICAL GRAB BAR



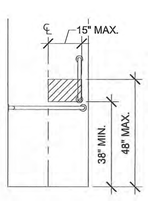
BACK GRAB BAR



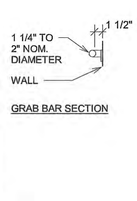
BACK GRAB BAR/SEAT



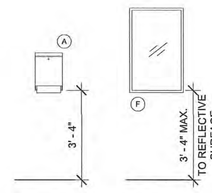
SIDE GRAB BAR



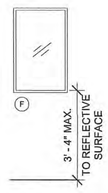
CONTROLS



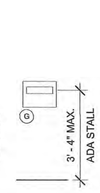
GRAB BAR SECTION



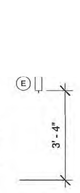
PAPER TOWEL DISPENSER SURFACE-MOUNTED



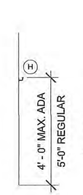
MIRROR SURFACE-MOUNTED



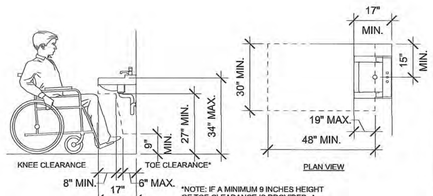
TOILET SEAT COVER DISPENSER



SURFACE MOUNTED SOAP DISPENSER



RESTROOM DOOR HOOK



*NOTE: IF A MINIMUM 9 INCHES HEIGHT OF TOE CLEARANCE IS PROVIDED, A MAXIMUM OF 6 INCHES OF THE 48 INCHES OF CLEAR FLOOR SPACE REQUIRED AT THE FIXTURE MAY EXTEND INTO THE TOE SPACE.

LAVATORY KNEE CLEARANCE

SCHEDULE OF ACCESSORIES

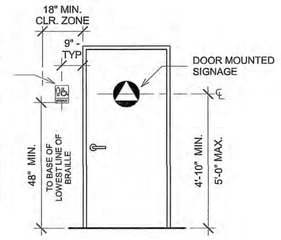
I.D.	ITEMS
A	PAPER TOWEL DISPENSER (OFCI)
B	TOILET PAPER HOLDER (OFCI)
C	HORIZONTAL GRAB BAR
D	VERTICAL GRAB BAR
E	SOAP DISPENSER (OFCI)
F	MIRROR
G	TOILET SEAT COVER DISPENSER (OFCI)
H	HOOK (OFCI)
I	SHOWER SEAT (OFCI)

NOTE:
1. DIMENSIONS TO FLOOR AND WALLS ARE TO FACE OF FINISH (U.N.O.)
2. NOT ALL ACCESSORIES MAY BE PRESENT IN THIS PARTICULAR BUILDING.

15 ADA - MOUNTING HEIGHTS
3/8" = 1'-0"

WALL MOUNTED SIGNAGE TO BE LOCATED ON LATCH SIDE, CLEAR OF DOOR-SWING. MOUNT AT 60" MAX. FROM FLOOR TO BOTTOM OF HIGHEST TACTILE TEXT LINE OF SIGN

NOTE:
SIGNAGE MOUNTING SHALL BE IN COMPLIANCE WITH ICC A117.1 2009 703.4



TYP. RESTROOM SIGNAGE HEIGHTS
NO SCALE

16 SIGNAGE - RESTROOM
1 1/2" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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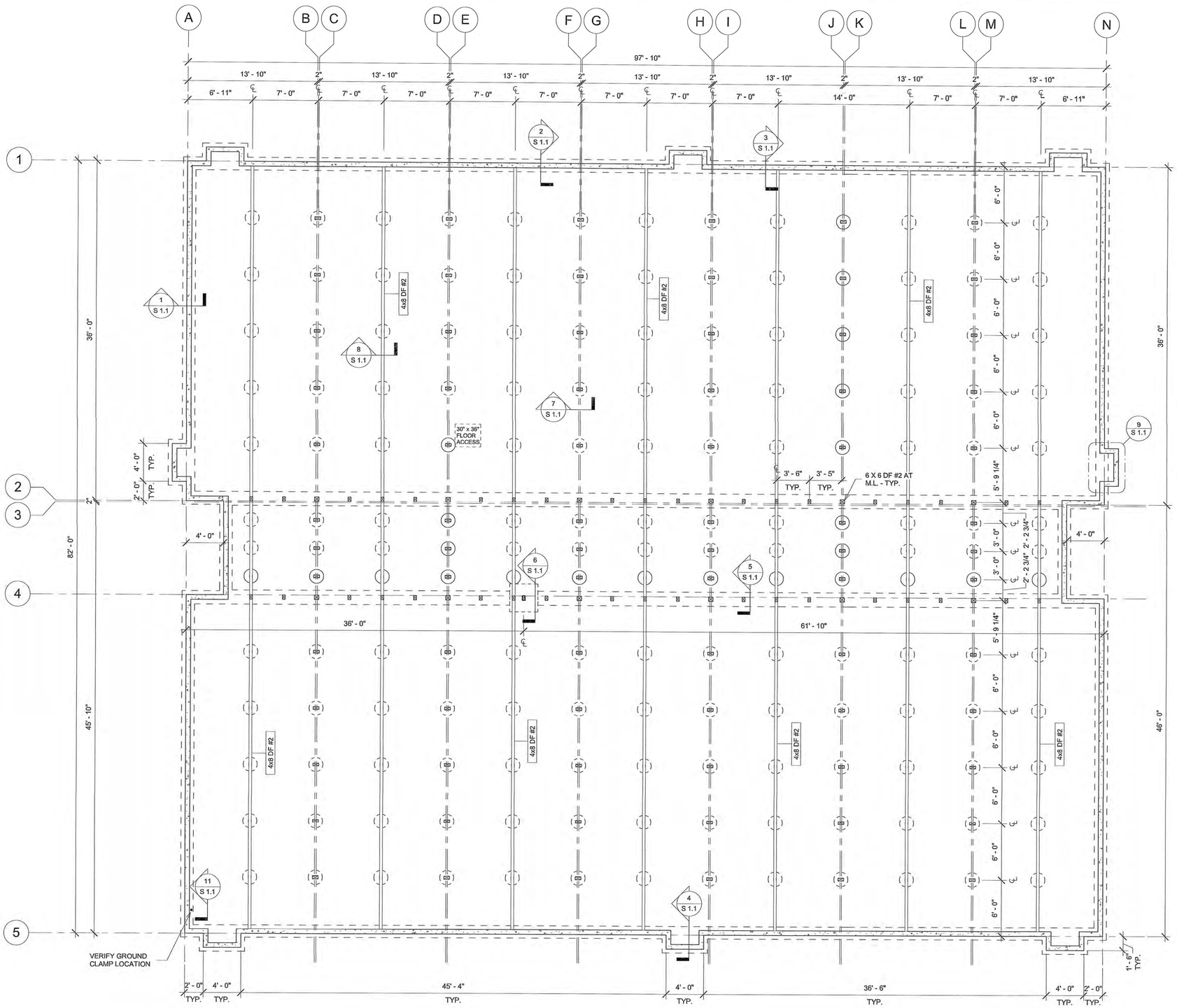
EXPIRES: 12/31/24

SHEET	INTERIOR ELEVATIONS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	A 4.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023



1 FOUNDATION PLAN
3/16" = 1'-0"

COORDINATE FOUNDATION SLEEVE LOCATIONS FOR UTILITIES, MECHANICAL SYSTEMS, DRAINS AND VENTING

FOUNDATION NOTES

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS. THIS STRUCTURE SHALL BE ADEQUATELY BRACED FOR WIND OR EARTHQUAKE FORCES AND TEMPORARY FORCES DURING SETTING AND ERECTION UNTIL ALL UNITS HAVE BEEN PERMANENTLY ATTACHED THERETO. REMOVE ORGANIC / SOD UNDER ALL BEARING PADS.
2. DESIGN LOADS:

ROOF DEAD LOAD	12 PSF
ROOF SNOW LOAD	25 PSF
FLOOR DEAD LOAD	10 PSF
FLOOR LIVE LOAD	50 PSF, 100 PSF
WIND LOAD	Lambda = 1.0 Vult = 120 MPH (Vasd = 93 MPH) 3 SECOND GUST - EXP. B
SEISMIC	BEARING WALL SYSTEM: S_s = 0.611, F_a = 1.312 S_{DS} = 0.534, RISK CATEGORY III I_e = 1.25, SEISMIC DESIGN CATEGORY D, SITE CLASS D
ALLOWABLE BEARING CAPACITY	1,500 PSF AT SOIL

3. EXCEPT AS NOTED, DIMENSION LUMBER FOR FOUNDATION SHALL BE HEM-FIR, NO. 2 AND BETTER. TREATED LUMBER SHALL BE ACQ PRESSURE TREATED IN ACCORDANCE WITH AWPA STANDARD U1, USE CATEGORY UC4A, TO A MINIMUM RETENTION OF 0.40 PCF. AT PIECES IN CONTACT WITH GROUND, SAWN END GRAIN SHALL BE FIELD TREATED WITH 2% MIN. CONCENTRATION COPPER NAPHTHENATE. TREATED PLATE STOCK SHALL BE GOOD QUALITY AND SHALL NOT CONTAIN EXCESSIVE SPLITS, CHECKS OR WANE. 2 x 4 FRAMING SHALL BE HEM-FIR, STANDARD OR BETTER, TREATED 2 x 4 FRAMING SHALL MEET THE REQUIREMENTS SPECIFIED ABOVE.
4. ALL FASTENERS TO BE HOT DIPPED GALVANIZED OR EQUAL AT P.T. MEMBERS.
5. VENT CRAWL SPACE AS SHOWN ON FOUNDATION PLAN. INSTALL 6 MIL. VAPOR BARRIER ON GROUND IN ENTIRE CRAWL SPACE. LAP VAPOR BARRIER JOINTS MIN 12".
6. CONNECT STORM WATER FROM ROOF GUTTERS AND DOWNSPOUTS AND DIRECT AWAY FROM BUILDING PAD TO AN APPROVED DRAINAGE SYSTEM.
7. FOUNDATION PLANS AND DETAILS ARE NOT REVIEWED BY BCD OR L&I, EXCEPT FOR THE SUITABILITY OF THE DESIGN TO SUPPORT THE MODULAR BUILDING. APPROVAL AND INSPECTION OF THE FOUNDATION SYSTEM IS THE JURISDICTION OF THE LOCAL BUILDING OFFICIAL.
8. CONCRETE STRENGTH: F'_C = 2,500 PSI AT FOUNDATION, 4,000 PSI AT FLATWORK
9. REINFORCEMENT STEEL: GRADE 60, ASTM A615

3/24/23
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 12, 1985
ANDREW A. RIEMENSCHNEIDER
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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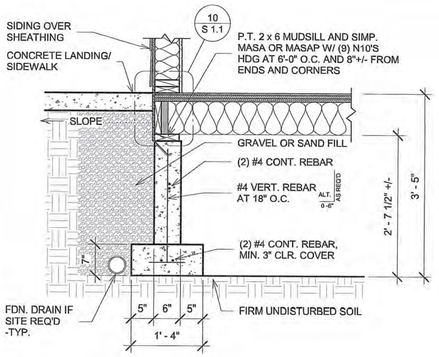
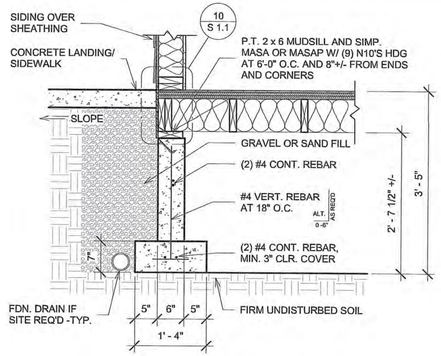
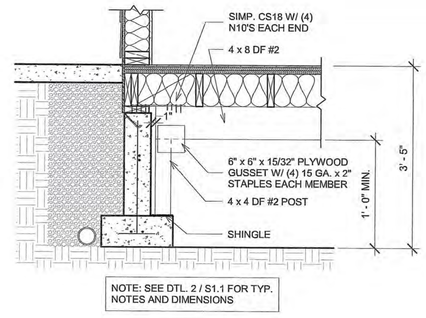
SHEET	FOUNDATION PLAN & NOTES	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 1.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



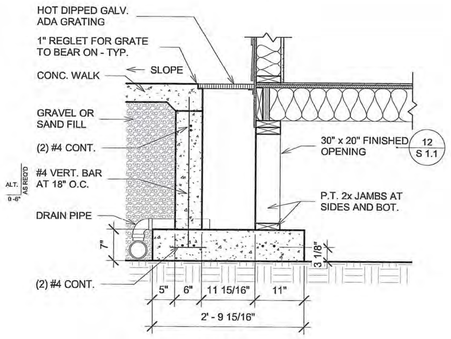
1 FOOTING - MOD SIDEWALL
3/4" = 1'-0"



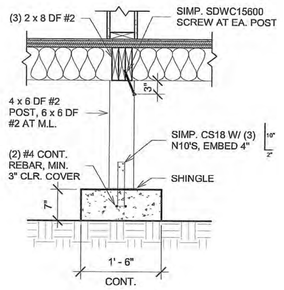
2 FOOTING - MOD ENDWALL
3/4" = 1'-0"



3 FOOTING - MOD ENDWALL AT BEAMS
3/4" = 1'-0"



4 FOOTING - FOUNDATION VENT
3/4" = 1'-0"

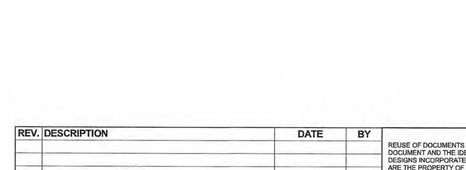


5 FOOTING - BEARING WALL
3/4" = 1'-0"

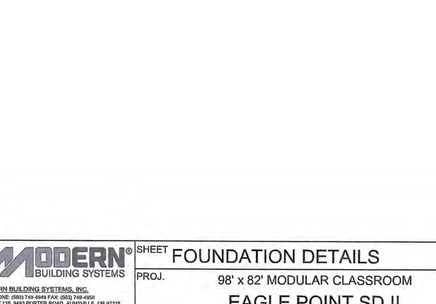
6 FOOTING - COLUMN
3/4" = 1'-0"

7 FOOTING - MOD MARRIAGE
3/4" = 1'-0"

8 FOOTING - MID-SPAN
3/4" = 1'-0"

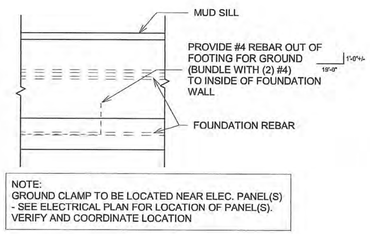


9 FOOTING - DOWEL BAR LAYOUT
1/2" = 1'-0"

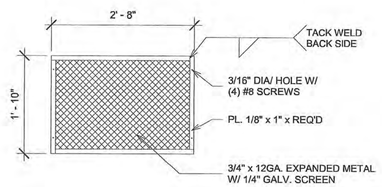


(EXPLODED VIEW)

10 FDN - FLASHING AT LANDING/WALKWAY
1 1/2" = 1'-0"



11 FDN - GROUND CLAMP
3/4" = 1'-0"



12 FDN - VENT COVER
3/4" = 1'-0"

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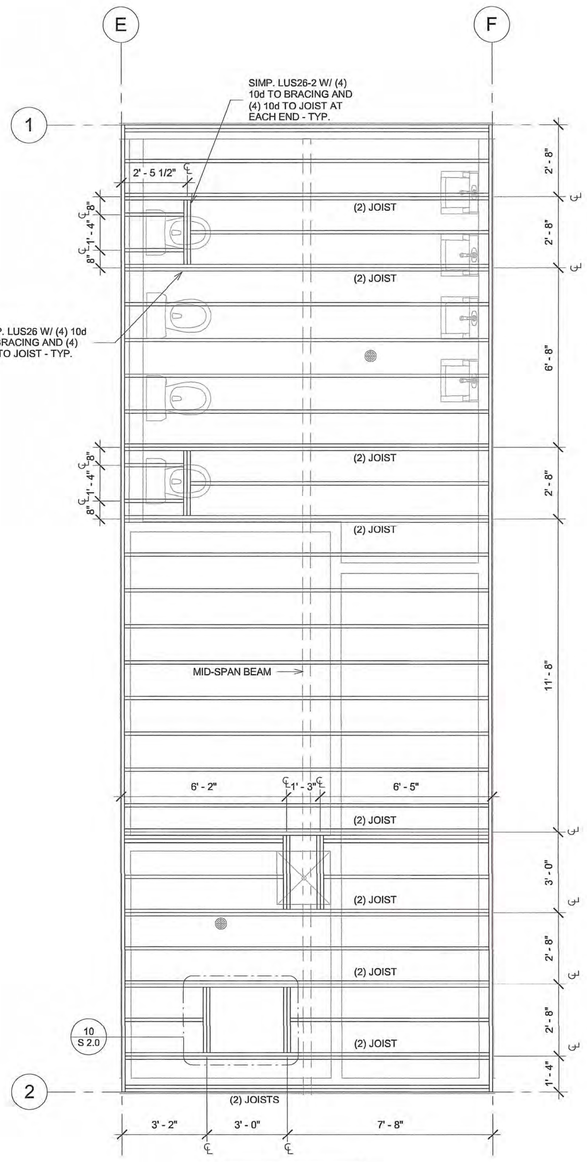
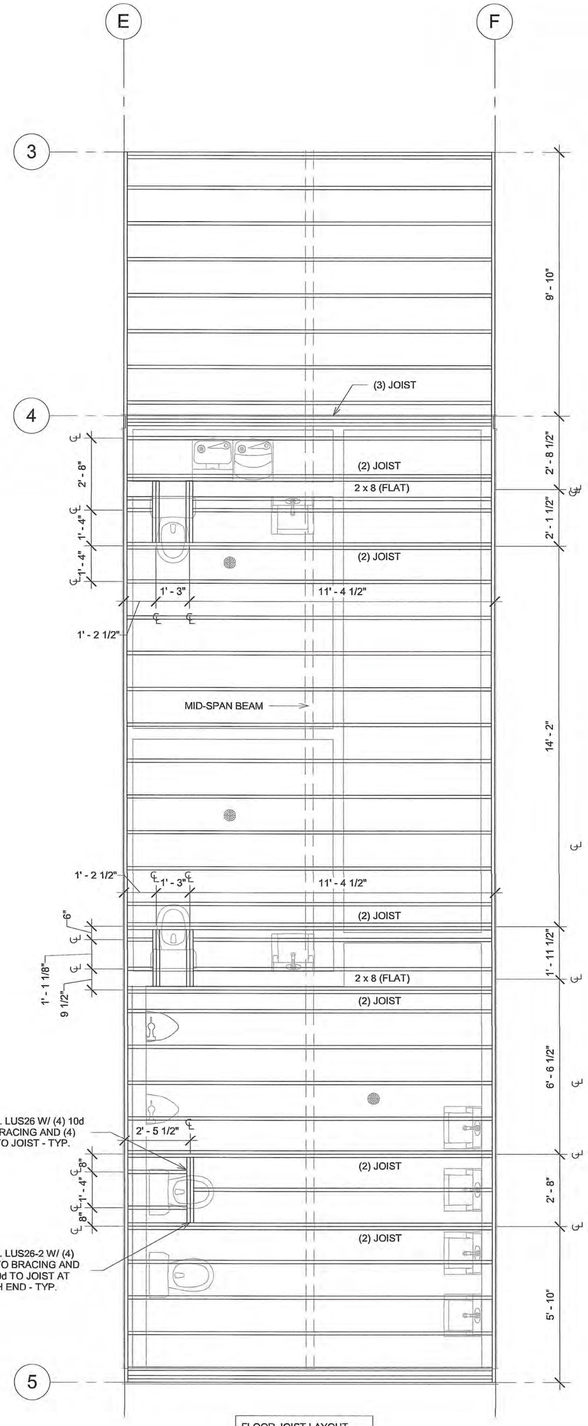
REGISTERED PROFESSIONAL ENGINEER
OREGON
CRAIG A. RASMUSSEN
3/29/23
EXPIRES: 12/31/24

SHEET	FOUNDATION DETAILS
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503
DRW	BJ
DATE	3/29/2023
JOB#	2022-LB-28
SHEET #	S 1.1



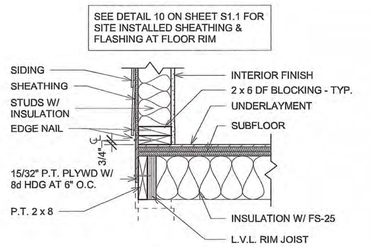
FLOOR JOIST LAYOUT STARTED FROM GIRD '1'

1 FLOOR FRAMING PLAN - MOD C
3/8" = 1'-0"

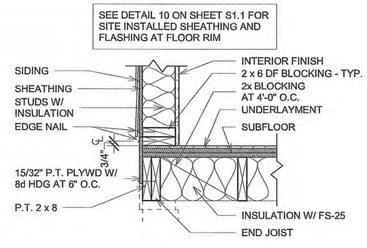


FLOOR JOIST LAYOUT STARTED FROM GIRD '3'

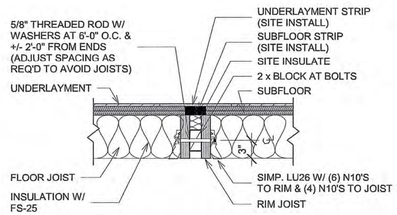
2 FLOOR FRAMING PLAN - MOD J
3/8" = 1'-0"



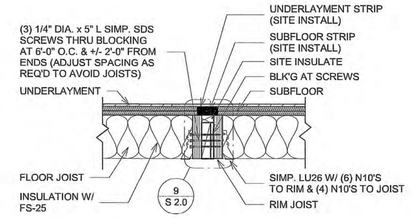
3 FLOOR - MOD SIDEWALL
1" = 1'-0"



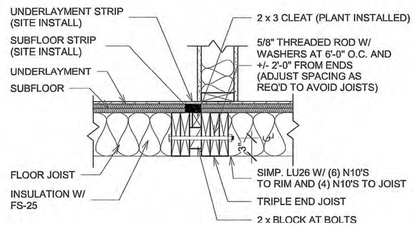
4 FLOOR - MOD ENDWALL
1" = 1'-0"



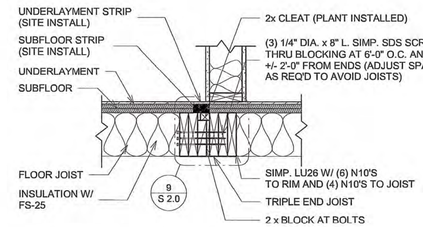
5 FLOOR - MOD SIDEWALL MARRIAGE
1" = 1'-0"



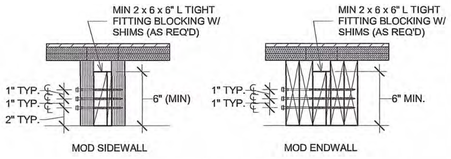
6 FLOOR - MOD SIDEWALL MARRIAGE (ALTERNATE)
1" = 1'-0"



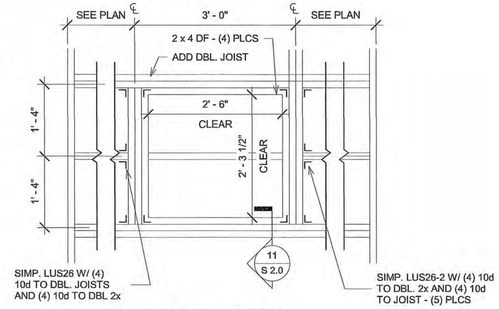
7 FLOOR - MOD ENDWALL MARRIAGE
1" = 1'-0"



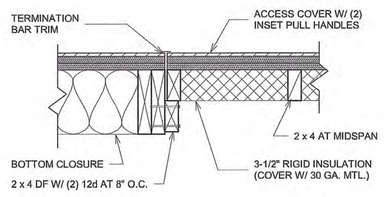
8 FLOOR - MOD ENDWALL MARRIAGE (ALTERNATE)
1" = 1'-0"



9 FLOOR - BLK'G & FASTENING AT RIM
1 1/2" = 1'-0"



10 FLOOR - ACCESS
3/4" = 1'-0"



11 FLOOR - ACCESS SECTION
1 1/2" = 1'-0"

3/29/23
REGISTERED PROFESSIONAL ENGINEER
CRAIG H. JOHNSON
EXPIRES: 12/31/24

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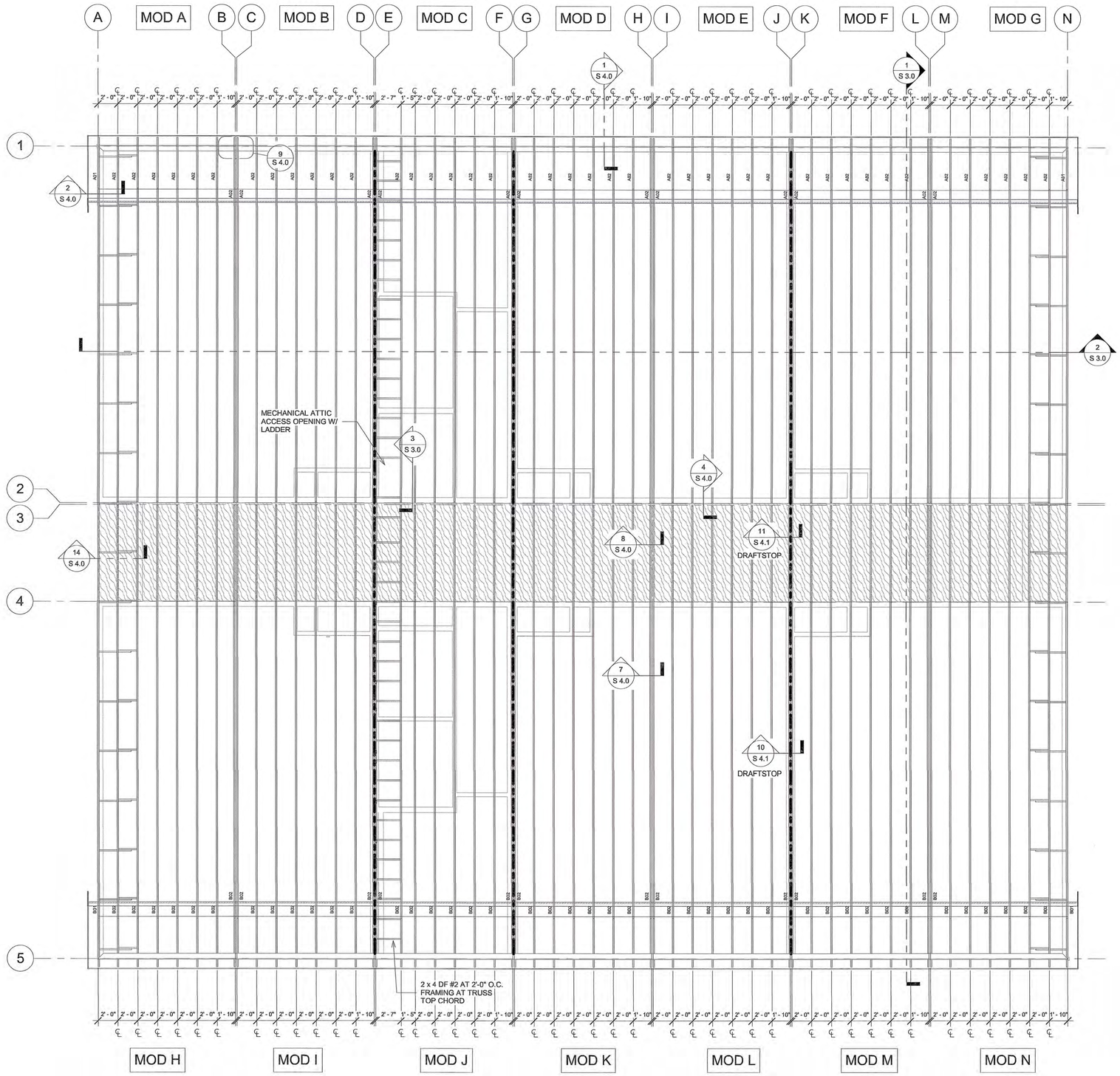
SHEET	FLR FRAMING PLANS & DETAILS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 2.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023



1 SUB-ROOF FRAMING PLAN
3/16" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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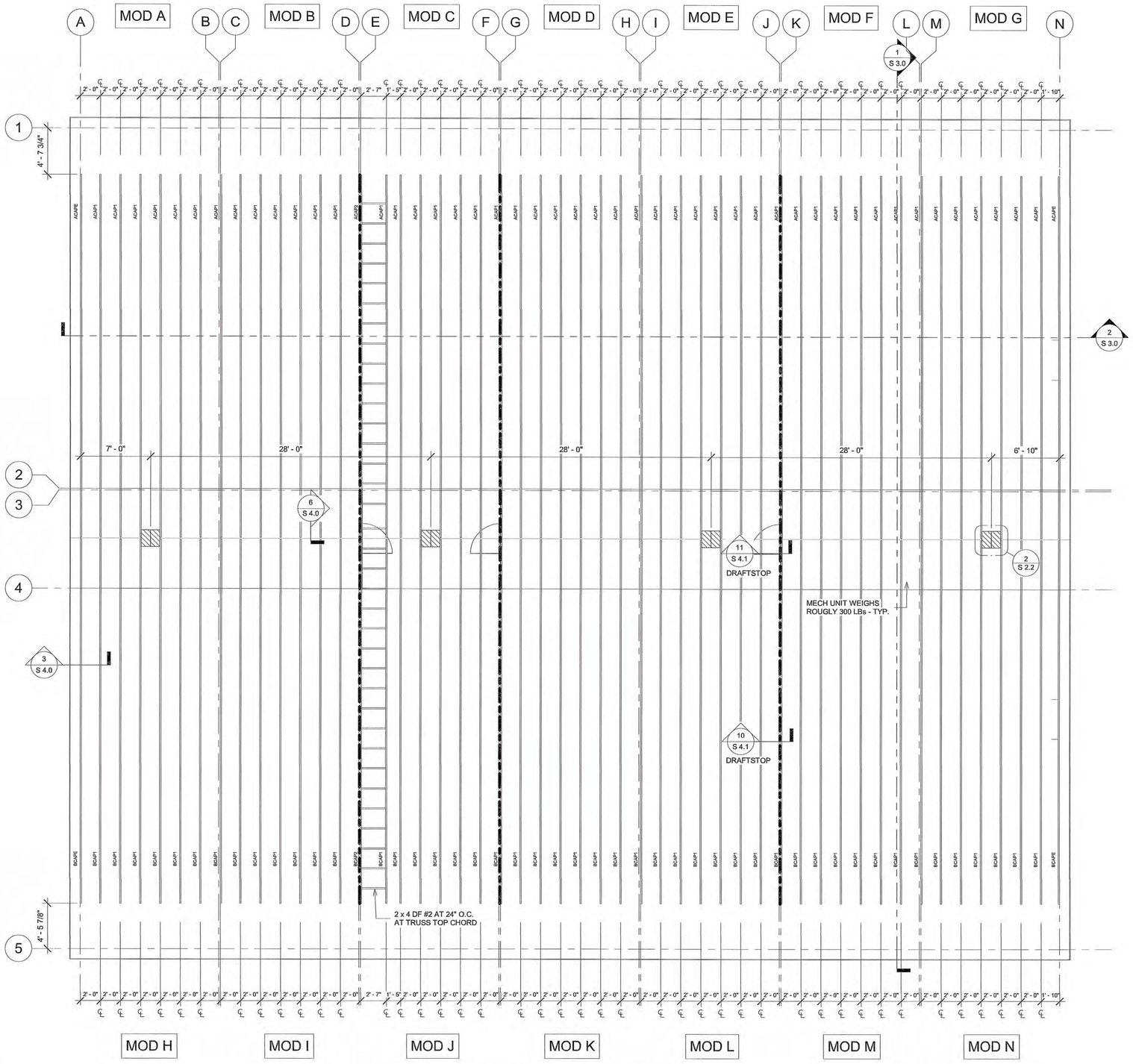
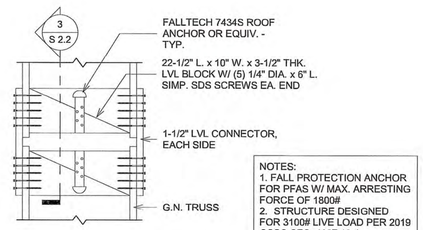
3/29/23
REGISTERED PROFESSIONAL ENGINEER
OREGON
EXPIRES: 12/31/24

SHEET	SUB-ROOF FRAMING PLAN	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 2.1
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023

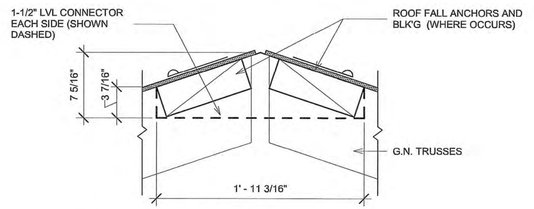


1 ROOF FRAMING PLAN
3/16" = 1'-0"



NOTES:
1. FALL PROTECTION ANCHOR FOR PFAS W/ MAX. ARRESTING FORCE OF 1800#
2. STRUCTURE DESIGNED FOR 3100# LIVE LOAD PER 2019 OSSC SEC. 1607.10.4

2 ROOF - FALL PROTECTION ANCHOR
3/4" = 1'-0"



3 ROOF - FALL PROTECTION (SECTION)
1 1/2" = 1'-0"

3/29/23
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 14, 2006
RENEWS: 12/31/24

REV.	DESCRIPTION	DATE	BY

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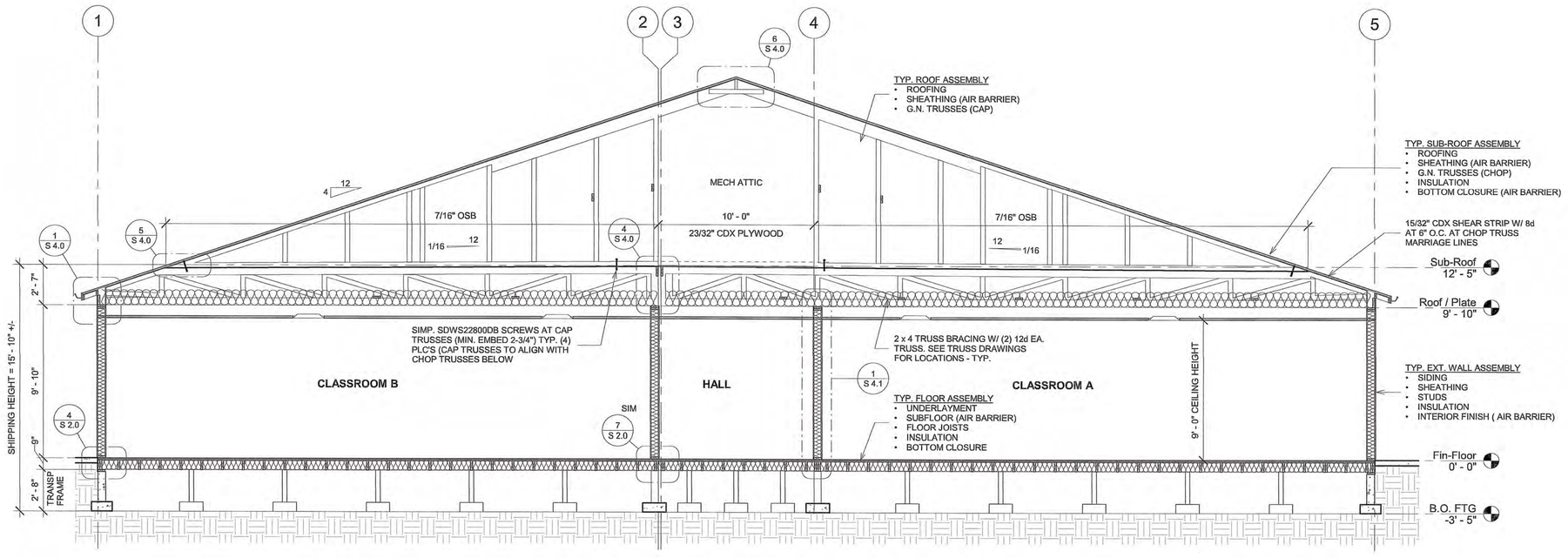
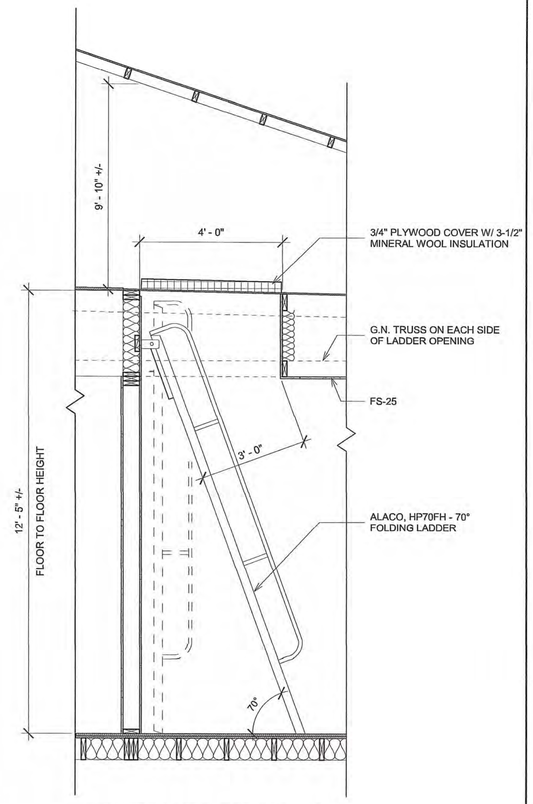
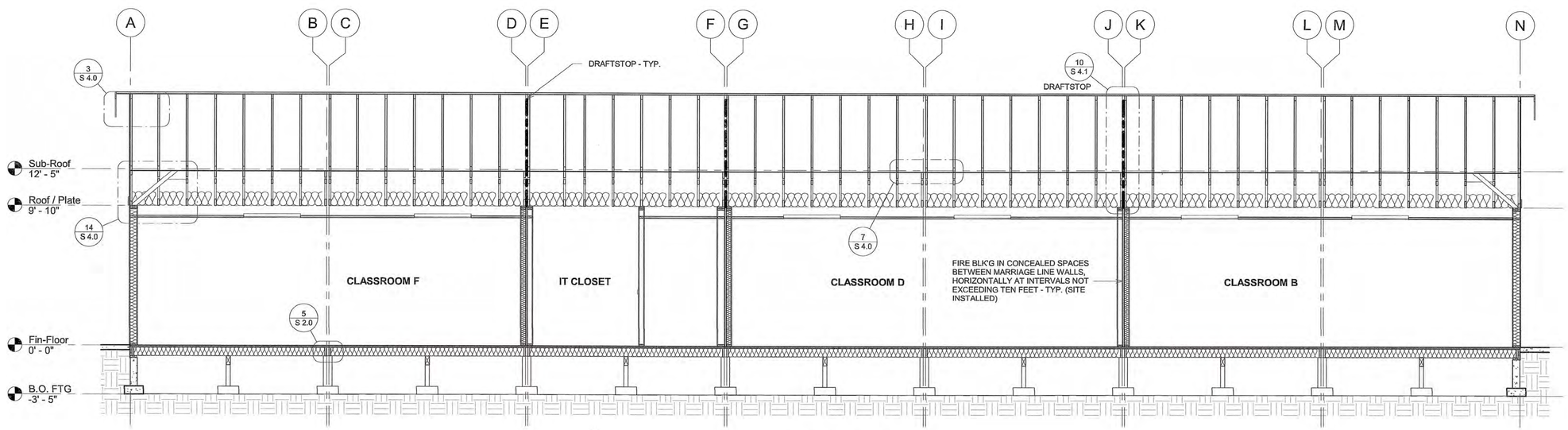
SHEET	ROOF FRAMING PLAN	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 2.2
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



1 MOD LONGITUDINAL SECTION
1/4" = 1'-0"



3 SECTION - ATTIC ACCESS LADDER
1/2" = 1'-0"



2 MOD TRANSVERSE SECTION
1/4" = 1'-0"

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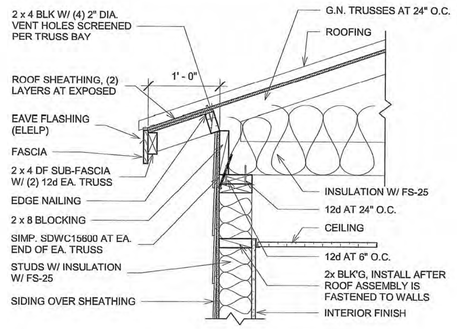
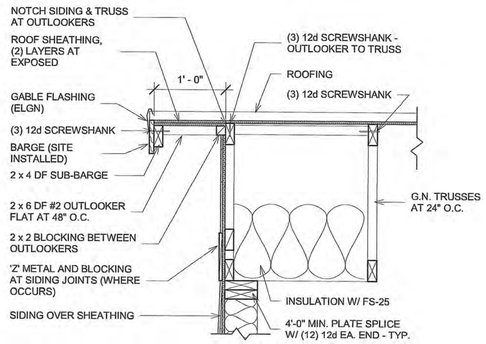
REGISTERED PROFESSIONAL ENGINEER
STATE OF WASHINGTON
EXPIRES: 12/31/24

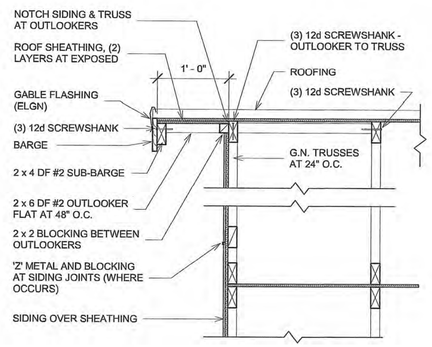
SHEET	BUILDING SECTIONS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 3.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023



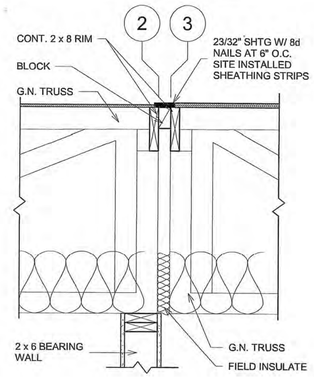
1 ROOF - MOD ENDWALL EAVE
1" = 1'-0"



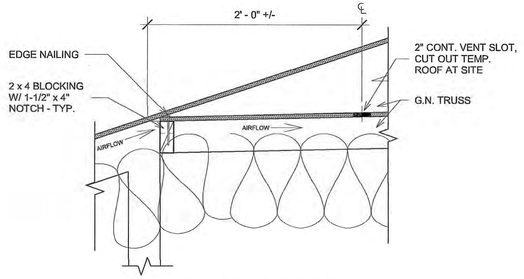
2 ROOF - MOD SIDEWALL GABLE AT SUB-ROOF
1" = 1'-0"



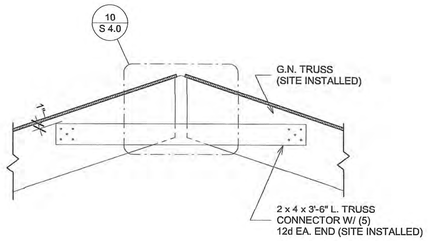
3 ROOF - MOD SIDEWALL GABLE
1" = 1'-0"



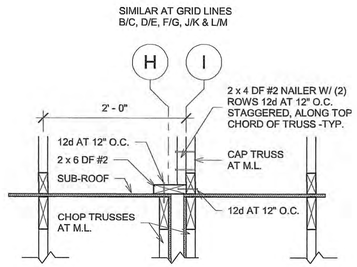
4 ROOF - TRUSS MARRIAGE AT BEARING WALL
1" = 1'-0"



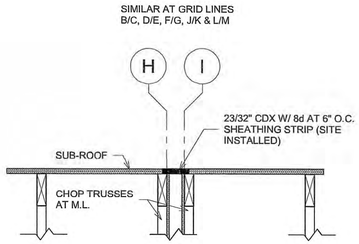
5 ROOF - VENTILATION AT SUB-ROOF
1 1/2" = 1'-0"



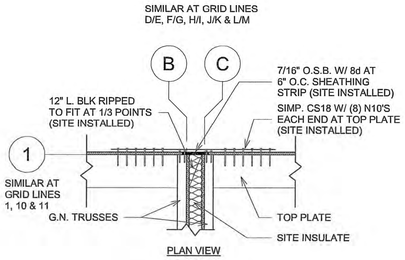
6 ROOF - MARRIAGE AT ATTIC TRUSS
1" = 1'-0"



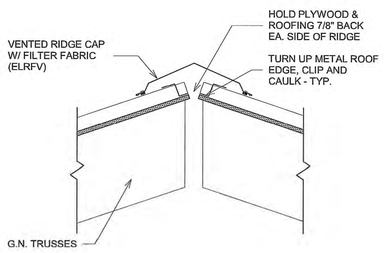
7 ROOF - MOD SIDEWALL MARRIAGE
1" = 1'-0"



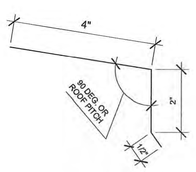
8 ROOF - MOD SIDEWALL MARRIAGE AT MECH ATTIC
1" = 1'-0"



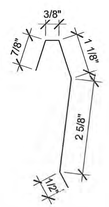
9 WALL - STRAP AT MARRIAGE
1" = 1'-0"



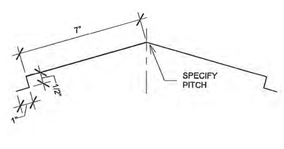
10 ROOF - RIDGE VENT
1 1/2" = 1'-0"



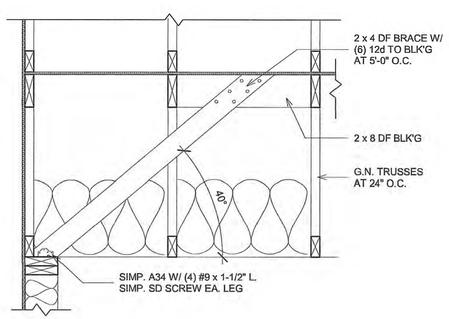
11 ROOF FLASHING - (ELELP) EAVE
6" = 1'-0"



12 ROOF FLASHING - (ELGN) NARROW GABLE
6" = 1'-0"



13 ROOF FLASHING - (ELRFV) FULL VENTED RIDGE
3" = 1'-0"



14 ROOF - GABLE TRUSS BRACING AT SUB-ROOF
1" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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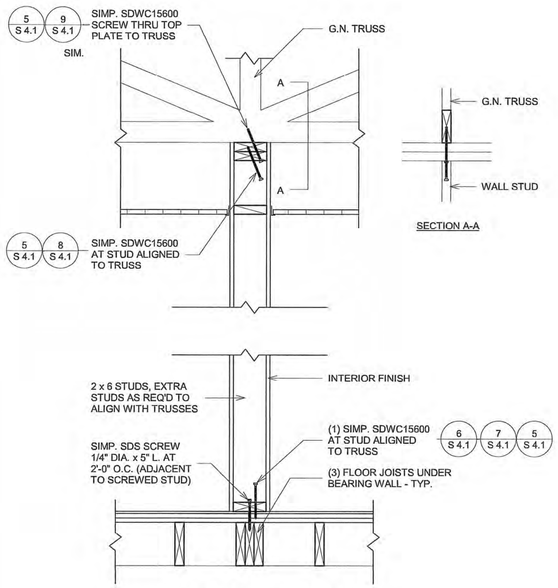
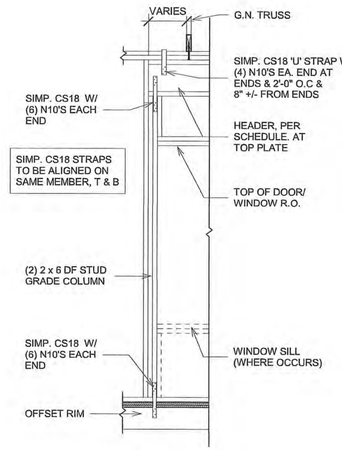
SHEET DETAILS
PROJ. 98' x 82' MODULAR CLASSROOM
EAGLE POINT SD II
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503
DRW BJ
JOB# 2022-LB-28
SHEET # S 4.0
DATE 3/29/2023

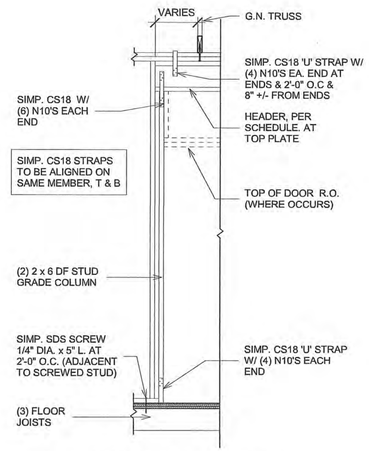
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 1981
KENNETH A. RASMUSSEN
EXPIRES: 12/31/24
3/29/23



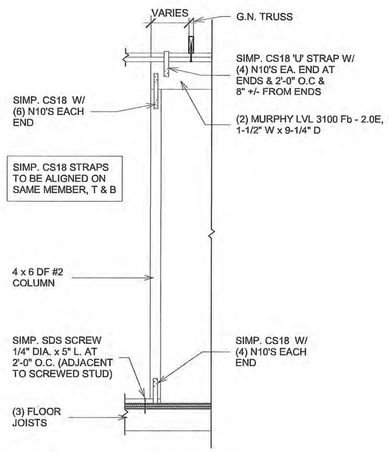
1 WALL SECTION - INTERIOR BEARING
1" = 1'-0"



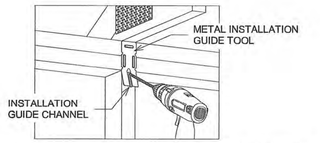
2 HEADER - EXT. WALL
1/2" = 1'-0"



3 HEADER - INT. BEARING WALL
1/2" = 1'-0"



4 HEADER - INT. BEARING WALL (MOD 'J')
1/2" = 1'-0"

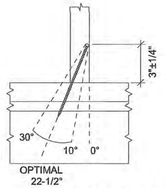


STEP 1 - ALIGN THE METAL INSTALLATION GUIDE TOOL (INCLUDED WITH THE TRUSS OR RAFTER, AND DRIVE THE TIP OF THE STRONG-DRIVE SDWC TO ENGAGE THE THREADS.

STEP 2 - WHILE CONTINUING TO DRIVE THE SDWC, "DROP" THE FASTENER HEAD INTO THE GUIDE CHANNEL TO ENSURE OPTIMAL INSTALLATION ANGLE OF 22.5°. THE INSTALLATION ANGLE RANGE IS 10° - 30° (SEE DETAIL). ONCE THE INSTALLATION ANGLE IS ESTABLISHED, THE METAL INSTALLATION GUIDE TOOL MAY BE REMOVED.

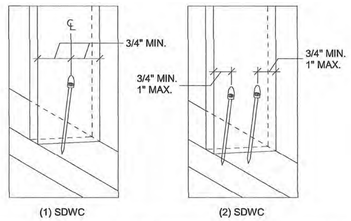
STEP 3 - DRIVE THE SDWC UNTIL THE HEAD OF THE FASTENER IS FULLY COUNTERSUNK INTO THE DOUBLE TOP PLATE. VERIFY THAT THE ENTIRE SHANK OF THE FASTENER IS INSTALLED INTO A WOOD MEMBER.

5 SIMP. - SDWC INSTALLATION (ROOF TO WALL)
1/4" = 1'-0"



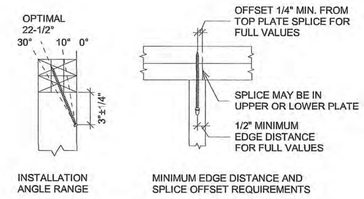
SDWC15600 AT STUD TO BOTTOM PLATE (WIDE FACE OF STUD)

6 SIMP. - SDWC STUD-TO-BOT. PLATE
1/4" = 1'-0"

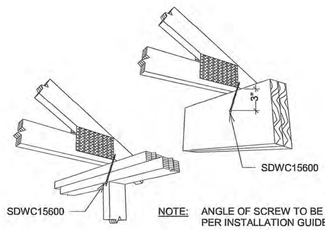


NOTE: STUD - TO - BOTTOM PLATE SHOWN. ALL OTHER INSTALLATIONS SIMILAR

7 SIMP. - SDWC EDGE DISTANCE AND SPACING
1/4" = 1'-0"

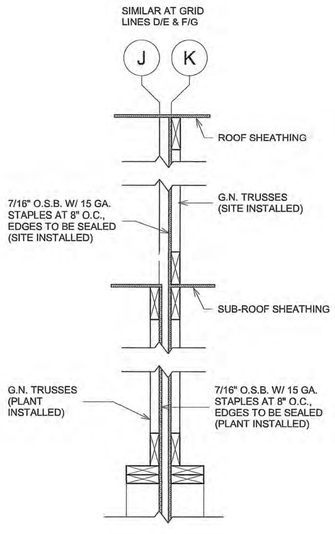


8 SIMP. - NARROW FACE OF STUD TO TOP PLATE
1/4" = 1'-0"

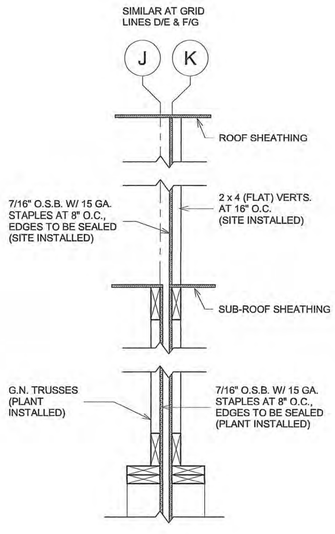


NOTE: ANGLE OF SCREW TO BE 22.5° PER INSTALLATION GUIDE

9 SIMP. - SINGLE SDWC ROOF TO WALL OR BEAM
1/4" = 1'-0"



10 ROOF - DRAFTSTOP
1" = 1'-0"



11 ROOF - DRAFTSTOP AT MECH ATTIC
1" = 1'-0"

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3/29/23
PROFESSIONAL ENGINEER
OREGON
EXPIRES: 12/31/24

SHEET	DETAILS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	S 4.1
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023

MAIN DISTRIBUTION PANEL PANEL A

MOUNTING Recessed

PROJECT NO: 2022-LB-28
DATE: 3/29/2023

Load Name	Rating	Circuit Number	Number of Poles	A		B		C		Number of Poles	Circuit Number	Rating	Load Name
Lighting/Fans - West	20 A	A1	1	1153 VA	1129 VA					1	A2	20 A	Lighting/Fans - East
Lighting - Hall	20 A	A3	1			330 VA	900 VA			1	A4	20 A	Recep. - Classroom B
Recep. - Classroom A	20 A	A5	1					720 VA	1440 VA	1	A6	20 A	Recep. - Classroom B
Recep. - Classroom A	20 A	A7	1	1440 VA	720 VA					1	A8	20 A	Recep. - Classroom D
Recep. - Classroom C	20 A	A9	1			900 VA	1440 VA			1	A10	20 A	Recep. - Classroom D
Recep. - Classroom C	20 A	A11	1					1440 VA	1260 VA	1	A12	20 A	Recep. - Classroom F
Recep.- Classroom E	20 A	A13	1	1260 VA	900 VA					1	A14	20 A	Recep. - Classroom F
Recep. - Classroom E	20 A	A15	1			720 VA	360 VA			1	A16	20 A	Recep. - Jan/Hall
Recep. - RR/Hall	20 A	A17	1					540 VA	360 VA	1	A18	20 A	4-Plex Recep. - IT
Drinking Fountain (GFCI)	20 A	A19	1	500 VA	360 VA					1	A20	20 A	4-Plex Recep. - IT
Smoke Detector	20 A	A21	1			1700 VA	1000 VA			1	A22	20 A	IDF Recep.
Attic Smoke Detector	20 A	A23	1					600 VA	1000 VA	1	A24	20 A	Fire Alarm
		A25									A26		
		A27									A28		
		A29									A30		
		A31									A32		
		A33									A34		
		A35									A36		
		A37									A38		
		A39									A40		
				7462 VA		7350 VA		7360 VA					

	TOTAL PANEL VA=	22172 VA	62 A	=TOTAL PANEL AMPS
BUSS SIZE	200 A		VOLTAGE	120/208 Wye
MAIN BREAKER	200 A		PHASE	3

ITEM	CONNECTED LOAD	DEMAND FACTOR	CALCULATED LOAD
LIGHTS	22893 VA	125.00%	28616 W
SIGN CIRCUIT			0 W
RECEPTACLE	14760 VA	83.88%	12380 W
DED. RECEPTACLE			0 W
MOTORS & COMPRESSORS			
EXHAUST FAN	336 VA	100.00%	336 W
LARGEST MOTOR	132 VA	25.00%	33 VA
HEATING & A/C (Per Mfg's Specs)			
TOTAL HEAT & A/C LOAD			
			0 W
MISCELLANEOUS			
FIRE ALARM	1000 VA	100.00%	1000 W
DRINKING FOUNTAIN	500 VA	100.00%	500 W
IDF	1000 VA	100.00%	1000 W
SMOKE DETECTORS	2300 VA	100.00%	2300 W
CONNECTED LOAD		**CALCULATED LOAD**	
TOTAL VA =	42921 VA	TOTAL VA =	46165 VA
TOTAL AMPS =	119 A	TOTAL AMPS =	128 A
NOTE: CONNECTED LOAD FOR LIGHTS IS FROM NEC TABLE 220.12			

NOTE:
PER NEC 220.44, RECPTACLES HAVE BEEN CALCULATED AT 10,000 VA AT 100% AND VA > 10,000 VA AT 50%. DRAFTING PROGRAM AUTOMATICALLY CALCULATES THIS FORMULA AND DISPLAYS AN ADJUSTED DEMAND FACTOR PER NEC 220.44

MAIN DISTRIBUTION PANEL PANEL B

MOUNTING Recessed

PROJECT NO: 2022-LB-28
DATE: 3/29/2023

Load Name	Rating	Circuit Number	Number of Poles	A		B		C		Number of Poles	Circuit Number	Rating	Load Name
Lighting - Mech Attic	20 A	B1	1	200 VA	1248 VA					3	B2	30 A	Condensing Unit CU-1
Furnace F-1	15 A	B3	1			1356 VA	1248 VA			--	B4	--	--
Furnace F-2	15 A	B5	1					1356 VA	1248 VA	--	B6	--	--
Furnace F-3	15 A	B7	1	1356 VA	1248 VA					3	B8	30 A	Condensing Unit CU-2
Furnace F-4	15 A	B9	1			1356 VA	1248 VA			--	B10	--	--
Furnace F-5	15 A	B11	1					1356 VA	1248 VA	--	B12	--	--
Furance F-6	15 A	B13	1	1356 VA	1248 VA					3	B14	30 A	Condensing Unit CU-3
Service Recep - Mech Attic	20 A	B15	1			720 VA	1248 VA			--	B16	--	--
Service Recep. - Exterior	20 A	B17	1					540 VA	1248 VA	--	B18	--	--
Heat Pump AC-1	25 A	B19	2	1976 VA	1248 VA					3	B20	30 A	Condensing Unit CU-4
--	--	B21	--			1976 VA	1248 VA			--	B22	--	--
Auxiliary	20 A	B23	1					1200 VA	1248 VA	--	B24	--	--
Water Heater	20 A	B25	1	180 VA	1248 VA					3	B26	30 A	Condensing Unit CU-5
Trap Primer	20 A	B27	1			360 VA	1248 VA			--	B28	--	--
		B29							1248 VA	--	B30	--	--
		B31			1248 VA					3	B32	30 A	Condensing Unit CU-6
		B33					1248 VA			--	B34	--	--
		B35							1248 VA	--	B36	--	--
		B37									B38		
		B39									B40		
				12546 VA		13256 VA		11940 VA					

	TOTAL PANEL VA=	37742 VA	105 A	=TOTAL PANEL AMPS
BUSS SIZE	200 A		VOLTAGE	120/208 Wye
MAIN BREAKER	200 A		PHASE	3

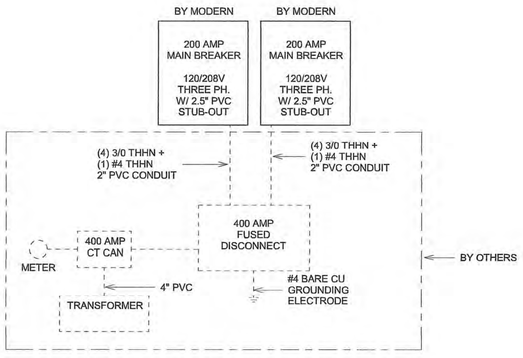
ITEM	CONNECTED LOAD	DEMAND FACTOR	CALCULATED LOAD
LIGHTS	200 VA	125.00%	250 W
SIGN CIRCUIT			0 W
RECEPTACLE	1260 VA	100.00%	1260 W
DED. RECEPTACLE			0 W
MOTORS & COMPRESSORS			
EXHAUST FAN			0 W
LARGEST MOTOR			
HEATING & A/C (Per Mfg's Specs)			
TOTAL HEAT & A/C LOAD			
	34552 VA	100.00%	34552 W
MISCELLANEOUS			
AUXILIARY	1200 VA	100.00%	1200 W
WATER HEATER	180 VA	125.00%	225 W
CONNECTED LOAD		**CALCULATED LOAD**	
TOTAL VA =	37392 VA	TOTAL VA =	37487 VA
TOTAL AMPS =	104 A	TOTAL AMPS =	104 A

ELECTRICAL LOAD SUMMARY

PANEL A:	46,165 VA
PANEL B:	37,487 VA
TOTAL:	83,652 VA = 83.6 kVA
	83,652 / (208*1.732) = 232 A

ONE-LINE DIAGRAM NOTES

1. EMT CONDUIT SHALL NOT BE USED WITH UNFUSED CONDUCTORS INSIDE BUILDING LINES
2. FIELD VERIFY AIC RATING REQUIREMENTS
3. N/A
4. GROUNDING TO BE IN ACCORDANCE TO NEC 250
5. SITE INSTALLED PORTION OF ELECTRICAL DISTRIBUTION SYSTEM DESIGN IS GENERIC SHALL BE INSTALLED IN ACCORDANCE WITH THESE APPROVED PLANS.



ONE-LINE DIAGRAM

NO SCALE

ELECTRICAL NOTES

1. CONDUIT SHALL BE ELECTRICAL METALLIC TUBING AND METAL CLAD CABLE
2. EXTERIOR RECEPTACLES SHALL BE WEATHER RESISTANT TYPE W/ IN USE WEATHERPROOF COVER
3. BUILDING SERVICE SHALL BE SERVED BY ONLY ONE SERVICE OR FEEDER PER NEC 225.30 AND 230.2
4. SERVICE OR FEEDER DISCONNECT SHALL BE INSTALLED PER NEC 230.70. FOR BUILDINGS IN THE STATE OF WASHINGTON SERVICE OR FEEDER DISCONNECT SHALL BE INSTALLED PER WAC 296-46B-230
5. PERMANENT MEANS OF LOCKING OUT DISCONNECT TO MECHANICAL UNIT(S) SHALL BE PROVIDED PER NEC 424.19
6. PERMANENT MEANS OF LOCKING OUT DISCONNECT TO WATER HEATER(S) SHALL BE PROVIDED PER NEC 422.31(B)
7. GASKET ALL EXTERIOR WALL BOX PLATE COVERS
8. PER NEC 110.26D, ILLUMINATION FOR PANEL BOARDS, SWITCH-BOARDS, AND SERVICE EQUIPMENT SHALL NOT BE CONTROLLED BY AUTOMATIC MEANS ONLY. A MANUAL MEANS TO BYPASS THE AUTOMATIC CONTROL IS REQUIRED.
9. PER NEC 406.9(B)(1) 15 AND 20 AMP RECEPTACLES INSTALLED IN WET LOCATION SHALL HAVE AN ENCLOSURE THAT WEATHER-PROOF WHETHER OR NOT THE ATTACHMENT PLUG CAP IS INSERTED. AN OUTLET BOX HOOD INSTALLED FOR THIS PURPOSE SHALL BE LISTED AND SHALL BE IDENTIFIED AS EXTRA DUTY. RECEPTACLES SHALL BE LISTED AS WEATHER-RESISTANT TYPE.
10. PER NEC 110.26, WORKING SPACE FOR EQUIPMENT OPERATING AT 600 VOLTS, NOMINAL, OR LESS TO GROUND AND LIKELY TO REQUIRE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE WHILE ENERGIZED SHALL COMPLY WITH THE DIMENSIONS OF 110.26(A)(1), (A)(2), AND (A)(3)
11. PER NFPA 72, NEC 760 AND WAC 296-46B-760 DEVICE AND JUNCTION BOXES FOR FIRE ALARM SYSTEMS OTHER THAN SURFACE RACEWAY TYPE MUST BE SUBSTANTIALLY RED IN COLOR BOTH INSIDE AND OUTSIDE. POWER LIMITED FIRE PROTECTIVE SIGNALING CIRCUIT CONDUCTORS MUST BE DURABLY AND PLAINLY MARKED IN OR ON JUNCTION BOXES OR OTHER ENCLOSURES TO INDICATE THAT IT IS POWER LIMITED FIRE PROTECTIVE SIGNALING CIRCUIT.
12. PER NEC 110.22 AND WAC 296-46B-110-022 IDENTIFICATION PLATES ON DISCONNECTING MEANS ARE TO SHOW DESIGNATION OF CIRCUIT SOURCE PANEL BOARD THAT SUPPLIES DISCONNECT AND IDENTIFY WHAT IT IS DISCONNECTING. MUST BE AN IDENTIFICATION PLATE
13. FIRE ALARM POWER SOURCE AND BRANCH CIRCUITS TO COMPLY WITH NEC 760.41(A)(B). THE FIRE ALARM CIRCUIT DISCONNECT SHALL BE PERMITTED TO BE SECURED IN THE "ON" POSITION. THE CIRCUIT DISCONNECTING MEANS SHALL HAVE RED IDENTIFICATION, SHALL BE ACCESSIBLE ONLY TO QUALIFIED PERSONNEL, AND SHALL BE IDENTIFIED AS "FIRE ALARM CIRCUIT".

REGISTERED PROFESSIONAL ENGINEER
BRENTA RASMUSSEN
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 745-4949 FAX: (503) 749-4950
P.O. BOX 110, 9493 PORTER ROAD, AUMSVILLE, OR 97325
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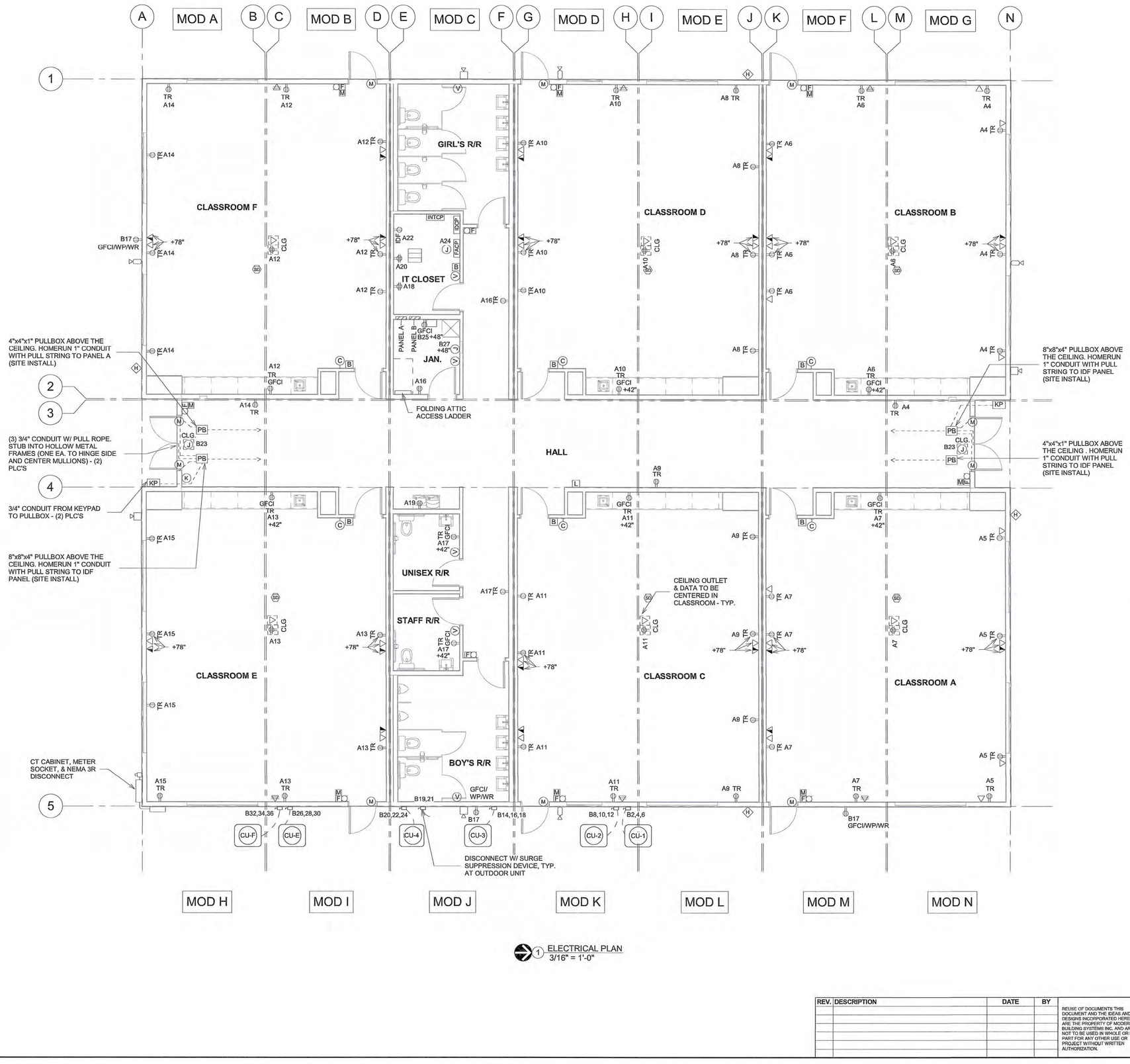
SHEET	ELEC. PANELS & LOAD CALCS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	E 0.1
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023



1 ELECTRICAL PLAN
3/16" = 1'-0"

ELECTRICAL SYMBOLS LEGEND

SYMBOL	DESCRIPTION	HEIGHT ℄ (U.N.O)
	DUPLEX RECEPTACLE GFCI = GROUND FAULT CIRCUIT INTERRUPTER WP = IN USE WEATHERPROOF COVER WR = WATER RESISTANT RECEPTACLE TR = TAMPER RESISTANT	+17"
	4-PLEX RECEPTACLE TR = TAMPER RESISTANT	+17"
	DUPLEX DATA BOX - 3/4" CONDUIT UP (RACEWAY ONLY)	+17"
	4-PLEX DATA BOX - 3/4" CONDUIT UP (RACEWAY ONLY)	+17"
	HDMI BOX - 1" CONDUIT UP (RACEWAY ONLY)	+17"
C	CLOCK RECEPTACLE (120V)	+94"
	DISCONNECT	-
T	THERMOSTAT (BY OWNER) - 3/4" CONDUIT UP (RACEWAY ONLY)	+48" TOP
	TWO-POST DATA RACK - FLOOR MOUNTED (BY OWNER)	-
	CCTV CAMERA - 3/4" CONDUIT UP (RACEWAY ONLY)	-
B	INTERCOM CALL SWITCH - 3/4" CONDUIT UP (RACEWAY ONLY)	+48" TOP
INTCP	INTERCOM/PA PANEL (RACEWAY ONLY)	+72" TOP

FIRE ALARM SYMBOLS LEGEND

SYMBOL	DESCRIPTION	HEIGHT ℄ (U.N.O)
FACP	FIRE ALARM CONTROL PANEL (RACEWAY ONLY)	+72" TOP
F	AUDIO/VISUAL FIRE ALARM - 3/4" CONDUIT UP (RACEWAY ONLY)	+80"
V	VISUAL ALARM - 3/4" CONDUIT UP (RACEWAY ONLY)	+80"
	AUDIBLE INDICATING ALARM - 3/4" CONDUIT UP (RACEWAY ONLY)	+96"
	CEILING MOUNTED AUDIO/VISUAL FIRE ALARM - 3/4" CONDUIT UP (RACEWAY ONLY)	-
M	MANUAL PULL STATION - 3/4" CONDUIT UP (RACEWAY ONLY)	+45"
SD	SMOKE DETECTOR	CEILING
H	WALL MOUNTED OUTDOOR HORN - 3/4" CONDUIT UP (RACEWAY ONLY)	+96"

SECURITY SYMBOLS LEGEND

SYMBOL	DESCRIPTION	HEIGHT ℄ (U.N.O)
IDCP	INTRUSION DETECTION CONTROL PANEL (RACEWAY ONLY)	+72" TOP
L	LOCKDOWN/POLICE CALL BUTTON - 3/4" CONDUIT UP (RACEWAY ONLY)	+48" TOP
KP	KEYPAD BOX (FOR FUTURE) - 3/4" CONDUIT UP (RACEWAY ONLY) (KEYPAD BY OTHERS)	+48" TOP
M	MAGNETIC DOOR CONTACT - 3/4" CONDUIT UP (RACEWAY ONLY)	-
K	INTRUSION DETECTION KEYPAD - 3/4" CONDUIT UP (RACEWAY ONLY)	+42"

REV.	DESCRIPTION	DATE	BY

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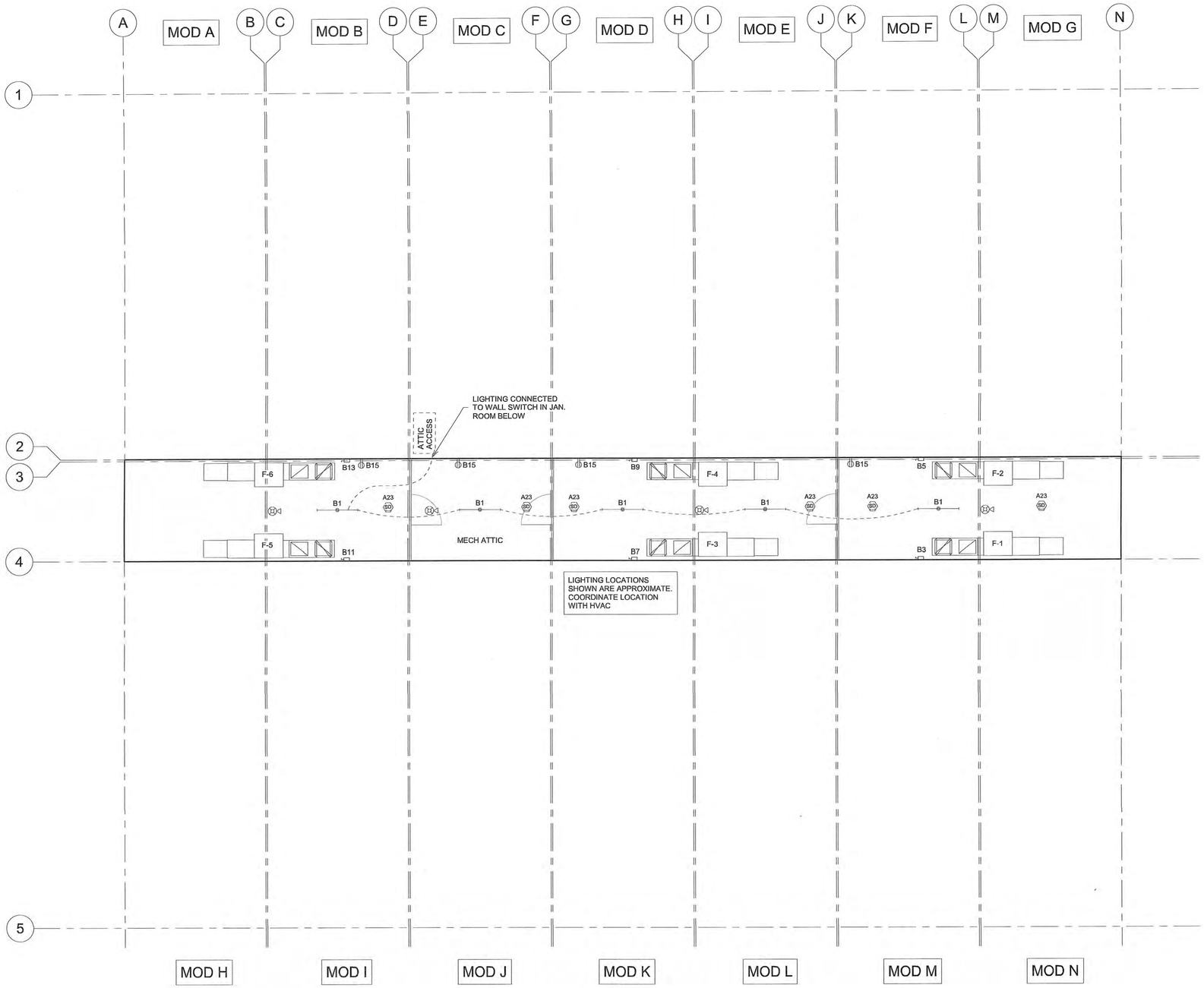
7/29/23

EXPIRES: 12/31/24

SHEET	ELECTRICAL PLAN	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	E 1.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW	BJ
		DATE	3/29/2023



1 ELEC & LIGHTING PLAN - ATTIC
3/16" = 1'-0"

REV.	DESCRIPTION	DATE	BY

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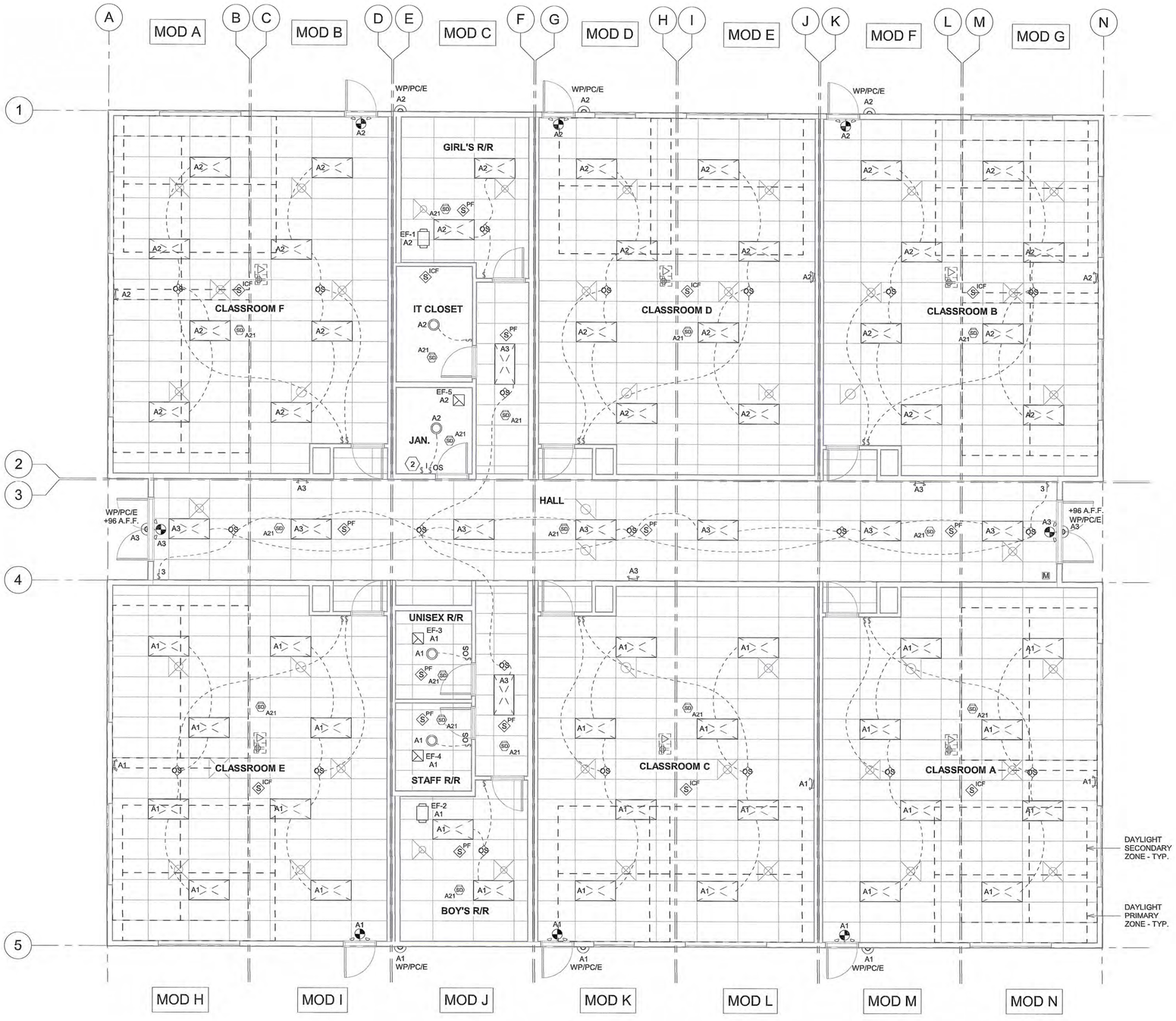
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 1982
KENNETH A. PASTRICK
EXPIRES: 12/31/24
3/29/23

SHEET	ELEC. & LIGHTING PLAN - ATTIC
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503
DRW	BJ
DATE	3/29/2023
JOB#	2022-LB-28
SHEET #	E 1.1



DAYLIGHT CONTROLS NOT REQUIRED PER LIGHTING PLAN NOTE #4

1 LIGHTING PLAN
3/16" = 1'-0"

LIGHTING PLAN KEYNOTES

1. POWER FOR IN-LINE EXHAUST FAN ABOVE CEILING
2. LIGHT SWITCH TO MECHANICAL ATTIC LIGHTING

LIGHTING SYMBOLS LEGEND		
SYMBOL	DESCRIPTION	HEIGHT ℄ (U.N.O)
	2' x 4' LED LAY IN FIXTURE, NON-nLIGHT	CEILING
	13" LED SURFACE MOUNT FIXTURE	CEILING
	EXTERIOR LED WALL MOUNT LIGHT FIXTURE PC = PHOTOCELL WP = WEATHERPROOF E = EMERGENCY LIGHT W/ BATTERY BACKUP	+86"
	4' LED STRIP SURFACE MOUNT LIGHT FIXTURE	CEILING
OS	OCCUPANCY SENSOR	CEILING
$	SINGLE POLE SWITCH	+48" TOP
$3	THREE-WAY SWITCH	+48" TOP
$OS	OCCUPANCY SWITCH SENSOR: - W/ MANUAL ON	+48" TOP
$I	INDICATOR SWITCH	+48" TOP
	EXIT LIGHT W/ EMERGENCY LIGHTS AND BATTERY BACK-UP (5 WATT MAX.)	-
	EMERGENCY LIGHT: - W/ BATTERY BACK-UP	+96"
SD	SMOKE DETECTOR	CEILING
S ICF	CEILING MOUNTED INTERCOM SPEAKER (FOR REFERENCE ONLY)	CEILING
S PA	CEILING MOUNTED PAGING SPEAKER (FOR REFERENCE ONLY)	CEILING

EXTERIOR LIGHTING SUMMARY					
SUBSTITUTIONS WITH EQUAL OR BETTER PERFORMING PRODUCTS ALLOWED WITH APPROVAL FROM MODERN					
Description	Model	Quantity	Lamp	Wattage	Total Wattage
EMERGENCY WALL MOUNT FIXTURE	CYBER TECH LIGHTING, LWP12BZACEMSDT850	8	LED	12 W	96 W
Total		8			96 W

INTERIOR LIGHTING SUMMARY					
SUBSITUTIONS WITH EQUAL OR BETTER PERFORMING PRODUCTS ALLOWED WITH APPROVAL FROM MODERN					
Description	Model	Quantity	Lamp	Wattage	Total Wattage
2'x4' LAY-IN FIXTURE	LITHONIA, 2BLT4	61	LED	34 W	2074 W
13" DIA. SURFACE MOUNT FIXTURE	LITHONIA, FMML 13 840	4	LED	28 W	112 W
48" STRIP SURFACE MOUNT FIXTURE	CYBER TECH LIGHTING, ST4840XSLED3CCT	5	LED	40 W	200 W
EMERGENCY WALL MOUNT FIXTURE	LITHONIA, ELM2 LED M12	9	LED	0 W	0 W
EXIT / EMERGENCY WALL MOUNT FIXTURE	COOPER/SURELITES, APC7R	8	LED	0 W	0 W
Total		87			2386 W

LIGHTING PLAN NOTES

1. CONTROLLED RECEPTACLES ARE NOT REQUIRED PER OEESC E301.3,b EXCEPTION #3C, AS EXCEPTIONS TO ASHRAE 8.4.2
2. OCCUPANCY SENSOR(S) IN EACH ROOM WILL BE WIRED TO CONTROL ALL LIGHT FIXTURES IN THAT ROOM.
3. LIGHT WIRING AS SHOWN IS FOR GENERAL CONTROL CLARIFICATION ONLY. ACTUAL WIRING FOR CONTROLS (I.E.: SWITCHES, OCCUPANCY SENSORS AND DAYLIGHT SENSORS) SHALL BE PER CONTROL MANUFACTURER'S SPECIFICATIONS AND AS NECESSARY TO MEET THE CODE REQUIREMENTS FOR EACH CONTROL AND THE LIGHT FIXTURES CONNECTED TO IT.
4. DAYLIGHTING AND OCCUPANCY SENSORS ARE INTEGRAL TO EACH LIGHT FIXTURE AS SHOWN AND PROGRAMMED TO COVER EACH DAYLIGHT ZONE. OCCUPANCY SENSORS ARE PROGRAMMED TO CONTROL ALL FIXTURES IN THE SPACE

   DAYLIGHT RESPONSIVE CONTROLS ARE NOT REQUIRED IN ZONES WITH LESS THAN 150 WATTS IN GENERAL PRIMARY SIDELIGHTING AREAS. DAYLIGHT ZONES INCLUDING BOTH PRIMARY AND SECONDARY SIDELIGHTED AREA LESS THAN 300 WATTS ARE NOT REQUIRED. WHEN REQUIRED, SIDELIGHTING AREAS SHALL BE CONTROLLED BY PHOTOCONTROLS; PER ASHRAE 9.4.1.1(e)
5. BUILDING FACADE LIGHTING OTHER THAN ENTRY DOORS, SHALL HAVE CONTROLS PER ASHRAE 9.4.1.4(b) TO AUTOMATICALLY SHUT OFF FACADE LIGHTING BETWEEN MIDNIGHT OR BUSINESS CLOSING, WHICHEVER IS LATER, AND 6 A.M. OR BUSINESS OPENING, WHICHEVER COMES FIRST.

REV.	DESCRIPTION	DATE	BY

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3/27/23
PROFESSIONAL ENGINEER
OREGON
JAMES M. BOYD
RENEWAL IS 6/30/2024
EXPIRES: 12/31/24

SHEET LIGHTING PLAN		JOB# 2022-LB-28
PROJ. 98' x 82' MODULAR CLASSROOM EAGLE POINT SD II		SHEET # E 2.0
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023

HVAC SYMBOLS LEGEND		
SYMBOL	DESCRIPTION	HEIGHT ℄ (U.N.O)
	2' x 2' LAY-IN SUPPLY DIFFUSER	CEILING
	2' x 2' LAY-IN RETURN GRILLE	CEILING
	2' x 2' LAY-IN EXHAUST GRILLE	CEILING
T	THERMOSTAT (BY OWNER) - 3/4" CONDUIT (RACEWAY ONLY)	+48" TOP
	FLEX DUCT	ATTIC

HVAC KEYNOTES

1. EXHAUST FANS DUCTED TO SUB-ROOF. COMPLETION OF DUCTING TO BE COMPLETED BY OTHERS
2. 10" DIA. SUPPLY AIR DUCT FROM CEILING DIFFUSER TO SUB-ROOF. COMPLETION OF DUCTING TO BE COMPLETED BY OTHERS
3. 12" DIA. RETURN AIR DUCT FROM CEILING GRILLE TO SUB-ROOF. COMPLETION OF DUCTING TO BE COMPLETED BY OTHERS
4. 16" x 20" RETURN AIR DUCT IN CHASE FROM SUB-ROOF TO 18" x 24" WALL GRILLE. BOTTOM OF GRILLE TO BE 6" A.F.F. ASSEMBLE DUCT WITH SLIP & DRIVE JOINTS. COMPLETION OF DUCTING TO BE COMPLETED BY OTHERS
5. 3" SLEEVE WITH CHASE FROM SUB-ROOF TO CRAWLSPACE FOR AIR CONDITIONING LINE SETS
6. 1" CONDENSATE DRAIN IN WALL FROM SUB-ROOF TO MOP SINK. COMPLETION OF CONDENSATE DRAINS TO BE COMPLETED BY OTHERS
7. 1" SCH 40 STEEL GAS PIPE IN WALL FROM WATER HEATER TO SUB-ROOF. COMPLETION OF GAS PIPING TO BE COMPLETED BY OTHERS
8. 1" SCH 40 STEEL GAS PIPE STUBBED OUT AT 12" A.F.F. AND IN WALL TO SUB-ROOF. COMPLETION OF GAS PIPING TO FURNACES TO BE COMPLETED BY OTHERS
9. 3"/5" CONCENTRIC VENTING OF TANKLESS GAS WATER HEATER TO SUB-ROOF, COMPLETION OF VENTING TO BE COMPLETED BY OTHERS
10. 3" SLEEVE WITH CHASE FROM SUB-ROOF TO 72" A.F.F. FOR AIR CONDITIONING LINE SETS. INSTALL 1" CONDENSATE FOR DRAINAGE

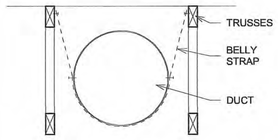
NOTE: HEATING AND AIR CONDITIONING EQUIPMENT PROVIDED AND SITE INSTALLED (BY OTHERS). SEE MECHANICAL DRAWINGS FROM INSIGHT CONSULTING ENGINEERS FOR MECHANICAL DESIGN AND EQUIPMENT SCHEDULES.

NOTE: MECHANICAL GAS PIPE INSTALLATION AND CALCS WILL BE REVIEWED AND APPROVED THROUGH THE STRUCTURAL/MECHANICAL DIVISION OF BCD AND NOT PLUMBING. SECTION 2021 OAR 918-440-0010

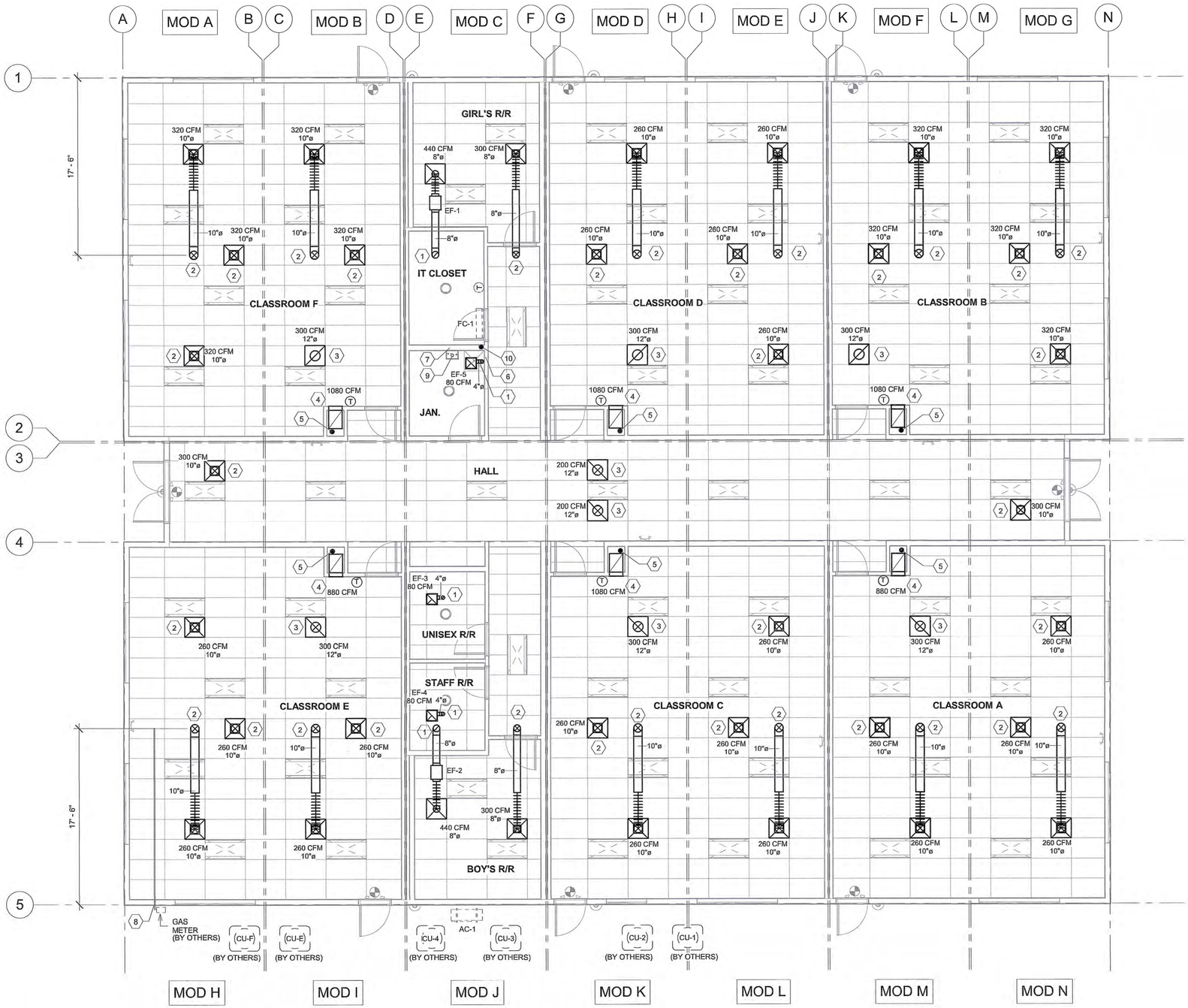
HVAC NOTES

1. **CONTROLS:**
   - **THERMOSTAT:** (BY OTHERS)

     DOOR SWITCH CONTROLS TO BE INSTALLED PER ASHRAE 6.5.10, EXCEPT WHERE NOT REQUIRED PER ASHRAE EXCEPTION #1
2. **DUCTWORK:**
   - **MATERIAL:** 1" FIBERGLASS (R-4.2) OR 24 GA. SHEET METAL W/ 26 GA. SHEET METAL ROUNDS AND FLEX DUCT ROUNDS AT DIFFUSERS
   - **INSULATING AND SEALING:** DUCTWORK TO BE INSULATED AND SEALED AT ALL CONNECTIONS
   - **CONSTRUCTION:** DUCTWORK TO BE CONSTRUCTED AS LOW PRESSURE DUCT SYSTEM
   - **EXHAUST OUTLETS:** FOR ENVIRONMENTAL AIR EXHAUST, A MINIMUM DISTANCE OF: 3 FEET FROM THE PROPERTY LINES; 3 FEET FROM OPERABLE OPENINGS INTO BUILDINGS, AND 10 FEET FROM MECHANICAL AIR INTAKES SHALL BE PROVIDED PER OMSC 501.3.1.3
3. **VOLUME DAMPERS:** PROVIDE VOLUME DAMPERS TO CONTROL AIRFLOW AT EACH TAKE-OFF OR DIFFUSER



2 HVAC - DUCT SUPPORT (ROUND)
1" = 1'-0"



1 HVAC PLAN
3/16" = 1'-0"

HVAC EQUIPMENT SCHEDULE												
SUBSTITUTIONS WITH EQUAL OR BETTER PERFORMING PRODUCTS ALLOWED WITH APPROVAL FROM MODERN												
Mark	Count	Description	Manufacturer	Model	Cooling Efficiency	Weight (LBS)	Cooling Capacity (Btu/h)	CFM	MCA	MOP	Volts	Phase	Notes
EF-1	1	EXHAUST FAN	PANASONIC	FV-40NLF1	-	19.1	-	440	1.1	20	120	1	INSTALL WHISPERGREEN FV-VS15K1 SPEED MODULE
EF-2	1	EXHAUST FAN	PANASONIC	FV-40NLF1	-	19.1	-	440	1.1	20	120	1	INSTALL WHISPERGREEN FV-VS15K1 SPEED MODULE
EF-3	1	EXHAUST FAN	PANASONIC	FV-0511VF1	-	8.82	-	80	0.29	20	120	1	
EF-4	1	EXHAUST FAN	PANASONIC	FV-0511VF1	-	8.82	-	80	0.29	20	120	1	
EF-5	1	EXHAUST FAN	PANASONIC	FV-0511VF1	-	8.82	-	80	0.29	20	120	1	

REV.	DESCRIPTION	DATE	BY

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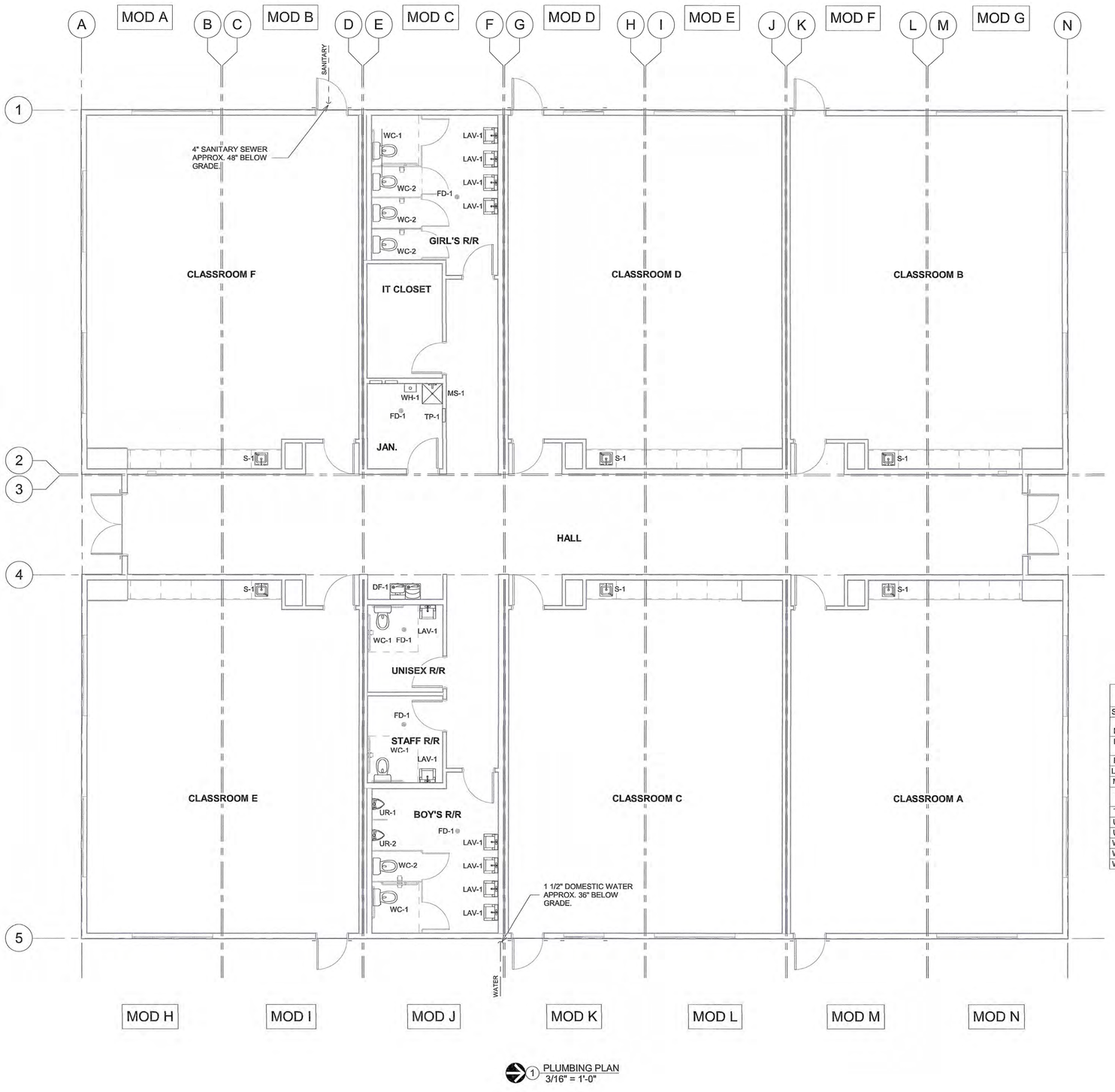
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 10, 1984 KENNETH A. HAUSER
EXPIRES: 12/31/24

SHEET	HVAC PLAN
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503
JOB#	2022-LB-28
SHEET #	M 1.0
DRW	BJ
DATE	3/29/2023



1 PLUMBING PLAN
3/16" = 1'-0"

PLUMBING NOTES

1. SUPPLY PIPING AND FITTINGS:
   - TYPE 'L' CU
   - CHLORINATED POLYVINYL CHLORIDE (CPVC) PLASTIC SCHED 40
   - CROSSLINKED POLYETHYLENE (PEX) PLASTIC
   - COPPER
2. SUPPLY PIPE SIZES BASED ON:
   - 100 FT. DEVELOPED LENGTH
   - 46 - 60 PSI
3. WASTE PIPING:
   - ABS - DWV
4. WASTE PIPE SIZES BASED ON:
   - 1/4" PER FOOT SLOPE
5. FLOOR DRAINS:
   - FLOOR SHALL BE SLOPED TO FLOOR DRAINS PER OPSC/UPC 418.5
   - PROVIDE TRAP SEAL PROTECTION PER OPSC/UPC 1007
6. TRAP PRIMERS TO BE MIN. 12" ABOVE FLOOR RIM PER OPSC 1007.4
7. WATER HAMMER ARRESTER(S): INSTALL AT FLUSHOMETERS OR QUICK-ACTING VALVES PER OPSC/UPC 609.10
8. SHOWERS:
   - WHEN PRESENT SHALL BE PROVIDED WITH A THERMOSTATIC BALANCE VALVE PER OPSC/UPC 408.3
   - A HAND SHOWER WITH A HOSE 59 INCHES MINIMUM IN LENGTH, THAT CAN BE USED BOTH AS A FIXED SHOWER HEAD AND AS A HAND SHOWER SHALL BE PROVIDED
9. DISHWASHER: WHEN PRESENT SHALL BE PROVIDED WITH AIR GAP FITTING PER OPSC/UPC 807.3
10. CLOTHES WASHER: WHEN PRESENT SHALL BE PROVIDED WITH A STANDPIPE PER OPSC/UPC 804
11. EXPOSED PIPES AND SURFACES:
    - PER 2009 ANSI A117.1, WATER SUPPLY AND DRAINPIPES UNDER LAVATORIES AND SINKS SHALL BE INSULATED OR OTHERWISE CONFIGURED TO PROTECT AGAINST CONTACT. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER LAVATORIES AND SINKS
12. WATER CLOSET SEATS:
    - PER OPSC/UPC 411.3, ADA COMPLIANT TOILET SEATS SHALL BE OF THE ELONGATED TYPE AND EITHER OF THE OPEN FRONT TYPE OR HAVE AN AUTOMATIC SEAT COVER DISPENSER. PLASTIC SEATS SHALL COMPLY WITH IAPMO Z124.5
13. WATER CLOSETS:
    - PER OPSC/UPC 411.1, WATER CLOSET BOWLS FOR PUBLIC USE SHALL BE OF THE ELONGATED TYPE.
14. FLUSH CONTROLS:
    - PER 2009 ANSI 604.6, FLUSH CONTROLS SHALL BE HAND OPERATED OR AUTOMATIC. HAND OPERATED FLUSH CONTROLS SHALL COMPLY WITH SECTION 309. FLUSH CONTROLS SHALL BE LOCATED ON THE OPEN SIDE OF THE WATER CLOSET.
15. URINALS:
    - PER 2009 ANSI 605.2, URINALS SHALL BE OF THE STALL TYPE OR SHALL BE OF THE WALL HUNG TYPE WITH THE RIM AT 17 INCHES MAXIMUM ABOVE THE FLOOR. WALL HUNG URINALS SHALL BE 13-1/2 INCHES MINIMUM IN DEPTH MEASURED FROM THE OUTER FACE OF THE URINAL RIM TO THE WALL
16. WATER HEATING:
    - SERVICE WATER HEATING EQUIPMENT SHALL BE PROVIDED WITH TEMPERATURE CONTROLS PER ASHRAE 7.4.4.1 AND 7.4.4.3 AND WSEC C404.7.3
    - HOT WATER FROM PUBLIC-USE LAVATORIES SHALL ALSO BE CONTROLLED PER OPSC/UPC 407.3
    - WATER HEATING EQUIPMENT SHALL BE SUPPLIED WITH HEAT TRAPS PER ASHRAE 7.4.6 AND WSEC C404.4
    - STRAP WATER HEATER TO WALL W/ 26 GA. x 1" SEISMIC STRAP W/ (1) #6 SMST TO TANK AND (1) #3 x 2" BUGLE HEAD SCREW TO WALL EACH END
    - HOT WATER PIPES TO BE INSULATED PER ASHRAE 7.4.3 AND WSEC C404.6
    - NO PEX PIPING WITHIN 18" OF WATER HEATER PER OPSC /UPC 604.13
    - WATER HEATING EQUIPMENT SHALL HAVE NO LESS THAN THE ENERGY FACTOR EFFICIENCY PER ASHRAE TABLE 7.8 AND WSEC TABLE C404.2
    - WATER HEATING EQUIPMENT SHALL BE SUPPLIED WITH DRAINAGE PER OPSC 507.4 AND UPC 507.5

PLUMBING FIXTURE SCHEDULE

SUBSTITUTIONS WITH EQUAL OR BETTER PERFORMING PRODUCTS ALLOWED WITH APPROVAL FROM MODERN

Mark	Count	Description	Model	Style	GPM/ GPF	Watts
DF-1	1	DUAL HEIGHT DRINKING FOUNTAIN AND BOTTLE FILLING STATION	ELKAY, EZSTL8WSLC			
FD-1	5	FLOOR DRAIN	SIOUX CHIEF, 822-2ANR	3"		
LAV-1	10	WALL HUNG LAVATORY	GERBER, PLYMOUTH 12-314; FAUCET: OLYMPIA, 3LG161G	VITR. CHINA	0.5	
MS-1	1	MOP SINK, 24x24	MUSTEE, 63M; FAUCET: CHICAGO, 897-CRCF			
S-1	6	CLASSROOM SINK W/ BUBBLER, 15" x 15" x 5-3/16"	SINK, DAYTON D11515; BUBBLER, ELKAY LK1141A; FAUCET, OLYMPIA, B-8160	S.S.	2.5	
TP-1	1	TRAP PRIMER	MIFAB, MI-100-5			
UR-1	1	ADA URINAL W/ FLUSHOMETER	KOHLER, DEXTER, 5016-ET; FLUSH VALVE: SLOAN, REGAL, 186-1XL	FLUSH VALVE	1	
UR-2	1	NON-ADA URINAL W/ FLUSHOMETER	KOHLER, DEXTER, 5016-ET; FLUSH VALVE: SLOAN, REGAL, 186-1XL	FLUSH VALVE	1	
WC-1	4	ADA WATER CLOSET	GERBER, MAXWELL MX21-928 (17" HIGH);TANK: GERBER, MAXWELL 28-990; SEAT: CHURCH, 295CT	TANK	1.28	
WC-2	4	NON-ADA WATER CLOSET	GERBER, MAXWELL 21-962 (15" HIGH); TANK: GEBER, MAXWELL 28-990; SEAT: CHURCH, 295CT	TANK	1.28	
WH-1	1	TANKLESS WATER HEATER	RHEEM, ECON180DVLN3-1	GAS		

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 15, 1997
KEITH A. RAKOSKA
EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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TELEPHONE: (503) 749-4949 FAX: (503) 749-4950
P.O. BOX 116, 9405 PORTER ROAD, AUMSVILLE, OR 97325
CHECK OUT OUR WEB PAGE: www.modernbuildingsystems.com
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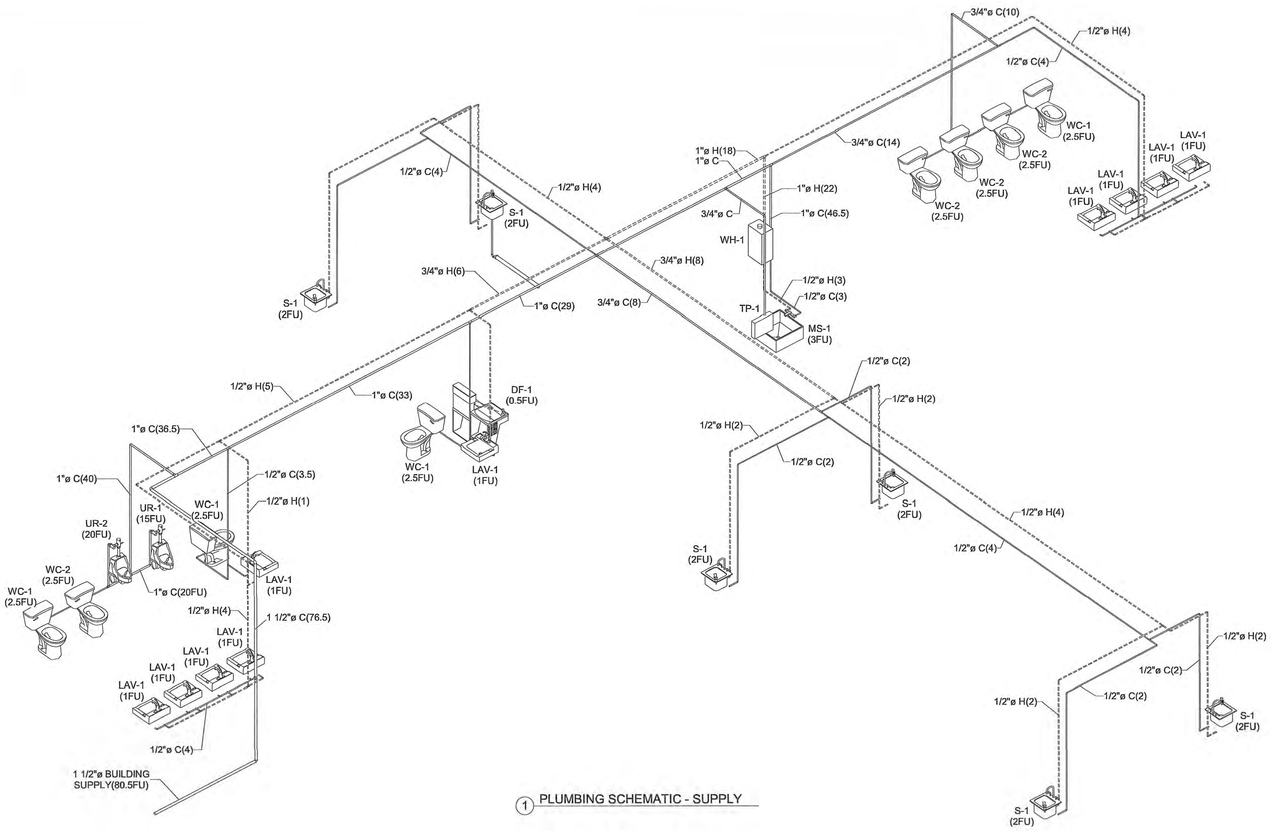
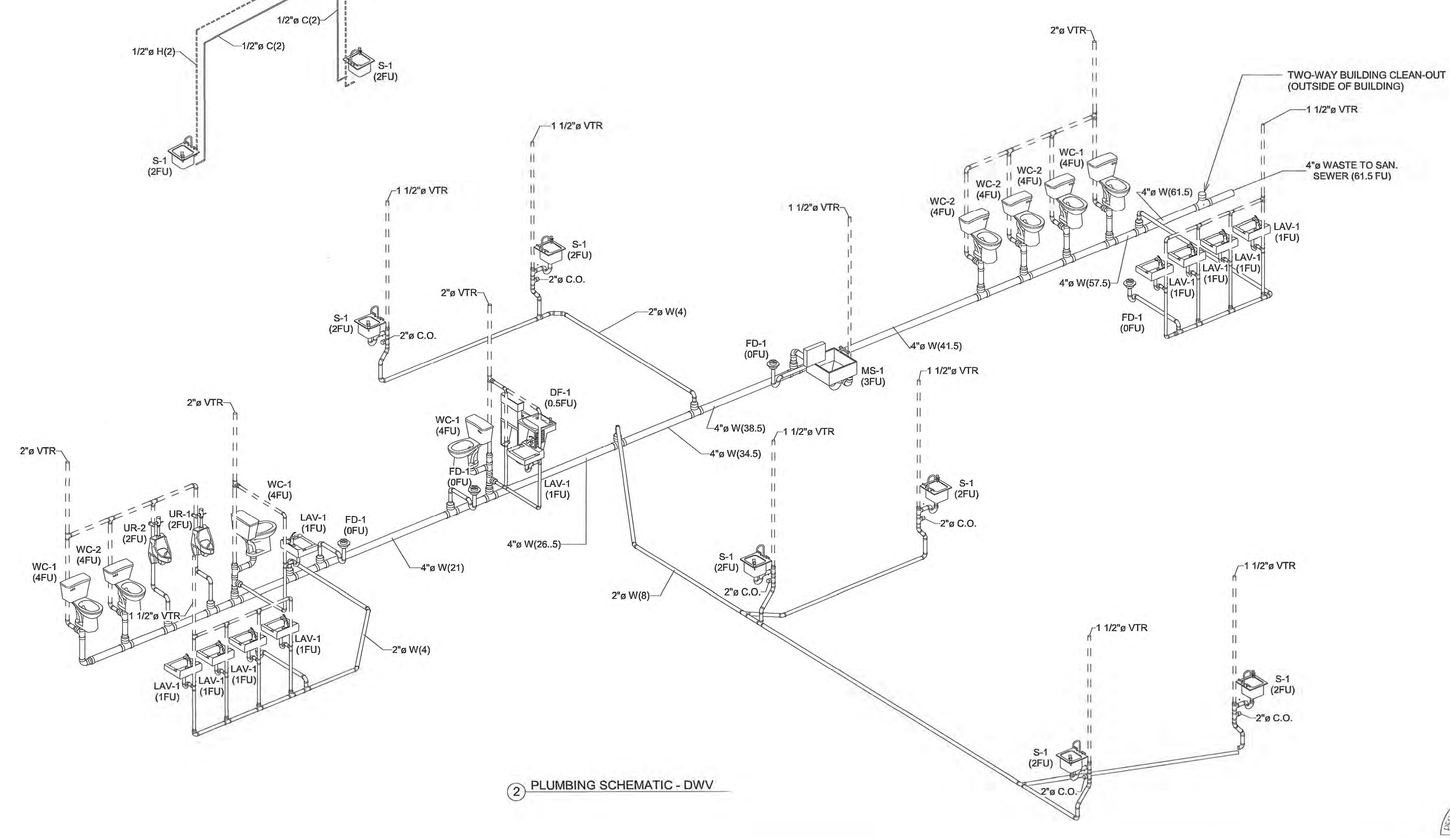
SHEET PLUMBING PLAN & NOTES
PROJ. 98' x 82' MODULAR CLASSROOM
EAGLE POINT SD II
ADDRESS 2830 MAPLE COURT WHITE CITY, OR 97503
DRW BJ
JOB# 2022-LB-28
SHEET # P 0.1
DATE 3/29/2023



1 PLUMBING SCHEMATIC - SUPPLY

PLUMBING SCHEMATICS NOTES:

1. PLUMBING SCHEMATICS ARE DEPICTED AS A GENERAL GUIDELINE, ACTUAL PIPING LAYOUT MAY VARY. VISUAL CONFLICTS MAY OCCUR
2. PROVIDE AT WATER HEATER:
   - CAPPED 'T' FOR FUTURE EXP. TANK
   - 3/4" PRESSURE AND TEMPERATURE RELIEF VALVE DISCHARGE TO EXTERIOR
   - WHEN ELEVATED PROVIDE A VACUUM RELIEF VALVE PER OPSC/UPC 608.7
3. BELOW THE FLOOR PLUMBING TREE, BY OTHERS ON SITE. BOTH WASTE AND VENT WILL REQUIRE HOOK-UP BELOW THE FLOOR TREE TO THE STUB-DOWNS, TO ACCOMMODATE INDIVIDUAL SITE CONDITIONS, SLOPE AND JOIST DEPTH. IT IS THE SITE PLUMBERS RESPONSIBILITY TO MAKE SURE THAT ALL PLUMBING DROPS ARE CONNECTED.



2 PLUMBING SCHEMATIC - DWV

3/21/23

REGISTERED PROFESSIONAL ENGINEER
OREGON
JEFFREY M. KAY
RENEWAL 6/30/2024

EXPIRES: 12/31/24

REV.	DESCRIPTION	DATE	BY

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TELEPHONE: (503) 749-4949 FAX: (503) 749-4988
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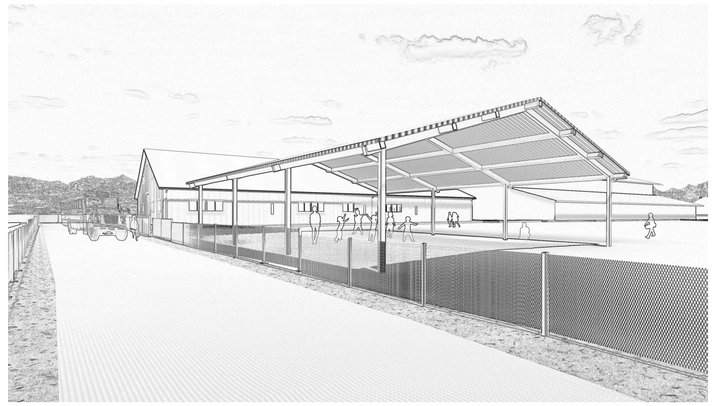
SHEET	PLUMBING SCHEMATICS	JOB#	2022-LB-28
PROJ.	98' x 82' MODULAR CLASSROOM EAGLE POINT SD II	SHEET #	P 1.0
ADDRESS	2830 MAPLE COURT WHITE CITY, OR 97503	DRW BJ	DATE 3/29/2023

OWNER	PROJECT MANAGER	ARCHITECT	STRUCTURAL ENGINEER
EAGLE POINT SCHOOL DISTRICT CONTACT: SCOTT WHITMAN 11 N ROYAL AVE, PO BOX 548, EAGLE POINT OR 97524 541-830-6559 WHITMANS@EAGLEPNT.K12.OR.US	**HMK COMPANY** CONTACT: DAVID MCKAY 695 COMMERCIAL ST. SE SUITE 116 SALEM, OR 97301 971.304.0710 DAVID@HMKCO.ORG	**ARKITEK:** **DESIGN & ARCHITECTURE** CONTACT: CHRISTOPHER BROWN 426 A ST. SUITE 101 ASHLAND,OR 97520 541.591.9988 ARKITEK@ARKITEK.US	**STRUCTURAL SOLUTIONS, INC** CONTACT: JASON N. PRINS 3559 NATIONAL DR. MEDFORD, OR 97501 541.608.8117 JASON@STRUCTURALSOLUTIONSINC.NET

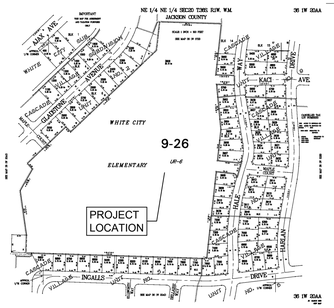
ATTACHMENT 2

TABLE ROCK ELEMENTARY SCHOOL COVERED OUTDOOR SPACE

2830 MAPLE COURT, WHITE CITY, OR



VICINITY MAP - WHITE CITY, OREGON



MATERIALS LEGEND

EARTH	DIMENSIONAL LUMBER
GRAVEL, ROCK	BLOCKING / SHIM
SAND, GROUT	WOOD
CONCRETE	PLYWOOD
MASONRY	CEILING / ACOUSTIC TILE / PANEL
METAL	BATT INSULATION

DRAWING INDEX

01 GENERAL:

G1.01	COVER SHEET
A1.01	ARCHITECTURAL SITE PLAN
A2.01	FLOOR PLAN, ROOF PLAN, SECTION AND ELEVATION

02 CIVIL:

C1.0	CIVIL GENERAL NOTES
C1.2	SITE DEMOLITION PLAN
C2.1	EROSION CONTROL PLAN
C2.2	ESC DETAILS
C3.0	CIVIL SITE PLAN
C4.0	DRAINAGE PLAN
C4.1	GRADING PLAN
C5.0	SITE UTILITY PLAN
C6.0	PROJECT DETAILS
C6.1	PROJECT DETAILS
C6.2	ADS STANDARD DETAILS

03 ELECTRICAL:

E0.01	ELECTRICAL LEGENDS AND NOTES
E0.02	ELECTRICAL LEGENDS AND NOTES
E1.01	SITE PLAN - ELECTRICAL

04 STRUCTURAL:

S0.1	STRUCTURAL GENERAL NOTES
S3.2	SPECIAL INSPECTION SCHEDULES
S3.1	FOUNDATION PLAN & DETAILS
S3.2	ROOF FRAMING PLAN & DETAILS

GENERAL NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH ANY WORK.

2. DIMENSIONS TAKE PRECEDENCE OVER DRAWING. DO NOT SCALE DRAWING TO DETERMINE ANY LOCATIONS. THE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO CONTINUING WITH WORK. DIMENSIONS ARE TAKEN TO THE FOF, FOC, FOM, OR GRID, UNO.

3. ALL CONSTRUCTION SHALL COMPLY WITH THE 2019 O.S.S.C. BUILDING CODE AND METHODS AND SHALL MAINTAIN THE STRUCTURAL INTEGRITY OF ANY CONSTRUCTION UNTIL ALL FINAL LATERAL AND VERTICAL CARRYING SYSTEMS ARE COMPLETED.

4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTIONS MEANS AND METHODS.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION AND COORDINATION OF SUBCONTRACTORS WORK TO SECURE COMPLIANCE OF DRAWINGS AND SPECIFICATIONS FOR THE ACCURATE LOCATION OF STRUCTURAL MEMBERS, AND OPENINGS FOR MECHANICAL, ELECTRICAL, AND MISCELLANEOUS EQUIPMENT. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND OPENING SIZES, CLEARANCES REQUIRED FROM MFR PRIOR TO CONSTRUCTION AND INSTALLATION OF EQUIPMENT, FURNISHINGS, ACCESSORIES ETC.

6. TRADE PERMITS, INCLUDING BUT NOT LIMITED TO, MECHANICAL, ELECTRICAL, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION TO BE DESIGN-BUILD BY SUBCONTRACTOR.

7. DETAILS NOTED AS "TYPICAL" OR "TYP" APPLY IN ALL CASES WHETHER OR NOT SPECIFICALLY REFERENCED. DETAILS THAT ARE SPECIFICALLY REFERENCED SHALL TAKE PRECEDENCE OVER "TYPICAL" OR "TYP." DETAILS. SPECIFIC DETAILS AND NOTES SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND DETAILS.

8. WHERE COMPONENTS, ASSEMBLIES, ITEMS, EQUIP, ETC. ARE BASED UPON A PARTICULAR SUPPLIER, FABRICATOR AND/OR MFR. THE CONTRACTOR SHALL ENSURE, PROVIDE OPTIONS, ALLOW FOR, AND SHALL MAKE ANY CHANGES REQUIRED FOR THE APPROVED ALTERNATE TO MEET THE DESIGN INTENT OF THE DOCUMENTS.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE GENERAL SECURITY OF THE SITE WHILE THE JOB IS IN PROGRESS AND UNTIL JOB COMPLETION. EACH CONTRACTOR/SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY AND PROTECTION OF ITS OWN MATERIALS, WORK PRODUCT AND EQUIPMENT.

10. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSES OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE PROSECUTION OF THE WORK. SEE CIVIL DRAWINGS FOR ADDITIONAL.

11. CONTRACTOR SHALL VERIFY ALL COMPONENTS TO BE INSTALLED W/ EXT. WALL FOR DIMENSIONAL ACCURACY AND FIT IN MASONRY COURSING PRIOR TO FABRICATION, PURCHASE, INSTALLATION, ETC.

12. ALL UNPAINTED FERROUS METALS EXPOSED TO THE WEATHER SHALL BE GALVANIZED, UNO.

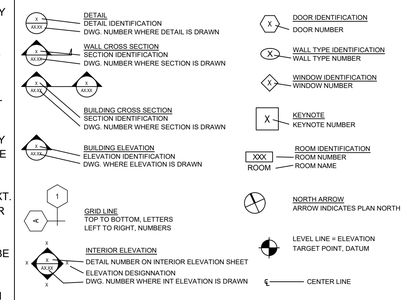
13. SEPARATE ALL AL AND OTHER METALS FROM DIS-SIMILAR METALS WITH BITUMINOUS TAPE OR PT.

14. APPROPRIATE SEALANT SHALL BE USED TO SEAL ALL JOINTS OF MILLWORK, TRIM, EQUIPMENT WALL MOUNTING PENETRATIONS TO PRODUCE A WATERTIGHT SEAL.

15. FASTENER SIZES AND CONNECTIONS PER STRUCTURAL ENGINEER OR AS NOTED. UNREFERENCED CONNECTIONS PER OSSC TABLE 2304.9.1.

(#) DESIGNATION TO BE INCLUDED IN SCOPE FOR COVERED OUTDOOR SPACE

LEGEND AND SYMBOLS



F.O.M.	FACE OF MASONRY
F.O.C.	FACE OF CONCRETE
F.O.C.	FACE OF COLUMN
F.O.S.	FACE OF STUD / STRUC
F.O.FIN.	FACE OF FINISH

SEE INDIVIDUAL SHEETS FOR ADDITIONAL LEGENDS AND SYMBOLS

GOVERNING CODES

THE DESIGN OF THIS PROJECT IS BASED ON THE FOLLOWING CODES:

OREGON STRUCTURAL SPECIALTY CODE, 2019 ed.

OREGON MECHANICAL SPECIALTY CODE, 2019 ed.

OREGON PLUMBING SPECIALTY CODE, 2021 ed.

OREGON ELECTRICAL SPECIALTY CODE, 2021 ed.

OREGON ENERGY EFFICIENCY SPECIALTY CODE, 2021

OREGON FIRE CODE, 2022 ed.

ABBREVIATIONS

ABV	ABOVE
ACT	ACOUSTIC CEILING TILE
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
B.O.	BOTTOM OF
BM	BEAM
CJ	CONTROL JOINT
CLG	CEILING
CLR	CLEAR
CLT	CROSS LAMINATED TIMBER
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CPT	CARPET
DBL	DOUBLE
DIA	DIAMETER
DIMS	DIMENSIONS
DW	DISHWASHER
EA	EACH
ELEC	ELECTRICAL
EQ	EQUAL(Y)
EX	EXISTING
FD	FLOOR DRAIN
FF	FINISHED FLOOR
FIN	FINISH(ED)
FRMG	FRAMING
FRZR	FREEZER
FTG	FOOTING
F.R.	FIRE RESISTANT
GA	GAUGE
GALV.	GALVANIZED
GWB	GYPSUM WALL BOARD
G.B.	GRAB BAR
G.I.	GALVANIZED IRON
G.S.	GALVANIZED STEEL
H	HIGH
HDBD	HARDBOARD
HDR	HEADER
HDWD	HARDWOOD
HGT	HEIGHT
HR	HOUR
HW	HOT WATER
INSUL	INSULATION
IR	INSIDE RADIUS
JST	JOIST
M	MIRROR
MAX	MAXIMUM
MB	MACHINE BOLT
MDL	MODEL
MECH	MECHANICAL
MTL	METAL
N.I.C.	NOT IN CONTRACT
(N)	NEW
O/	OVER, ON
OCC	OCCUPANCY
OPNG	OPENING
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
P	PAINT
PWD	PLYWOOD
P.T.	PRESSURE TREATED
RM	ROOM
R.O.	ROUGH OPENING
SEP	SEPARATION
SF	SQUARE FEET
SJ	SAW JOINT
SQ. FT.	SQUARE FEET
SHTG	SHEATHING
SIM	SIMILAR
T.O.	TOP OF
TS	TUBE STEEL
TYP	TYPICAL
TH	THRESHOLD
UL	UNDERWRITERS LABORATORY
UTIL	UTILITY
U.N.O.	UNLESS NOTED OTHERWISE
WD	WOOD

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TABLE ROCK ELEMENTARY COVERED OUTDOOR SPACE

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6022
ASHLAND, OREGON
STATE OF OREGON

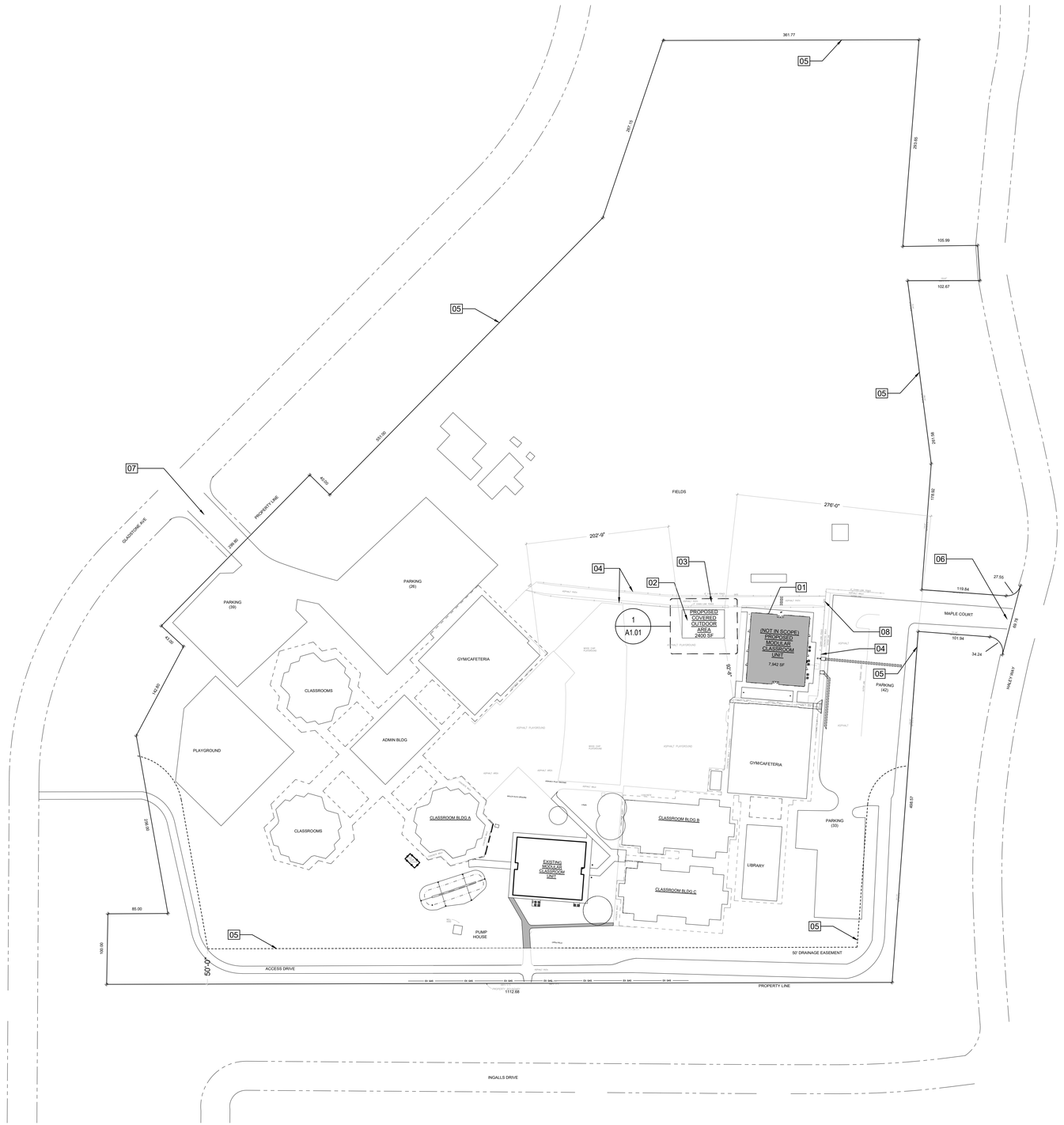
Revision	Date

Date	03.30.23
Job	22-012
Drawn By	JKA/SSU
Checked By	
Scale	AS NOTED

PERMIT SET

Drawing Title
COVER SHEET

Drawing No.
G1.01



1 ARCHITECTURAL SITE PLAN

1" = 80'-0"

NORTH

PROJECT INFORMATION

PROJECT NAME:	TABLE ROCK ELEMENTARY COVERED OUTDOOR SPACE
PROJECT DESCRIPTION:	NEW COVERED OUTDOOR SPACE
ADDRESS:	2830 MAPLE COURT WHITE CITY, OR 97503
MAP & TAX LOT:	361W20AA 3800

CLIENT INFORMATION

NAME:	SCHOOL DISTRICT NO. 9
ADDRESS:	11 N ROYAL AVE EAGLE POINT, OR 97524

NARRATIVE

THIS PROJECT INCLUDES THE CONSTRUCTION OF A COVERED OUTDOOR SPACE.

PLANNING SUMMARY

LOT AREA COVERAGE	AREA	% OF LOT
TOTAL LOT AREA	1,095,534 SF	100.0%
EXISTING STRUCTURES (TO REMAIN)	139,422 SF	12.7%
PROPOSED STRUCTURE	2,400 SF	0.2%
TOTAL LOT COVERAGE	149,764 SF	12.9%
TOTAL LANDSCAPED AREA	750,858 SF	68.5%
TOTAL IMPERVIOUS AREA	141,583 SF	18.0%

ZONING INFORMATION

ZONING: WCUR-6
MIN. SETBACKS:

FRONT: 20' FRONT,
SIDE: 6' (FOR 25' HIGH BUILDING)
REAR: 10' (FOR 25' HIGH BUILDING)
MAX BUILDING HEIGHT: 35'

BUILDING AREA SUMMARY

PROPOSED COVERED AREA	2,400 SF

SITE PLAN KEY NOTES:

01 PROPOSED MODULAR CLASSROOM UNIT (NOT IN SCOPE)
02 PROPOSED COVERED OUTDOOR AREA
03 EXISTING ACCESS DRIVE
04 EXISTING FENCE LINE
05 PROPERTY LINE
06 EXISTING ACCESS FOR UPPER TABLE ROCK SCHOOL
07 EXISTING ACCESS FOR LOWER TABLE ROCK SCHOOL
08 EXISTING ACCESS GATE

TABLE ROCK ELEMENTARY COVERED OUTDOOR SPACE

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White City, OR 97503

arkitek:
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REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
6022
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.30.23
Job	22-012
Drawn By	JKA/SSU
Checked By	
Scale	AS NOTED

PERMIT SET

Drawing Title
ARCHITECTURAL SITE PLAN

Drawing No.
A1.01

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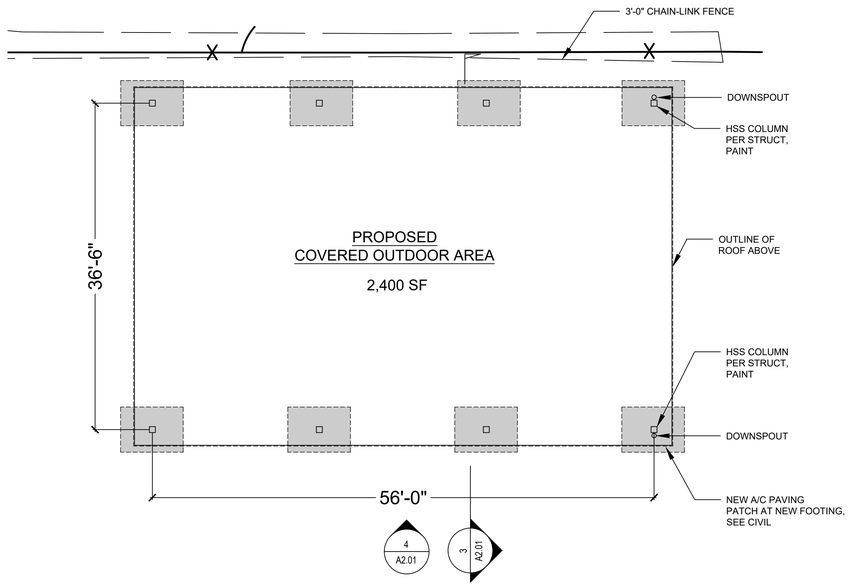
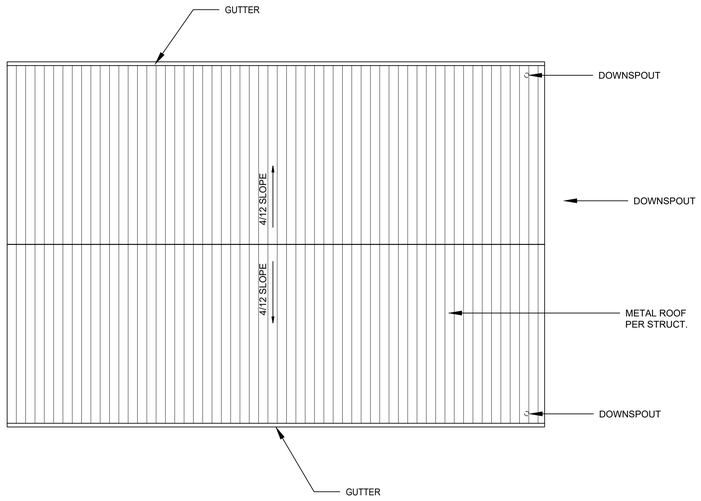


1 FLOOR PLAN

1/8" = 1'-0"

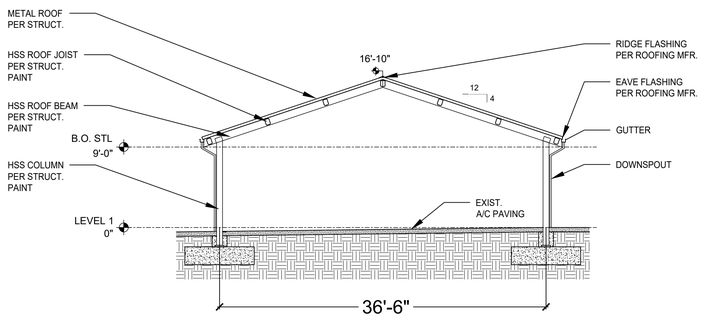
NORTH



2 ROOF PLAN

1/8" = 1'-0"

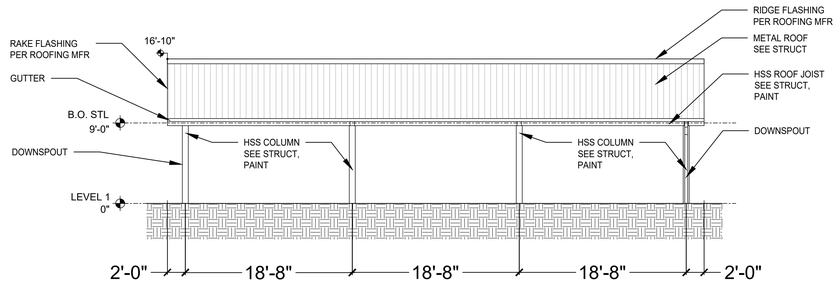
NORTH



HSS COLUMN NOTE:
COLUMN EXPOSURE VARIES TO SLOPING A/C PAVING, SEE CIVIL FOR FINAL A/C PAVING GRADES.

3 SECTION

1/8" = 1'-0"



4 ELEVATION

1/8" = 1'-0"

SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS:

REFERENCE STRUCTURAL DRAWINGS.

DIVISION 3 -CONCRETE:

CAST-IN-PLACE CONCRETE:
1. SEE STRUCTURAL DRAWINGS FOR STRUCTURAL CONCRETE SPECIFICATIONS.
2. AT SLABS REQUIRING DRAINAGE, SLOPE SLABS A MINIMUM OF1/8" PER FOOT UNLESS SPECIFICALLY SHOWN OTHERWISE.
3. PROVIDE 1/8" WIDE X 3'4" DEEP CONTROL JOINTS ON SLABS-ON-GRADE AT 10'-0" MAXIMUM ON CENTER UNLESS NOTED OTHERWISE ON THE DRAWINGS AND/OR AS DIRECTED BY THE ARCHITECT.
4. FINISHES:
   A. ALL EXPOSED CONCRETE SURFACES TO BE BROOM FINISH.

DIVISION 5 - METALS:

STRUCTURAL STEEL FRAMING:
1. SEE STRUCTURAL DRAWINGS FOR STRUCTURAL STEEL AND METAL FABRICATION SPECIFICATIONS.

METAL DECKING:
1. SEE STRUCTURAL DRAWINGS FOR METAL DECKING SPECIFICATIONS.

DIVISION 6 - WOOD AND PLASTICS:
NOT USED

DIVISION 7 - THERMAL AND MOISTURE PROTECTION:
1. PROVIDE FABRICATED SHEET METAL ITEMS, INCLUDING FLASHING, COUNTER FLASHING, GUTTERS, DOWNSPOUTS AS INDICATED ON DRAWINGS.
2. USE SIDING MANUFACTURER'S FLASHING PRODUCTS WHERE POSSIBLE.
3. GUTTERS TO BE PREFINISHED 5" K STYLE ALUMINUM. DOWNSPOUTS TO BE 4"X5" PAINTED ALUMINUM, MATCH GUTTER.

DIVISION 8 - DOORS AND WINDOWS:
NOT USED

DIVISION 9 - FINISHES:

PAINTING:
1. ALL NEW SURFACES SHALL BE PAINTED PER FINISHING COATINGS SCHEDULE BELOW.
2. SUBMITTALS: SUBMIT DRAWDOWNS OF ALL PAINTS TO OWNER AND ARCHITECT FOR REVIEW. UPON REQUEST, SUBMIT MANUFACTURER'S PRODUCT DATA SHEETS FOR PRODUCTS PROPOSED FOR USE.
3. PAINT MATERIALS SHALL BE OF BEST QUALITY AND DURABILITY FOR EACH TYPE OF COATING SCHEDULED.
4. MANUFACTURER: RODDA PAINT, OR APPROVED SUBSTITUTION.
5. COLOR AND SHEEN: VERIFY WITH OWNER
6. FINISH COATINGS SCHEDULE:
   A. EXTERIOR METAL:
      a. 1ST COAT: SHOP PRIMER.
      b. 2ND COAT: MULTI MASTER VST
7. PREPARATION:
   A. THOROUGHLY CLEAN AND PREPARE ALL SURFACES TO RECEIVE PAINTED FINISH AS REQUIRED TO ENSURE HIGHEST QUALITY FINISHED SURFACE FREE FROM DISCOLORATION OR BLEMISHES.
   B. PREPARE INTERIOR WOOD SURFACES PER AWI ARCHITECTURAL WOODWORK STANDARDS, SECTION 5.
8. PAINTING:
   A. PRIME ALL SURFACES AS REQUIRED BY FINISH COATING.
   B. APPLY PAINT COATINGS PER MANUFACTURER'S INSTRUCTIONS.
   C. ENSURE PROPER DRY TIME IS ALLOWED IN MULTIPLE COAT APPLICATIONS AS REQUIRED BY THE MANUFACTURER.
   D. PROTECT ALL ADJACENT SURFACES NOT INTENDED TO BE PAINTED OR STAINED.
   E. DO NOT THIN BEYOND MANUFACTURER'S LISTED TOLERANCES.

DIVISION 11 - EQUIPMENT:
NOT USED.

DIVISION 21 - FIRE SUPPRESSION:
NOT USED

9. DIVISION 22 - PLUMBING:
NOT USED.

DIVISION 23 - HEATING, VENTILATION AND AIR-CONDITIONING (HVAC):
NOT USED.

DIVISION 26 - ELECTRICAL:
1. SEE ELECTRICAL ENGINEER'S DRAWINGS FOR POWER DESIGN.

DIVISION 31 - EARTHWORK:
1. SEE CIVIL ENGINEER'S DRAWINGS FOR EARTHWORK SPECIFICATION.

DIVISION 32 - EXTERIOR IMPROVEMENTS:
1. SEE CIVIL ENGINEER'S DRAWINGS FOR EXTERIOR IMPROVEMENT SPECIFICATION.

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2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

REGISTERED ARCHITECT
CHRISTOPHER PLUMMER BROWN
8022
ASHLAND, OREGON
STATE OF OREGON

Revision	Date

Date	03.30.23
Job	22-012
Drawn By	JKA/SSU
Checked By	
Scale	AS NOTED

PERMIT SET

Drawing Title

FLOOR PLAN, ROOF PLAN, SECTION AND ELEVATION

Drawing No.

A2.01

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GENERAL NOTES

1. ALL WORK PERTAINING TO THIS PROJECT SHALL BE SUBJECT TO INSPECTION BY THE PROJECT ENGINEER AND/OR PUBLIC AGENCY HAVING AUTHORITY (AHJ). PRIOR TO ANY SITE WORK, THE CONTRACTOR SHALL CONTACT THE AHJ AND PROJECT ENGINEER TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE.
2. PRIOR TO ANY SITE DISTURBING ACTIVITY INCLUDING CLEARING, LOGGING OR GRADING, THE SITE BOUNDARIES & CLEARING LIMITS AS SHOWN ON THESE PLANS SHALL BE LOCATED AND FIELD IDENTIFIED BY THE PROJECT SURVEYOR AND ALL ESC MEASURES SHALL BE INSTALLED AS IDENTIFIED ON THE EROSION & SEDIMENT CONTROL PLAN.
3. A COPY OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
4. ALL SITE WORK IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE PRIOR APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES PRIOR TO PERFORMING THE CHANGES IN THE FIELD.
5. ALL LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITIES LOCATION SERVICE (DIAL 811) AT LEAST TWO BUSINESS DAYS PRIOR TO CONSTRUCTION. THE APPLICANT OR HIS REPRESENTATIVE AND THE ENGINEER SHALL BE CONTACTED IMMEDIATELY IF CONFLICTS EXIST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT.
7. THE CONTRACTOR SHALL KEEP OFF-SITE STREETS CLEAN AT ALL TIMES BY SWEEPING. STREET WASHING WILL NOT BE ALLOWED WITHOUT PRIOR CITY APPROVAL.
8. THE CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS PRIOR TO INITIATING WORK. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER WHEN CONFLICTS OCCUR BETWEEN THE PLANS AND FIELD CONDITIONS. CONFLICTS SHALL BE RESOLVED PRIOR TO PROCEEDING WITH CONSTRUCTION. REVISIONS SHALL BE FORMALLY APPROVED BY THE APPLICANT AND PROJECT ENGINEER PRIOR TO MAKING CHANGES IN THE FIELD.
9. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY UTILITY RELOCATIONS WITH UTILITY COMPANIES.
10. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.
11. CONTRACTOR SHALL DOCUMENT AND RECORD FIELD CHANGES, PIPE INVERT, PIPE SLOPE, AND ANY OTHER CRITICAL AS-CONSTRUCT DATA. AS-BUILT DRAWINGS AND FINAL REPORTS WILL BE REQUIRED BEFORE FINAL APPROVAL.
12. WORK IN CITY OR COUNTY RIGHT-OF-WAY REQUIRES AN ENCROACHMENT PERMIT FROM THE LOCAL AUTHORITY.
13. WORK IN ANY STATE RIGHT-OF-WAY REQUIRES A MISCELLANEOUS PERMIT FROM OREGON DEPARTMENT OF TRANSPORTATION.
14. DURING PROJECT CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL TEMPORARY CONSTRUCTION SIGNS, TRAFFIC CONTROL SIGNS, DELINEATORS AND TEMPORARY MARKINGS AS REQUIRED.
15. ACCESS BY EMERGENCY VEHICLES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
16. UNLESS OTHERWISE SPECIFIED, ALL CLEARED AND GRUBBED MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED AT AN APPROVED LOCATION.
17. ALL AREAS WITH ABANDONED UTILITY LINES, STORM DRAINS, UNDERGROUND TANKS, ETC. WHICH MAY PROVIDE VOID SPACE BENEATH THE SURFACE SHALL BE REMOVED. WHEN APPROVED BY THE ENGINEER THE VOID SPACE MAY BE FILED WITH APPROVED MATERIAL. ALL TANKS OR HAZARDOUS MATERIALS SHALL BE DEALT WITH IN ACCORDANCE TO ALL LOCAL, STATE AND FEDERAL LAWS.
18. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY GRADES AT SAWCUT LOCATIONS AND MATCHING OF EXISTING GRADE LOCATIONS.
19. CONTRACTOR IS RESPONSIBLE FOR ANY ASPHALT GRINDING, OVERLAY AND SLURRY SEAL. ALL SPECIFICATIONS SHALL COMPLY WITH ALL LOCAL AUTHORITY REQUIREMENTS.
20. CONTRACTOR SHALL BE RESPONSIBLE TO CLEAN AND/OR MAINTAIN EXISTING PUBLIC STREETS OF SOIL OR OTHER DEBRIS DEPOSITED BY CONSTRUCTION OPERATIONS AND REPAIR ALL STREETS DAMAGED BY CONSTRUCTION OPERATIONS IN A TIMELY MANNER TO AVOID INCONVENIENCES OR HAZARDS TO THE PUBLIC.
21. THE CONTRACTOR SHALL NOT PERFORM WORK WITHOUT AGENCY INSPECTIONS WHERE INSPECTIONS ARE REQUIRED BY THE SPECIFICATIONS.
22. WHEN PERFORMING EXCAVATIONS, THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS OF ORS 757.541 TO 757.571, WHICH INCLUDE REQUIREMENTS THAT THE CONTRACTOR HAND-EXPOSE (POTHOLE) UNDERGROUND FACILITIES AND USE REASONABLE CARE TO AVOID DAMAGING THEM.
23. PLACEMENT OR STORAGE OF SPOILS FROM TRENCHES IS NOT PERMITTED ON HARD SURFACE STREETS WITHIN PUBLIC RIGHT-OF-WAY. SPOILS STORED IN OTHER RIGHT-OF-WAY AREAS SHALL BE COVERED TO PREVENT EROSION.

APPLICABLE CODES

ALL WORK SHALL BE IN CONFORMANCE WITH ALL FEDERAL, STATE, AND SOCIAL CODES. SPECIFICATIONS AND STANDARDS SHALL MEAN, AND ARE INTENDED TO BE, THE LATEST EDITION, AMENDMENT OR REVISION OF SUCH REFERENCE STANDARD IN EFFECT AS OF THE DATE OF THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO TO FOLLOWING:

OREGON STANDARD DRAWINGS (ODOT)

JACKSON COUNTY ADOPTED STANDARD DETAILS AND SPECIFICATIONS

ROGUE VALLEY SEWER SERVICES (RVSS) STORMWATER MANAGEMENT MANUAL, LATEST EDITION.

OPSC: OREGON PLUMBING SPECIALTY CODE, LATEST EDITION

OFC: OREGON FIRE CODE, LATEST EDITION

NFPA: NATIONAL FIRE PROTECTION ASSOCIATION 101 LIFE SAFETY CODE, LATEST EDITION

GRADING NOTES

1. DEQ 1200-C PERMIT IS NOT REQUIRED.
2. UNLESS DIRECTED OTHERWISE, REMOVE CLEARED AND GRUBBED MATERIAL FROM THE SITE AND DISPOSE AT AN APPROVED LOCATION.
3. PRIOR TO THE START OF CONSTRUCTION, VERIFY GRADES AT SAWCUT LOCATIONS AND MATCHING OF EXISTING GRADE LOCATIONS.
4. MINIMIZE TRAFFIC ON SOIL AREAS DURING WET WEATHER. IF THE SITE SOILS ARE EXPOSED DURING WET WEATHER, THE USE OF CRUSHED ROCK PLACED AS ENGINEERED FILL IN THE BOTTOM OF THE EXCAVATIONS MAY BE NECESSARY TO PROTECT THE SUBGRADE. TAKE ALL PRECAUTIONS TO LIMIT SURFACE DISTURBANCE AND PROTECT THE SITE GRADING AREA FROM EROSION AND RUNOFF.
5. UNLESS OTHERWISE NOTED, THE SAMPLING AND TESTING OF MATERIALS FOR USE ON THE JOBSITE SHALL BE AT THE EXPENSE OF THE CONTRACTOR. ALL TESTING OF MATERIALS AND WORKMANSHIP SHALL BE PERFORMED BY A CERTIFIED TESTER. RESULTS OF THE TESTS SHALL BE SENT DIRECTLY TO THE PROJECT ENGINEER AS WELL AS THE CONTRACTOR, BY THE LABORATORY. LOCATION AND FREQUENCY OF TESTS SHALL BE DESIGNATED BY THE GENERAL CONTRACTOR.
6. ALL CUT AND FILL SLOPES SHALL BE MAXIMUM OF 2:1.

STORM DRAIN NOTES

1. ALL STORM SEWER PIPE SHALL MEET THE OREGON STATE PLUMBING SPECIALTY CODE.
2. ALL PIPE SHALL BE PLACED ON STABLE EARTH, OR IF IN THE OPINION OF THE PROJECT ENGINEER THE EXISTING FOUNDATION IS UNSATISFACTORY, THEN IT SHALL BE EXCAVATED BELOW GRADE AND BACKFILLED WITH A GRAVEL MATERIAL TO SUPPORT THE PIPE.
3. THE BACKFILL SHALL BE PLACED EQUALLY ON BOTH SIDES OF THE PIPE IN LAYERS WITH A LOOSE AVERAGE DEPTH OF 6", MAXIMUM DEPTH 8"-9", THOROUGHLY TAMPING EACH LAYER. THESE COMPACTED LAYERS MUST EXTEND FOR ONE DIAMETER ON EACH SIDE OF THE PIPE OR TO THE SIDE OF THE TRENCH. MATERIALS TO COMPLETE THIS FILL OVER PIPE SHALL BE THE SAME AS DESCRIBED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL MANHOLE, INLET, AND CATCH BASIN FRAMES AND GRATES TO GRADE JUST PRIOR TO PAVING. MANHOLE GRATE SLOPES SHALL MATCH SLOPE OF FINISHED GRADE ASPHALT.
5. CULVERT ENDS AT OUTFALLS SHALL BE BEVELED TO MATCH SIDE SLOPES. FIELD CUT OF CULVERT ENDS IS PERMITTED WHEN APPROVED BY THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE. CULVERT OUTFALLS SHALL BE RIP RAPPED WITH A PAD MINIMUM OF 12" THICK, EXTENDING MINIMUM OF 6' FROM DISCHARGE POINT.
6. ALL STEEL PIPES, CULVERTS, TANKS AND OTHER STEEL PARTS OF ANY STORM DRAINAGE SYSTEM SHALL BE GALVANIZED OR HAVE A TREATMENT 1 ASPHALT COATING OR BETTER AS SPECIFIED IN THE ODOT STANDARD SPECIFICATIONS. ALUMINUM AND CONCRETE PIPES AND STRUCTURES DO NOT REQUIRE A TREATMENT 1 COATING.
7. STORM WATER RETENTION/DETENTION FACILITIES, STORM DRAINAGE PIPE AND CATCH BASINS SHALL BE FLUSHED AND CLEANED PRIOR TO CITY ACCEPTANCE.
8. ALL PIPES SHALL HAVE A MINIMUM OF 18" COVER AT THE TOP OF THE BELL, OR SHALL HAVE MINIMUM COVER PER THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.
9. CATCH BASIN STATIONS AND OFFSETS ARE MEASURED TO CENTER OF GRATE.
10. 100-FT MAX LINEAR RUN BETWEEN CLEANOUTS. 135° MAX AGGREGATE HORIZONTAL CHANGE IN DIRECTION WITHOUT CLEANOUT.

SANITARY SEWER NOTES

1. ALL PRIVATE SANITARY SEWER PIPE SHALL MEET THE OREGON STATE PLUMBING SPECIALTY CODE.
2. ALL PIPE SHALL BE PLACED ON STABLE EARTH, OR IF IN THE OPINION OF THE PROJECT ENGINEER THE EXISTING FOUNDATION IS UNSATISFACTORY, THEN IT SHALL BE EXCAVATED BELOW GRADE AND BACKFILLED WITH A GRAVEL MATERIAL TO SUPPORT THE PIPE.
3. THE BACKFILL SHALL BE PLACED EQUALLY ON BOTH SIDES OF THE PIPE IN LAYERS WITH A LOOSE AVERAGE DEPTH OF 6", MAXIMUM DEPTH 8"-9", THOROUGHLY TAMPING EACH LAYER. THESE COMPACTED LAYERS MUST EXTEND FOR ONE DIAMETER ON EACH SIDE OF THE PIPE OR TO THE SIDE OF THE TRENCH. MATERIALS TO COMPLETE THIS FILL OVER PIPE SHALL BE THE SAME AS DESCRIBED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL MANHOLE GRATES TO GRADE JUST PRIOR TO PAVING. MANHOLE GRATE SLOPES SHALL MATCH SLOPE OF FINISHED GRADE ASPHALT.
5. ALL PRIVATE SEWER PIPES SHALL HAVE A MINIMUM OF 36" COVER AT THE TOP OF THE BELL, OR SHALL HAVE MINIMUM COVER PER THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS GREATER.
6. MANHOLE STATIONS AND OFFSETS ARE MEASURED TO CENTER OF STRUCTURE.
7. 100-FT MAX LINEAR RUN BETWEEN CLEANOUTS. 135° MAX AGGREGATE HORIZONTAL CHANGE IN DIRECTION WITHOUT CLEANOUT.
8. MINIMUM SLOPE ON 4" SEWER LATERALS IS 2%. MINIMUM SLOPE ON 6" SEWER LATERALS IS 1%. MINIMUM SLOPE ON 8" SEWER LATERALS IS 0.50%.

LEGEND:

EXIST. FIRE HYDRANT	FIRE HYDRANT
EXIST. WATER VALVE	WATER VALVE
EXIST. BLOW OFF	WATER METER
EXIST. WATER METER	BACKFLOW DEVICE
EXIST. HOSE BIB	IRRIGATION WATER METER
EXIST. IRRIGATION VALVE	AIR RELEASE VALVE
EXIST. AIR RELEASE VALVE	BLOWOFF DEVICE ASSEMBLY
EXIST. STORM DRAIN MANHOLE	FIRE DEPARTMENT CONNECTION
EXIST. CLEANOUT	END PLUG
EXIST. SANITARY SEWER MANHOLE	TEE
EXIST. MAILBOX	SANITARY SEWER CLEANOUT
HANDICAP PARKING SYMBOL	CONCENTRIC MANHOLE
PARALLEL PARKING STRIPING	STORM DRAIN CLEANOUT
BICYCLE LANE SYMBOL	CONTROL STRUCTURE MANHOLE
EXIST. SANITARY SEWER	ATRIUM DRAIN / BUBBLER
EXIST. STORM DRAIN	AREA DRAIN
EXIST. WATER	CATCH BASIN INLET
EXIST. GAS	CURB INLET
EXIST. ELECTRIC	LIGHTS
EXIST. OVERHEAD POWER	SIGN (TRAFFIC, INFORMATION)
EXIST. TELEPHONE	BOLLARD
EXIST. FIBER OPTIC	CONCRETE
EXIST. CURB AND GUTTER	HMAC PAVING
EXIST. CENTERLINE	NEW RIP RAP
EXIST. RIGHT OF WAY	
EXIST. CONTOUR	
PROPOSED CONTOUR	
SANITARY SEWER	
STORM DRAIN	
WATER	
GAS	
ELECTRIC	
CURB AND GUTTER	
PROPOSED RIGHT OF WAY	
FLOW LINE	
PROPERTY LINE	

CONCRETE NOTES

1. PROVIDE A MINIMUM 8' TRANSITION SECTION WHEN JOINING CURBS OF DIFFERENT CROSS SECTIONS.
2. CONCRETE SHALL NOT BE PLACED UNTIL FORMS HAVE BEEN INSPECTED AND APPROVED.
3. CONCRETE SHALL BE COMMERCIAL GRADE RETAINING THE FOLLOWING CHARACTERISTICS: ENTRAINED AIR – 4.0% TO 7.0%; SLUMP – 5 INCHES OR LESS; COMPRESSIVE STRENGTH – MINIMUM 3,000 PSI AT 28 DAYS; TEMPERATURE – MINIMUM 50°F TO MAXIMUM 90°F.
4. ALL CONCRETE STRUCTURES REINFORCED WITH REBAR SHALL BE VIBRATED TO REMOVE VOIDS.
5. SURFACE SHALL HAVE A FINISHED TEXTURE THAT WILL NOT BE SLICK WHEN WET (MEDIUM BROOM FINISH). CURING COMPOUND MAY BE APPLIED IMMEDIATELY AFTER CONCRETE IS FINISHED. WHITE PIGMENT RECOMMENDED, CLEAR ACCEPTABLE.
6. AN EDGING TOOL SHALL BE USED ON ALL EDGES AND JOINTS.
7. PROVIDE CONTRACTION JOINTS AT 15' INTERVALS AND "DUMMY" TOOLED JOINTS AT 5' INTERVALS ON CURBS, SIDEWALKS AND APPROACHES. CONTRACTION JOINT GROOVES SHALL BE AT MINIMUM, 1 ½" DEEP OR ONE-THIRD THE THICKNESS OF THE CONCRETE.
8. PROVIDE EXPANSION JOINTS OPPOSITE ABUTTING EXPANSION JOINTS IN ABUTTING CONCRETE, AT EACH POINT OF TANGENCY IN THE STRUCTURE ALIGNMENT, BETWEEN DRIVEWAYS AND CONCRETE PAVEMENT, AROUND POLES, POSTS, BOXES AND OTHER FIXTURES WHICH PROTRUDE THROUGH OR AGAINST THE STRUCTURES, AT ALL BCR'S AND ECR'S, AT MAXIMUM OF 100' INTERVALS. EXPANSION JOINT MATERIAL SHALL BE OF THE BITUMINOUS, PREFORMED FILLER TYPE NOT LESS THAN ½" WIDE, PLACED FLUSH OR NO MORE THAN 1/8" BELOW THE CONCRETE SURFACE.
9. STRAIGHT LINE EDGES SHALL NOT VARY MORE THAN ¼" UNDER A TWELVE-FOOT STRAIGHT EDGE.
10. CURE AND PROTECT CONCRETE AFTER PLACING AND FINISHING. KEEP STRUCTURES FREE FROM CONTACT, STRAIN AND PUBLIC TRAFFIC FOR AT LEAST SEVEN DAYS OR LONGER AS DIRECTED. MIXES TO EXPEDITE CURING MAY BE USED WITH APPROVAL OF THE ENGINEER OF RECORD.
11. CONCRETE SHALL BE REMOVED TO THE NEAREST CONTRACTION JOINT, COLD JOINT OR CRACK WITHIN 4' OF THE REPLACEMENT AREA. CONCRETE SHALL BE SAW CUT WITH A SMOOTH, UNIFORM JOINT PROVIDED.
12. EXISTING A/C SHALL BE REMOVED/REPLACED ALONG ENTIRE CURB SECTION TO A MINIMUM 18" WIDTH UNLESS APPROVED BY ENGINEER OF RECORD.

ADA NOTES

1. ALL ADA ACCESSIBLE FACILITIES SHALL BE INSTALLED PER THE CURRENT ADA REQUIREMENTS AND SHALL COMPLY WITH 405 ANSI ICC A117.1.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE ACCESSIBLE PATH OF TRAVEL AND ACCESSIBLE PARKING STALLS AND ACCESS AISLES COMPLIES WITH AMERICAN DISABILITIES ACT AND ALL LOCAL CODES.
3. THE ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLANS IS A BARRIER FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING ½" BEVELED AT 1:2 MAX SLOPE, OR VERTICAL CHANGES NOT EXCEEDING ¼" MAX AND AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE NOTED.
4. ALL ADA PARKING STALLS AND ACCESS AISLES SHALL BE CONSTRUCTED WITH A SLOPE NOT TO EXCEED 1.5% IN ANY DIRECTION. PARKING STALLS AND ACCESS AISLES WITH AS-BUILT SLOPES EXCEEDING 2.0% IN ANY DIRECTION WILL NOT PASS FINAL INSPECTION.
5. IF SPOT ELEVATIONS ON PLANS ARE NOT CONSISTENT WITH THESE ADA REQUIREMENTS, NOTIFY ENGINEER OF RECORD PRIOR TO PLACEMENT OF ACCESSIBLE ROUTE.

ABBREVIATIONS:

AC	ASPHALT
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ASTM	AMERICAN STANDARD TEST METHOD
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BACK OF CURB
BR	BOTTOM OF RAMP
BS	BOTTOM OF STAIRS
BW	BOTTOM OF WALL
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT RISER
C	CONCRETE
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
DIP	DUCTILE IRON PIPE
DWG	DRAWING
(E)	EXISTING
EG	EXISTING GRADE
EOC	EDGE OF CONCRETE
EOP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
G	GAS
GB	GRADE BREAK
GC	GENERAL CONTRACTOR
GRD	GROUND
GRVL	GRAVEL
HDPE	HIGH-DENSITY POLYETHYLENE
HP	HIGH POINT
IE	INVERT ELEVATION
LP	LOW POINT
MAX	MAXIMUM
ME	MATCH EXISTING
MIN	MINIMUM
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
(N)	NEW
NAVD	NORTH AMERICAN VERTICAL DATUM
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
P	PROPOSED
PERF	PERFORATED PIPE
PLY	PLAYGROUND SURFACE
PVC	POLYVINYL CHLORIDE
PVR	PAVER
RCP	REINFORCED CONCRETE PIPE
RE	RIM ELEVATION
REQ'D	REQUIRED
ROW	RIGHT-OF-WAY
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STD	STANDARD
SW	SIDEWALK
TBR	TO BE REMOVED
TC	TOP OF CURB
TR	TOP OF RAMP
TOW	TOP OF WALL
TYP	TYPICAL
UPC	UNIFORM PLUMBING CODE
W	WATER

Know what's **below.** **Call** before you dig.

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TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek: design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

POWELL engineering + consulting
STRONG RELATIONSHIPS • INFINITE POSSIBILITIES
100 E. Main St. Suite "O"
Medford, OR 97501
541.613.0723 phone
www.powellengineeringconsulting.com

REGISTERED PROFESSIONAL ENGINEER
OREGON
JAN. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

CIVIL GENERAL NOTES

Drawing No.

C1.0

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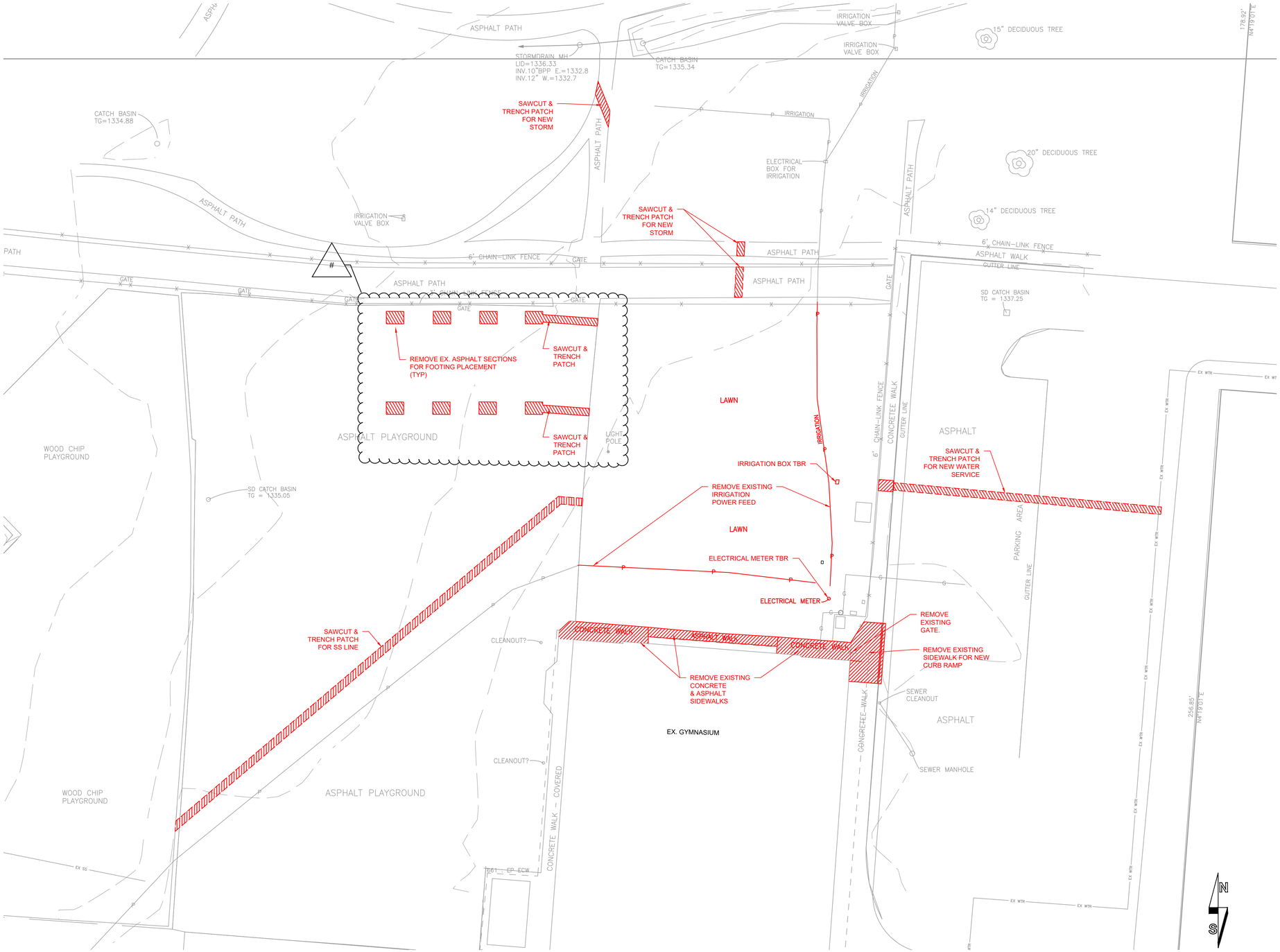

PLAN VIEW - SITE DEMOLITION PLAN

SCALE: 1" = 20' - 0" (24x36)

DEMO KEY

1) BOLD/RED ELEMENTS TO BE DEMOLISHED AND HAULED OFF TO AN APPROVED DISPOSAL GROUND.
2) TBR = "TO BE REMOVED"
3) CONTRACTOR TO COORDINATE ALL EXISTING UTILITY RELOCATION AND/OR REMOVALS WITH THE APPROPRIATE FRANCHISE UTILITY PRIOR TO CONSTRUCTION.

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

POWELL
engineering + consulting
STRONG RELATIONSHIPS • INFINITE POSSIBILITIES

100 E. Main St. Suite "O"
Medford, OR 97501
541.613.0723 phone
www.powellengineeringconsulting.com

REGISTERED PROFESSIONAL ENGINEER
58125PE
OREGON
Jan. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

SITE DEMOLITION PLAN

Drawing No.

C1.2

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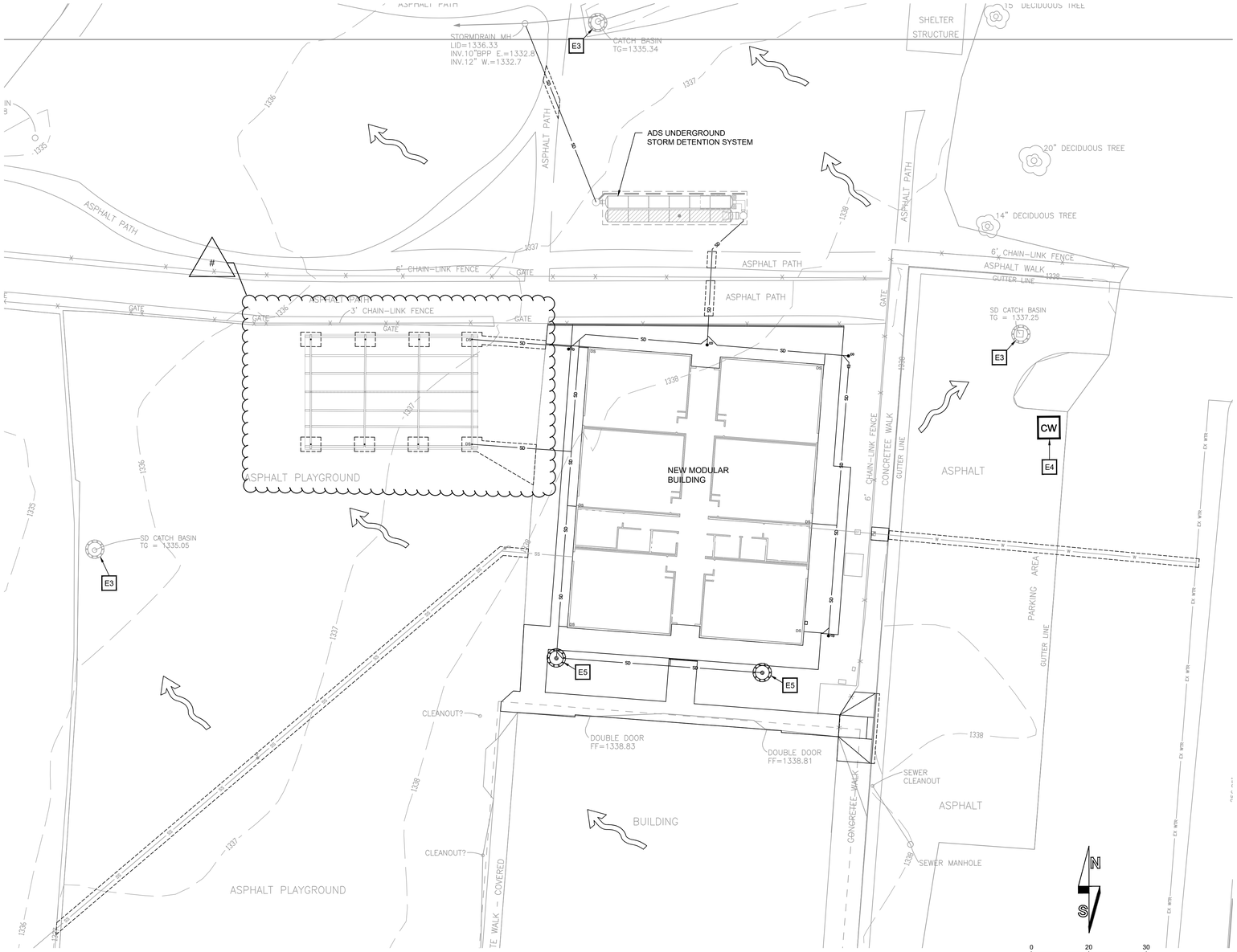
Drawing Name: C:\Users\TTek\Powell Engineering and Consulting, LLC\PEC Shared - Documents\All Staff\Projects\Current Projects\Arktek TRES PZ\Drawings\CAD\DArktek TREM C1-C5.dwg Last Save: March 24, 2023 3:08 PM By: TPOWELL Plot Date: March 26, 2023 10:05 AM



PLAN VIEW - EROSION CONTROL PLAN

SCALE: 1" = 20' - 0" (24x36)

ESCP LEGEND

E3	INSTALL INLET PROTECTION ON EXISTING CATCH BASINS PER ODOT DETAIL RD1010 ON SHEET C2.2.
E4	INSTALL CONCRETE WASH OUT PER DETAIL 1, ON SHEET C2.1.
E5	INSTALL INLET PROTECTION ON NEW CATCH BASINS PER ODOT DETAIL RD1010 ON SHEET C2.2.
	EX. SURFACE FLOW DIRECTION

WET WEATHER CONSTRUCTION

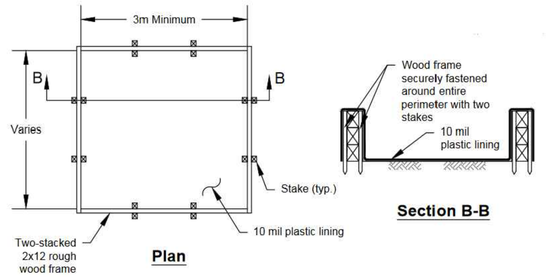
THE SITE SOILS ARE CONSIDERED VERY MOISTURE SENSITIVE AND, AS SUCH, ARE SUSCEPTIBLE TO DISTURBANCE BY CONSTRUCTION EQUIPMENT, PARTICULARLY DURING PERIODS OF WET WEATHER. DURING WET WEATHER, THE CONTRACTOR SHALL MINIMIZE TRAFFIC ON PREPARED SOIL SUBGRADE AREAS. IF THE SITE SOILS ARE EXPOSED DURING WET WEATHER, THE USE OF CRUSHED ROCK PLACED AS ENGINEERED FILL IN THE BOTTOM OF THE EXCAVATIONS MAY BE NECESSARY TO PROTECT THE SUBGRADE. THE GRADING CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO LIMIT SURFACE DISTURBANCE AND PROTECT THE SITE GRADING AREA FROM EXCESSIVE RUNOFF EROSION.

ESCP RESPONSIBILITY

IT IS THE INTENT OF THIS TEMPORARY EROSION AND SEDIMENT CONTROL PLAN THAT STORM WATER RUNOFF BE CONTROLLED AT ALL TIMES TO PREVENT SOIL EROSION AND TO MAINTAIN WATER QUALITY. ANY AND ALL MEASURES NECESSARY TO DO SO SHALL BE EMPLOYED BY THE CONTRACTOR.

1. REGARDLESS OF SITE, WEATHER, SOIL OR OTHER CONDITIONS, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ENSURING THAT EROSION DOES NOT OCCUR ON THE SITE AND THAT POLLUTED OR SILT-LADEN RUNOFF DOES NOT LEAVE THE SITE OR ENTER INTO ANY CREEK, STREAM, WETLAND OR WATER BODY ON THE SITE.
2. BEYOND THE MINIMUM REQUIREMENTS SHOWN ON THIS PLAN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND IMPLEMENTING APPROPRIATE METHODS, "BEST MANAGEMENT PRACTICES" (BMPS), FOR STORM WATER TREATMENT AND CONTROL THAT MEET THE REQUIREMENTS OF THE STATE AND LOCAL JURISDICTION.
3. THE CONTRACTOR SHALL REPORT ALL WATER QUALITY CONCERNS AND ACTIVITIES TO THE PROJECT ENGINEER. IN THE EVENT THAT THE INSTALLED WATER QUALITY CONTROL MEASURES ARE INEFFECTIVE AT CONTROLLING EROSION AND SEDIMENT, THE CONTRACTOR SHALL IMMEDIATELY REPORT TO AND CONSULT WITH THE PROJECT ENGINEER TO FIND AN APPROPRIATE REMEDY. ALL CONSTRUCTION ACTIVITIES, WITH THE EXCEPTION OF EROSION AND SEDIMENT CONTROL MEASURES, SHALL CEASE UNTIL SUCH TIME AS THE WATER QUALITY IS BROUGHT UNDER CONTROL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MONITORING WEATHER FORECASTS AND ANTICIPATING STORM ACTIVITY AND SHALL SCHEDULE ALL PROJECT ACTIVITIES IN ANTICIPATION OF THE WEATHER.
5. ALL SUPPLIES AND MATERIALS NECESSARY FOR IMPLEMENTING BMPS SHALL BE STORED ON SITE AND SHALL BE IMMEDIATELY AVAILABLE FOR USE. SUCH SUPPLIES AND MATERIALS SHALL INCLUDE, BUT NOT BE LIMITED TO, STRAW BALES OR OTHER MULCHING MATERIAL, SILT FENCING AND STAKES, FILTER FABRIC, ETC.
6. DURING AND AFTER RUNOFF PRODUCING STORM EVENTS, CONTRACTOR SHALL MONITOR ALL EROSION CONTROL MEASURES AND SHALL PRIORITIZE IMPLEMENTATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES ABOVE ALL OTHERS.

NOTE: IMPLEMENT EROSION CONTROL MEASURES PER EROSION AND SEDIMENT CONTROL PLANS PRIOR TO VEGETATION BEING DISTURBED. CONTACT ROGUE VALLEY SEWER SERVICES FOR EROSION CONTROL INSPECTION PRIOR TO THE START OF GRADING OR EXCAVATION.



NOTES

1. DETAIL SHOWN TO REPRESENT INTENT. EQUIVALENT ALTERNATIVES ARE AVAILABLE.
2. COORDINATE MODIFICATIONS WITH EROSION CONTROL INSPECTOR.

1 / ---

CONCRETE WASH OUT

SCALE: NTS

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
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OREGON
Jan. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

EROSION CONTROL PLAN

Drawing No.

C2.1

Drawing Name: C:\Users\TekPowell Engineering and Consulting, LLC\PEC Shared - Documents\All Staff\Projects\Current Projects\Arktek TRES P2\Drawings\CADD\Arktek TREM C1-C5.dwg Last Save: March 26, 2023 12:43 PM Plot Date: March 29, 2023 11:32 AM By: TPOWELL

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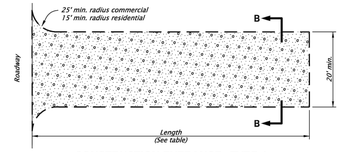
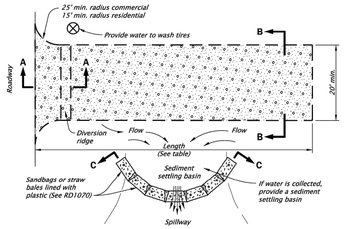
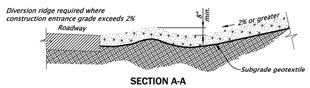
rd1000.dgm 01-20-2021



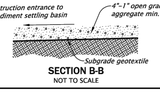
CONSTRUCTION ENTRANCE - TYPE 1
NOT TO SCALE



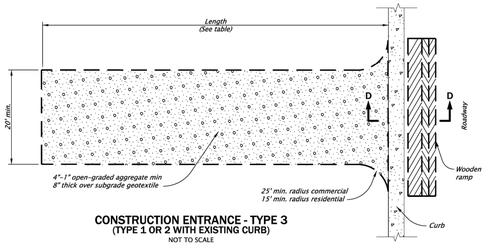
CONSTRUCTION ENTRANCE - TYPE 2
NOT TO SCALE



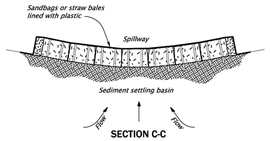
SECTION A-A
NOT TO SCALE



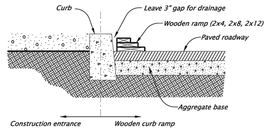
SECTION B-B
NOT TO SCALE



CONSTRUCTION ENTRANCE - TYPE 3
(TYPE 1 OR 2 WITH EXISTING CURB)
NOT TO SCALE



SECTION C-C
NOT TO SCALE



WOODEN CURB RAMP SECTION D-D
NOT TO SCALE

NOTES:
1. The Type 1 entrance is a simple entrance without a diversion ridge or settling basin.
2. The wooden ramp may be used on either Type 1 or Type 2 entrances in situations where there is curb and the curb is not removed for the construction entrance.

CONSTRUCTION ENTRANCE TABLE MINIMUM LENGTH	
Length (FT)	Area Of Exposed Soil (Acre)
20	0.25
50	0.25 < A < 1.0
100	A > 1.0

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CONSTRUCTION ENTRANCES

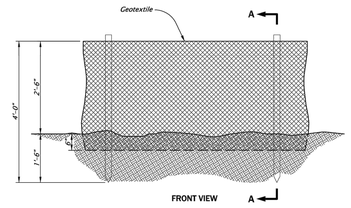
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

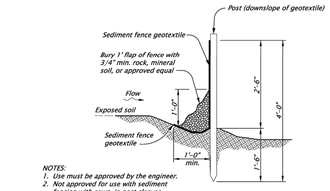
Effective Date: December 1, 2022 - May 31, 2023 RD1000

RD1000

rd1040.dgm 01-20-2021

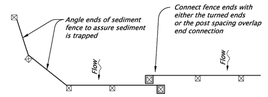


SEDIMENT FENCE AND GEOTEXTILE BURY DETAIL - TYPE 1
NOT TO SCALE

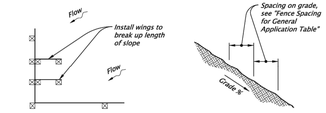


NOTES:
1. Use must be approved by the engineer.
2. Not approved for use with sediment fencing with sewn-in post sleeves.

ALTERNATE SEDIMENT FENCE WITHOUT TRENCHING - TYPE 2
NOT TO SCALE



PLAN VIEW

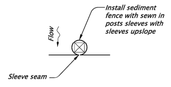


TERMINATION AT CORNER OR PROPERTY LINE

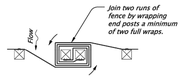
GENERAL NOTES:
1. Use 2"x2" wood fence posts.
2. Posts to be installed on downhill side of sediment fence geotextile. Position posts to prevent separation from geotextile.
3. Compact filter fabric trench backfill and soil on uphill side of fence.
4. Locate fence no closer than three feet to the toe of a slope.
5. Wing spacing shall comply with "Fence Spacing for General Application Table".

FENCE SPACING FOR GENERAL APPLICATION TABLE	
INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS	
GRADE	MAXIMUM SPACING ON GRADE
Grade < 10%	300'
10% ≤ Grade < 15%	150'
15% ≤ Grade < 20%	100'
20% ≤ Grade < 30%	50'
30% ≤ Grade	25'

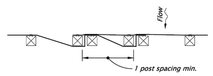
POST SPACING TABLE	
6"	Sediment Fence with Geotextile elongation less than 50%
4"	Sediment Fence with Geotextile elongation 50% or more



GEOTEXTILE WITH POST SLEEVES



TURNED ENDS CONNECTION



POST SPACING OVERLAP CONNECTION

GEOTEXTILE END CONNECTIONS
NOT TO SCALE

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

SEDIMENT FENCE

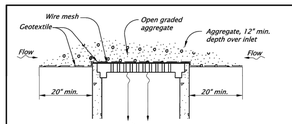
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

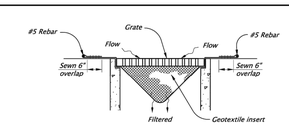
Effective Date: December 1, 2022 - May 31, 2023 RD1040

RD1040

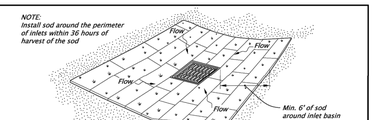
rd1010.dgm 01-20-2021



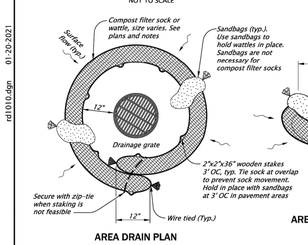
GEOTEXTILE/WIRE MESH/AGGREGATE - TYPE 2
NOT TO SCALE



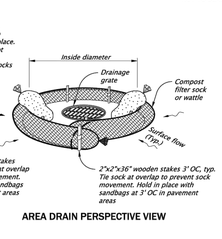
PREFABRICATED FILTER INSERT - TYPE 3
NOT TO SCALE



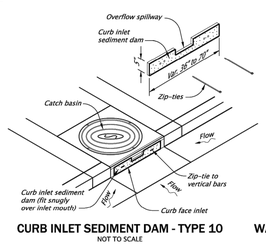
SOD PROTECTION - TYPE 6
NOT TO SCALE



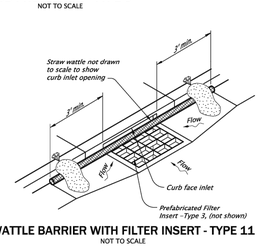
AREA DRAIN PLAN



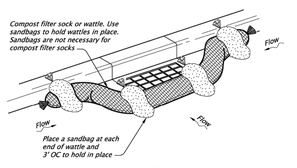
AREA DRAIN PERSPECTIVE VIEW



CURB INLET SEDIMENT DAM - TYPE 10
NOT TO SCALE



WATTLE BARRIER WITH FILTER INSERT - TYPE 11
NOT TO SCALE



CURB INLET PERSPECTIVE VIEW

COMPOST FILTER SOCK OR WATTLE - TYPE 7
NOT TO SCALE

NOTES:
Type 2 – Geotextile/wire mesh/aggregate
Place the wire mesh over the grate. Place sediment fence geotextile over the wire mesh and perimeter area around structure.
Install aggregate over the geotextile fabric.

Type 3 – Prefabricated filter inserts
Install prefabricated filter inserts according to the plans, special provisions, and manufacturer recommendations. Prefabricated inserts with provisions for overflow are allowed only when accompanied by additional BMP's to prevent the potential of sediments entering project storm systems. Field fabricated inserts are not allowed.

Type 7 – Compost filter sock
Drive 2"x2" wood stakes a minimum of 6" into ground and flush with the top of the sock.
Overlap ends of sock per manufacturers recommendations (12"min., 36" max.). Use 8" to 12" dia sock on curbside in traffic areas.

(Type 7 cont.)
Use 12" to 18" dia sock in non-traffic areas or areas where the larger socks can be used safely.
use synthetic mesh socks for temporary installations.

Type 10 – Curb inlet sediment dam
Fit curb inlet sediment dam snugly into inlet mouth. Curb inlet sediment dam is required for use with inlet filter insert where at-grade inlet grate and curb inlet are combined at a catch basin.

Type 11 – Wattle barrier with filter insert
Install prefabricated filter insert per Type 3 detail.
Install wattles over opening and 36" to each side of opening tight against curb. Adjust wattle to force storm water to flow through filter insert or wattle prior to leaving the site.
Adjust, replace or modify the inlet protection as needed to prevent sediment laden water from entering the catch basin.

CALC. BOOK NO. N/A

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

INLET PROTECTION
TYPE 2, 3, 6, 7, 10 AND 11

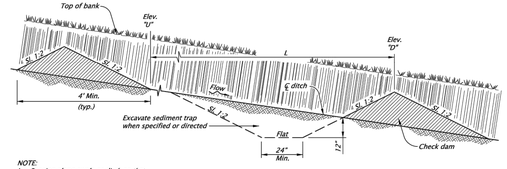
2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers
Jan 2021	Moved notes up from overlapping the sheet border

Effective Date: December 1, 2022 - May 31, 2023 RD1010

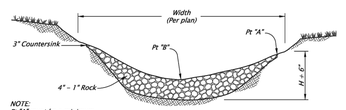
RD1010

rd1005.dgm 01-20-2021



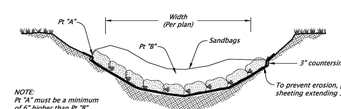
NOTE:
L = Spacing along swale or ditch so that Elevation "U" equals Elevation "D".

TYPICAL PROFILE SECTION CHECK DAMS
(SHOWN WITH AGGREGATE)
NOT TO SCALE



NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

AGGREGATE CHECK DAM - TYPE 1
NOT TO SCALE



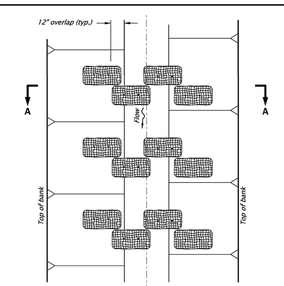
NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

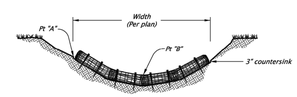
SANDBAG CHECK DAM - TYPE 4
NOT TO SCALE

NOTES:
1. Type 3 – stake biofilter bags with two 2"x2"x18" (minimum) wood stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags. Omit stakes if placed over paved surfaces. Overlap bags 12" minimum at each joint.
2. Type 4 – Tightly abut or overlap ends of sandbags at each joint.
3. Spacing between check dams for all check dam types shall comply with the typical profile section shown above.

MAXIMUM CHECK DAM SPACING "L"				
Ditch Grade	H=8"	H=12"	H=18"	H=24"
10%	* *	* *	15'	20'
9%	* *	* *	16'	22'
8%	* *	* *	18'	25'
7%	* *	* *	21'	28'
6%	* *	16'	25'	33'
5%	* *	20'	30'	40'
4%	16'	25'	37'	50'
3%	22'	33'	50'	66'
2%	33'	50'	75'	100'

* * Not allowed H = Min. dam height





SECTION A-A

BIOFILTER BAG CHECK DAM - TYPE 3
NOT TO SCALE

CALC. BOOK NO. N/A

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SDR DATE January, 2021

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CHECK DAMS
TYPE 1, 3 AND 4

2021

DATE	REVISION DESCRIPTION
Jan 2021	Removed Calc book numbers

Effective Date: December 1, 2022 - May 31, 2023 RD1005

RD1005

Drawing Name: C:\Users\Tek\Powell Engineering and Consulting, LLC\PEC Shared - Documents\All Staff\Projects\Current Projects\Arktek TRES P2\Drawings\CAD\Arktek TRES P2 Drawings.dwg Last Save: March 24, 2023 3:08 PM By: TPOWELL Plot Date: March 26, 2023 10:23 AM

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OREGON
Jan. 13, 2004
TODD D. POWELL
EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

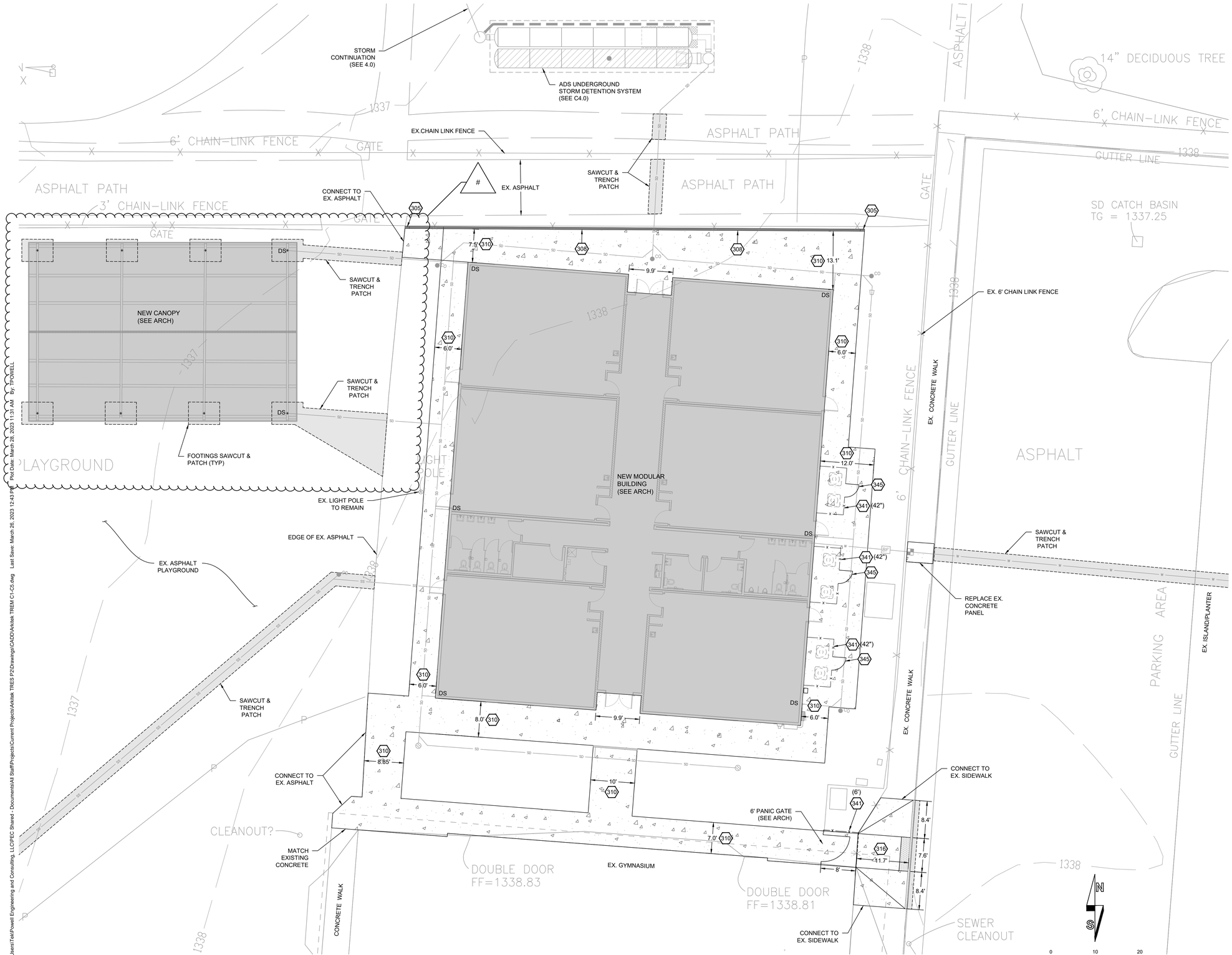
100% CD

Drawing Title

ESC DETAILS

Drawing No.

C2.2



PLAN VIEW - CIVIL SITE PLAN

SCALE: 1" = 10' - 0" (24x36)

KEYNOTES

- 305 CURB TAPER (305 C6.0)
- 308 CURB WALL (308 C6.0)
- 310 CONCRETE SIDEWALK OVER CRUSHED ROCK BASE. (309 C6.0) (310 C6.0)
- 316 PERPENDICULAR CURB RAMP WITH TRUNCATED DOMES. (rd910 C6.0)
- 341 CHAIN LINK FENCING (HEIGHT AS INDICATED) (341 C6.0)
- 345 3' WIDE CHAIN LINK SWING GATE (345 C6.0)

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84425PE
OREGON
Jan. 13, 2004
TODD D. POWELL

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CIVIL SITE PLAN

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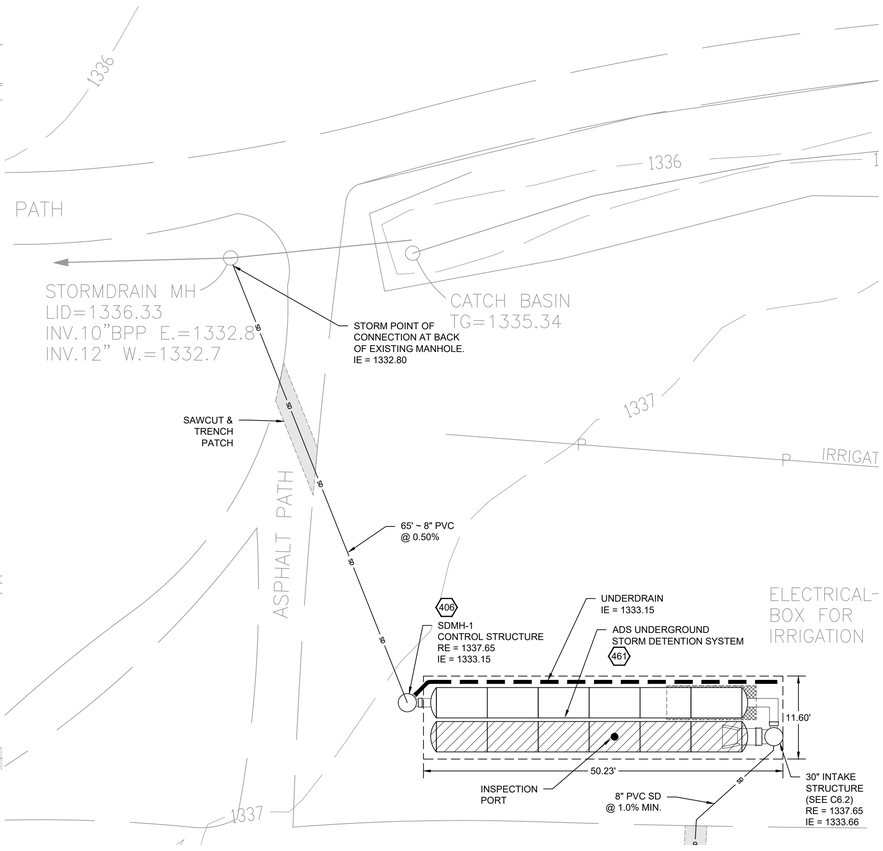
PLAN VIEW - DRAINAGE PLAN

SCALE: 1" = 10' - 0" (24x36)



PLAN VIEW - ADS STORMTECH CHAMBERS

SCALE: 1" = 10' - 0" (24x36)

KEYNOTES

- 406 CONTROL STRUCTURE MANHOLE (406 / C6.1)
- 408 AREA DRAIN (408 / C6.1)
- 415 4" NDS DURA SLOPE CHANNEL DRAIN WITH HEEL PROOF GRATE.
- 418 DOWNSPOUT TRANSITION (418 / C6.1)
- 461 ADS UNDERGROUND STORM DETENTION SYSTEM (SEE C6.2)
- 540 STORM CLEAN OUT (540 / C6.1)

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OREGON
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DRAINAGE PLAN

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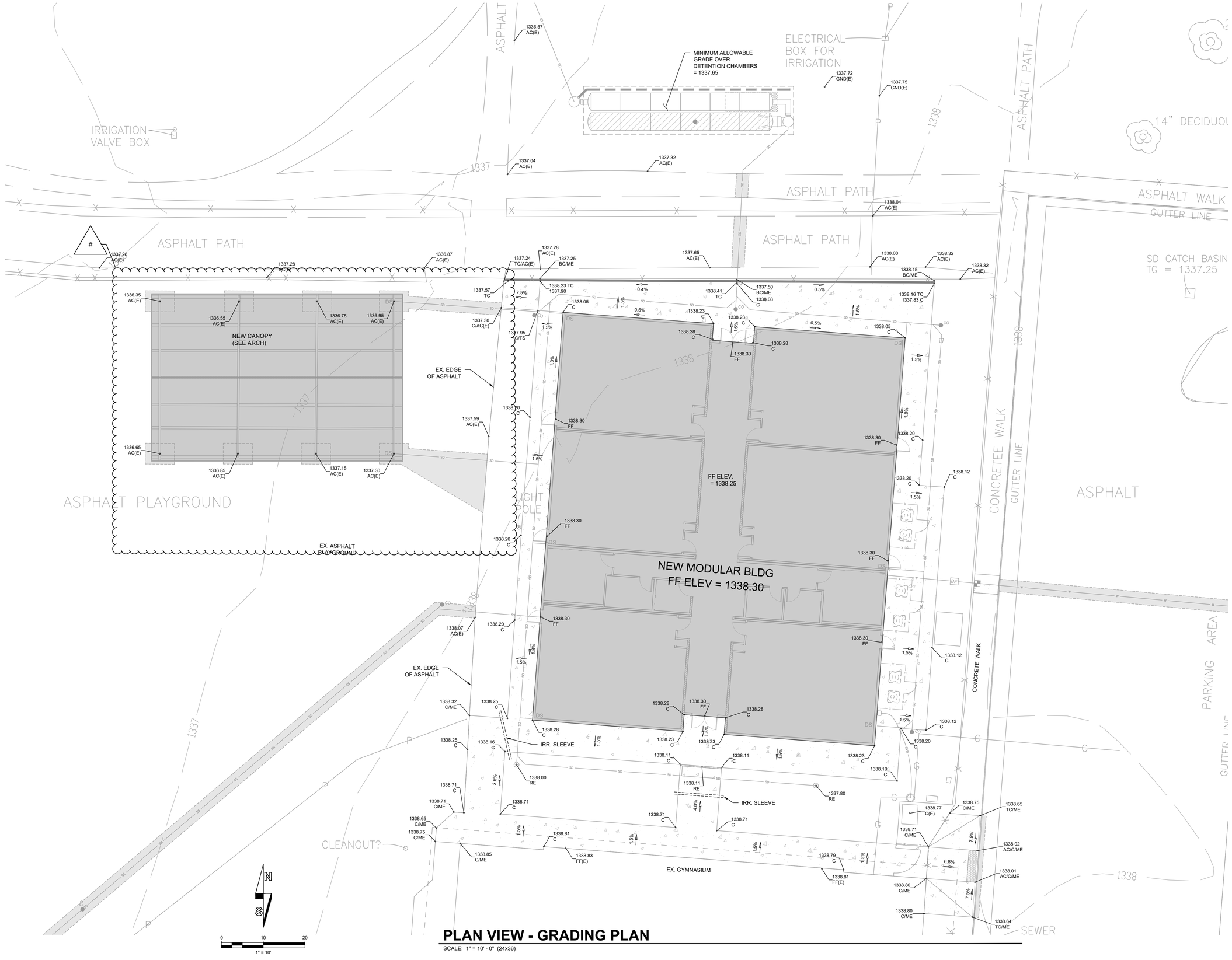

PLAN VIEW - GRADING PLAN

SCALE: 1" = 10' - 0" (24x36)

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56726PE
OREGON
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TODD D. POWELL
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Drawing Title

GRADING PLAN

Drawing No.

C4.1

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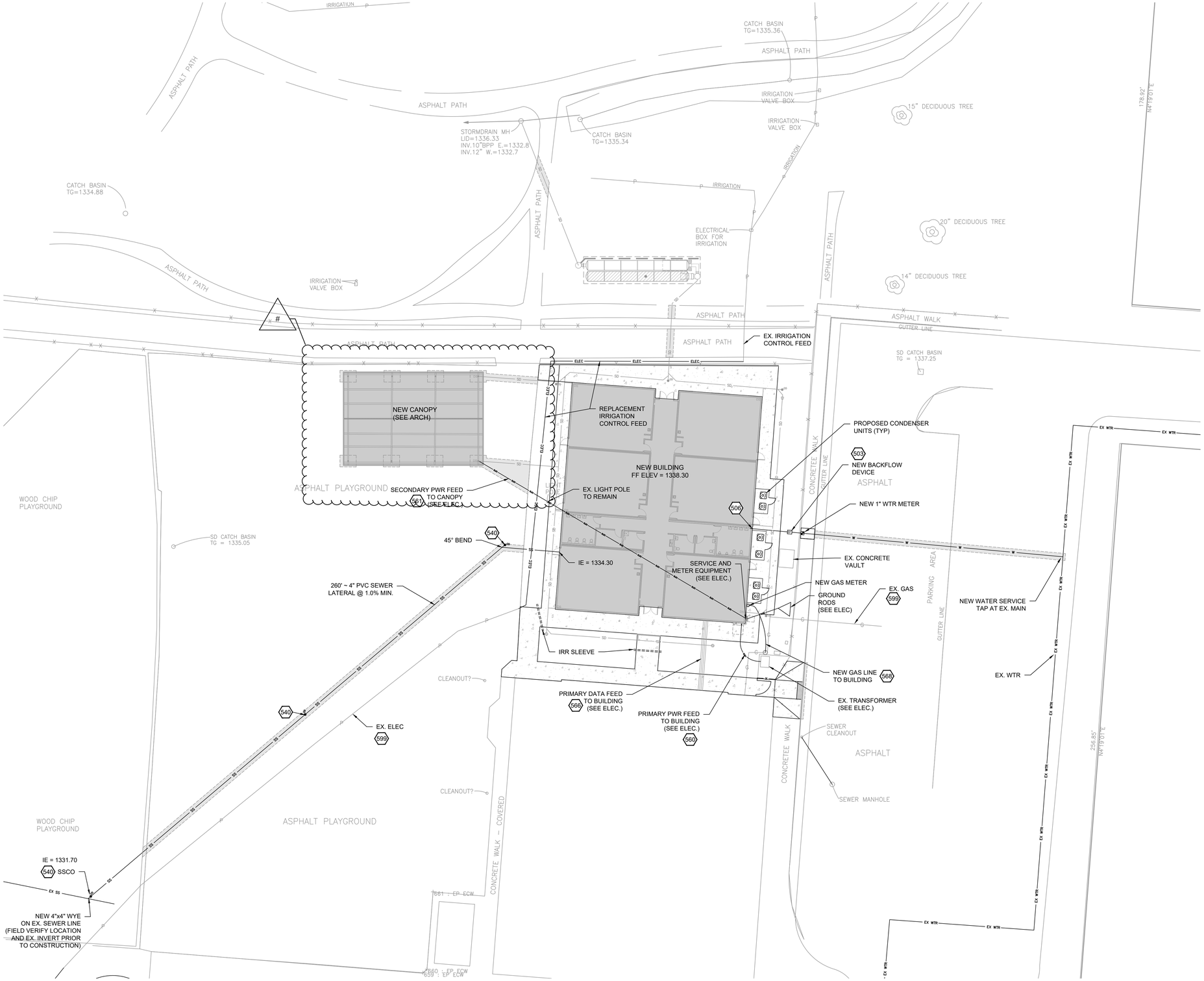

PLAN VIEW - SITE UTILITY PLAN

SCALE: 1" = 20' - 0" (24x36)

KEYNOTES

503 STATE OF OREGON APPROVED BACKFLOW DEVICE. TESTING SHALL BE COMPLETED BY AN OREGON CERTIFIED BACKFLOW ASSEMBLY TESTER.

506 1.5" DOMESTIC WATER MAIN CONNECTION AT BUILDING WITH SHUT OFF VALVE. SEE PLUMBING.

540 SANITARY SEWER CLEANOUT. (540 / C6.1)

560 PRIMARY POWER FEED TO BUILDING (SEE ELEC). CONTRACTOR TO COORDINATE WITH PPL ON SERVICE FEEDS TO BUILDING.

561 SECONDARY POWER FEED

566 PRIMARY DATA FEED TO BUILDING. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES ON SERVICE LATERALS TO BUILDING.

568 PRIMARY GAS SERVICE LINE TO BUILDING

599 EXISTING UNDERGROUND UTILITY. CONTRACTOR TO COORDINATE WITH APPROPRIATE UTILITY PRIOR TO CONSTRUCTION. REPLACE OR PROTECT DURING CONSTRUCTION AS DIRECTED BY FRANCHISE UTILITY.

UTILITY STATEMENT:

EXISTING UNDERGROUND UTILITIES ILLUSTRATED IN THESE PLANS ARE APPROXIMATED BASED ON MAPS OBTAINED FROM THE CITY OF MEDFORD PUBLIC WORKS, OR HAVE BEEN LOCATED BY A UTILITY LOCATE COMPANY. LAYOUT INDICATED IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. ALL LINES WITHIN PROJECTED WORK ZONE SHALL BE FIELD VERIFIED AS REQUIRED PRIOR TO CONSTRUCTION.

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SITE UTILITY PLAN

Drawing No.

C5.0

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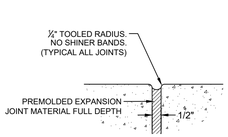
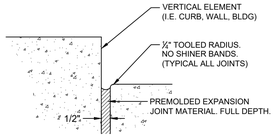
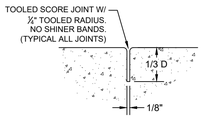


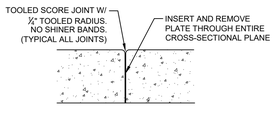
EXPANSION JOINT



EXPANSION JOINT AT VERTICAL ELEMENTS

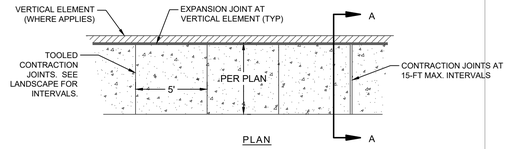


TOOLED CONTRACTION JOINT

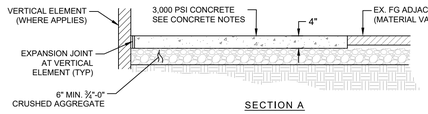


WEAKENED PLANE CONTRACTION JOINT

309 **CONCRETE CONTROL JOINTS**
SCALE: NTS



PLAN



SECTION A

NOTES

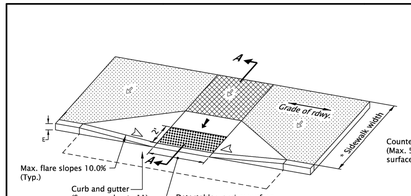
1. COMPACT SUBGRADE AND AGGREGATE TO 95% OF MAXIMUM DRY DENSITY.
2. FINISH SHALL BE MEDIUM BROOM PERPENDICULAR TO PEDESTRIAN TRAFFIC UNLESS OTHERWISE DIRECTED.
3. CROSS SLOPE OF SIDEWALK SHALL BE 1.5% AWAY FROM THE BUILDING.
4. SEE CONCRETE CONTROL JOINT DETAIL ON THIS SHEET.

310 **TYPICAL CONCRETE SIDEWALK**
SCALE: NTS

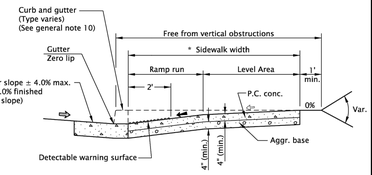
305 **CURB TAPER**
SCALE: NTS

308 **CURB WALL**
SCALE: NTS

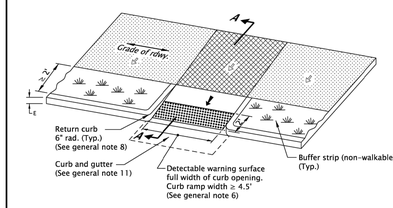
rd910.dgn 14-JAN-2022



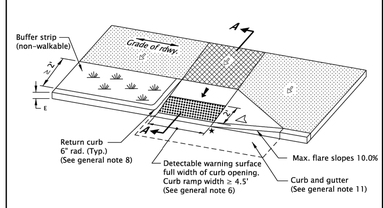
PERPENDICULAR CURB RAMP DETAIL
(Use "Parallel Curb Ramp Detail" or "Combination Curb Ramp Detail" when reqd. turning space cannot be obtained)



SECTION A-A
* NOTE: Minimum width of 14.25 feet sidewalk for E=7"



THROUGH BUFFER STRIP



WITH SINGLE FLARE

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on applicable ODOT Standards.
2. See Std. Dwgs. RD700 & RD701 for curbs.
   See Std. Dwgs. RD720 & RD721 for sidewalks.
   See Std. Dwgs. RD902 through RD908 for detectable warning surface installation details.
   See Std. Dwgs. RD912 through RD916 for curb ramp placement options.
3. Site conditions normally require a project specific design. See project plans for details not shown.
4. Tooled dummy joints are required at all curb ramp grade break lines, (see Std. Dwg. RD722).
5. Curb ramp slopes shown are relative to the true level horizon (zero bubble).
6. Place detectable warning surface at the back of curb for a minimum depth of 2' in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.
7. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
8. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping, see Std. Dwg. RD721. Return curb shall not reduce width of approaching sidewalk.
9. Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be ≥ 8' wide, (see Std. Dwg. RD909 for additional details).
10. Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.
11. On or along state highways, curb and gutter is required at curb ramps.

LEGEND:

- Sidewalk
- Detectable warning surface
- Level area (Turning space/landing)
  Unobstructed 4.5' x 4.5'
  With obstruction 4.5' x 5.5' (Longer dimension in direction of pedestrian street crossing).
  For the purposes of this application, a max. 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
- Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Running slope 7.5% max. (Max. 8.3% finished surface slope)
- Counter slope 4.0% max. ascending or descending, (Max. 5.0% finished surface slope) Slope as required for drainage
- Flare slope (Max. 10% finished surface slope)

CALC. BOOK NO. N/A

SDR DATE 14-JAN-2022

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

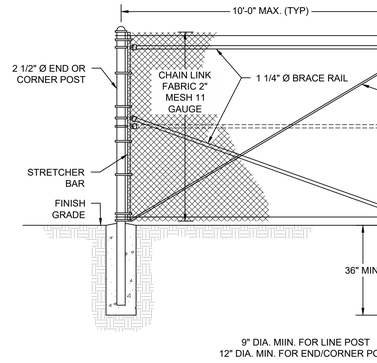
PERPENDICULAR CURB RAMP

2021

DATE	REVISION DESCRIPTION
07-2020	DRAWING CREATED
01-2022	REVISED NOTES

Effective Date: December 1, 2022 - May 31, 2023

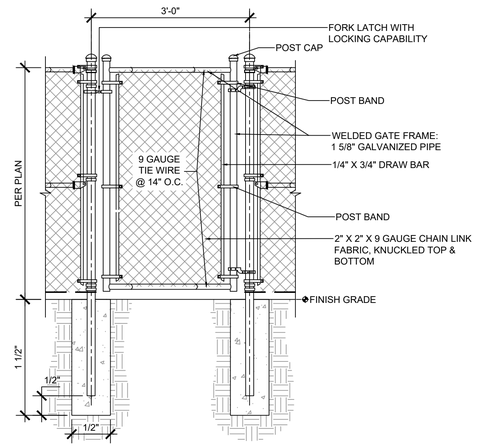
RD910



NOTES

1. SEE PLAN FOR FENCE HEIGHT.
2. CONCRETE SHALL BE COMMERCIAL GRADE.
3. CHAIN LINK FABRIC TOP AND BOTTOM SELVAGE SHALL BE KNUCKLED FINISH.
4. POSTS AND CHAIN LINK FENCE TO BE PAINTED BLACK.

341 **CHAIN LINK FENCE**
SCALE: NTS



NOTE

1. ALL WIRE FABRIC AND FENCE HARDWARE SHALL BE GALVANIZED.
2. FABRIC SHALL BE INSTALLED ON THE OUTSIDE.

345 **4 FT. CHAIN LINK GATE**
SCALE: NTS

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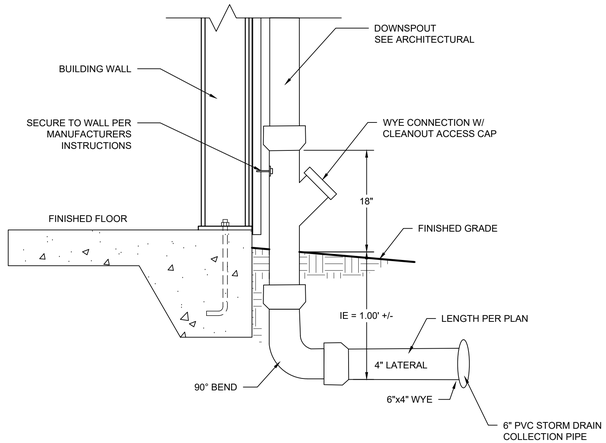
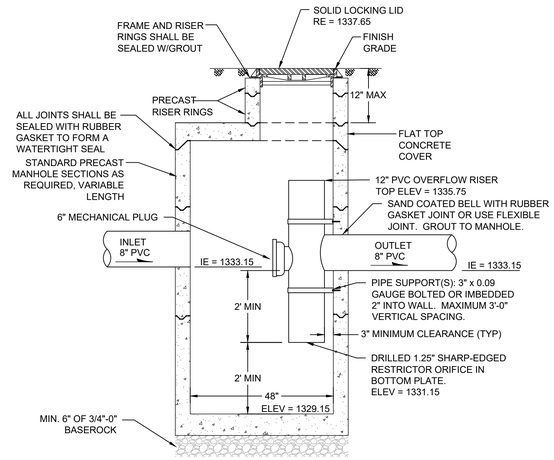


418 **DOWNSPOUT TRANSITION**

SCALE: NTS

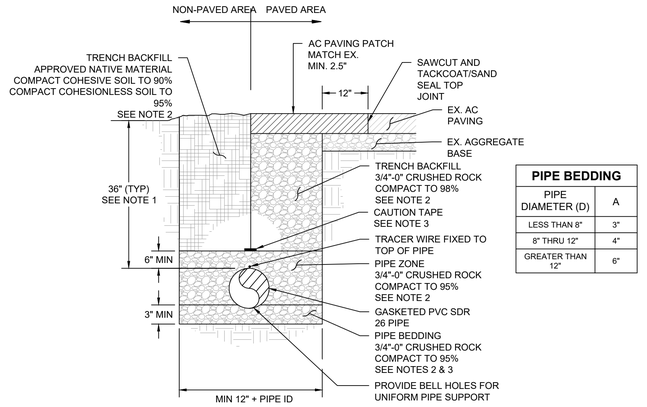


NOTE

ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C 478.

406 **CONTROL STRUCTURE MANHOLE**

SCALE: NTS



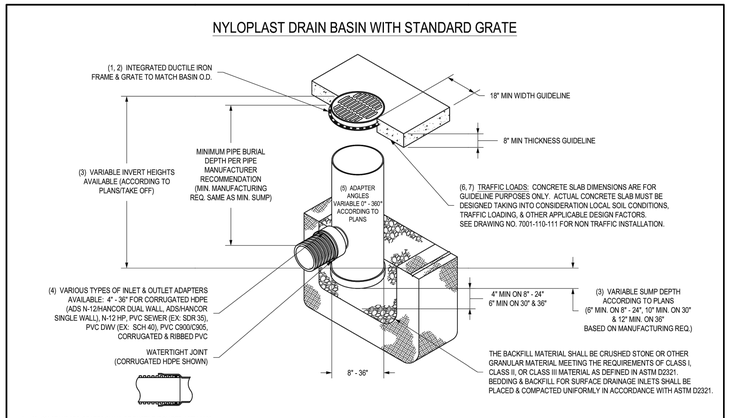
PIPE BEDDING	
PIPE DIAMETER (D)	A
LESS THAN 8"	3"
8" THRU 12"	4"
GREATER THAN 12"	6"

NOTES

1. COVER OVER PIPE MAY VARY FROM 36" MIN TO 42" MAX UPON APPROVAL FROM ENGINEER.
2. REQUIRED COMPACTION ACCORDING TO ASTM D 1557 MAXIMUM DRY DENSITY.
3. SEWER: 3" WIDE GREEN POLYETHYLENE TAPE IMPRINTED "CAUTION: BURIED SEWER LINE BELOW"

590 **SEWER TRENCH DETAIL**

SCALE: NTS



1 - 8" - 30" STANDARD GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - 12" - 30" FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05. 8" & 10" STANDARD GRATES FIT DIRECTLY ONTO DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" - 36").
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
6 - 12" - 30" STANDARD GRATES SHALL MEET H-20 LOAD RATING.
7 - 8" & 10" STANDARD GRATES ARE RATED FOR LIGHT DUTY APPLICATIONS ONLY; NO CONCRETE COLLAR NEEDED FOR LIGHT DUTY RATING.

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DRAWN BY	EBC	MATERIAL	
DATE	1-23-06		
REVISED BY	NMH	PROJECT NO./NAME	
DATE	06-12-18		
DWG SIZE	A	SCALE 1:40	SHEET 1 OF 1

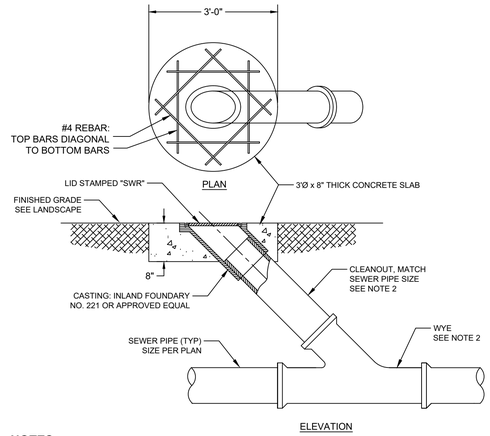
Nyloplast
3128 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-3443
FAX (770) 932-2460
www.nyloplast-us.com

TITLE: DRAIN BASIN WITH STANDARD GRATE QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-144 REV J

408 **NYLOPLAST AREA DRAIN**

SCALE: NTS



NOTES

1. CONCRETE TO BE COMMERCIAL GRADE CONCRETE (CGC) PER 2015 ODOT STANDARD SPECIFICATIONS SECTION 00440. MINIMUM 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. FITTINGS AND PIPE TO BE GASKETED PVC SDR 26.

540 **TYPICAL CLEANOUT**

SCALE: NTS

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc

426 a street
ashland, or 97520
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OREGON
Jan. 13, 2004
TODD D. POWELL

EXPIRES: 12/31/24

Revision	Date

Date	03.29.23
Job	22-037
Drawn By	
Checked By	TDP
Scale	

100% CD

Drawing Title

PROJECT DETAILS

Drawing No.

C6.1

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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist® FOR STORMTECH® INSTALLATION INSTRUCTIONS VISIT OUR APP

TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING

WHITE CITY, OR, USA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD. THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM -6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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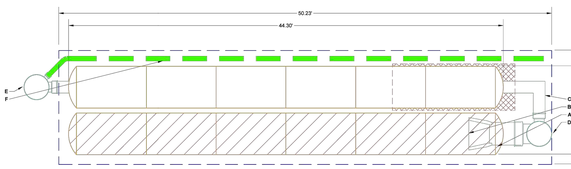
PROPOSED LAYOUT	PROPOSED ELEVATIONS		PART TYPE	ITEM OR LAYOUT	DESCRIPTION	*INVERT	MAX FLOW
12	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)	1344.19				
4	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)	1339.19				
4	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)	1337.69	EZ	PREFABRICATED EZ END CAP		
6	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF BASE/CONCRETE PAVEMENT)	1337.19				
35	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)	1337.69				
1072	INSTALLED SYSTEM VOLUME (CY) (PERIMETER STONE INCLUDED)	TOP OF STONE	1344.19				
		TOP OF SC-740 CHAMBER	1343.69				
	(BASE STONE INCLUDED)	12" BOTTOM CONNECTION INVERT	1339.19				
		12" BOTTOM CONNECTION INVERT	1339.19				
583	SYSTEM AREA (SF)	24" ISOLATOR ROW PLUS INVERT	1339.69				
123.7	SYSTEM PERIMETER (ft)	BOTTOM OF SC-740 CHAMBER	1339.69				
		UNDERDRAIN INVERT	1339.19				
		BOTTOM OF STONE	1339.19				

ITEM OR LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
A	24" BOTTOM PREFABRICATED EZ END CAP. PART#: SC740ECEZ / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	0.10"	
B	MINIMUM ADS "FLEXSTORM CATCH IT" INSERT		
B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: SC740245AMP		
C	12" x 12" TOP MANIFOLD. ADS N-12	12.50"	
D	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN
E	30" DIAMETER (DESIGN BY ENGINEER)		2.2 CFS OUT
F	9" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 12.50" OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES
- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.30 FOR MANIFOLD SIZING GUIDANCE.
- CUTTING FLEXSTORM AT THE JOINTS OF THE CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THE STORMTECH CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING — WHITE CITY, OR, USA — DRAWN: TP — CHECKED: N/A — DATE: — PROJECT #:

StormTech® Chamber System — 888.892.2694 | WWW.STORMTECH.COM

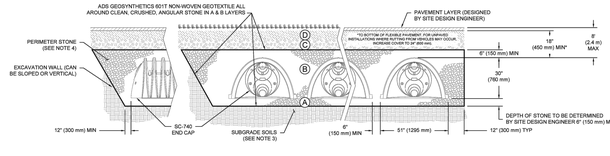
ADS — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1.800.733.7473

SHEET 2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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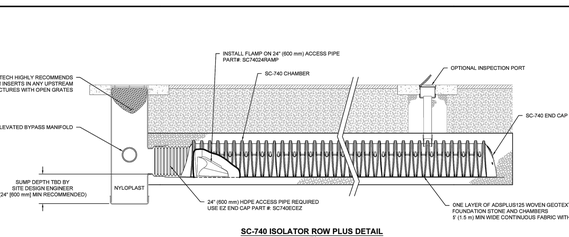
SHEET 3 OF 6



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A) INSPECTION PORTS (IF PRESENT)
  - A.1 REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2 REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3 USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4 LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5 IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B) ALL ISOLATOR PLUS ROWS
  - B.1 REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2 USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

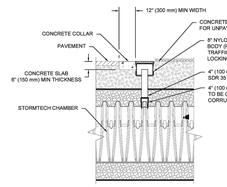
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)
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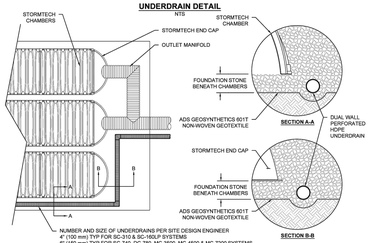
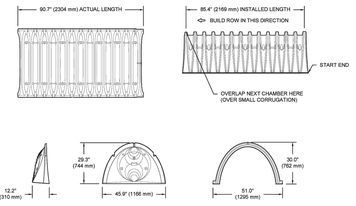
SHEET 4 OF 6

UNDERDRAIN DETAIL
NTS



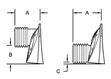
SC-740 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06BT / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			16.5" (419 mm)	0.5" (13 mm)
SC740EPE06T / SC740EPE06TPC				
SC740EPE08B / SC740EPE08BPC	8" (200 mm)	12.2" (310 mm)	---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.9" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

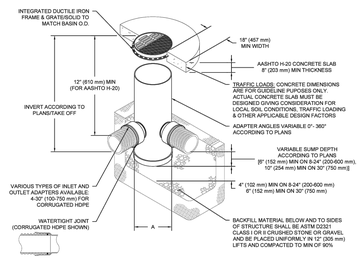
TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING — WHITE CITY, OR, USA — DRAWN: TP — CHECKED: N/A — DATE: — PROJECT #:

StormTech® Chamber System — 888.892.2694 | WWW.STORMTECH.COM

ADS — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1.800.733.7473

SHEET 5 OF 6

NYLOPLAST DRAIN BASIN
NTS



NOTES

1. 9.00" (600-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12.30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

TABLE ROCK ELEMENTARY SCHOOL MODULAR BUILDING — WHITE CITY, OR, USA — DRAWN: TP — CHECKED: N/A — DATE: — PROJECT #:

Nyloplast® — 2729 DIX STREET, BUFFALO, NY 14211 — 1.800.821.6710 | WWW.NYLOPLAST-US.COM

ADS — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1.800.733.7473

SHEET 6 OF 6

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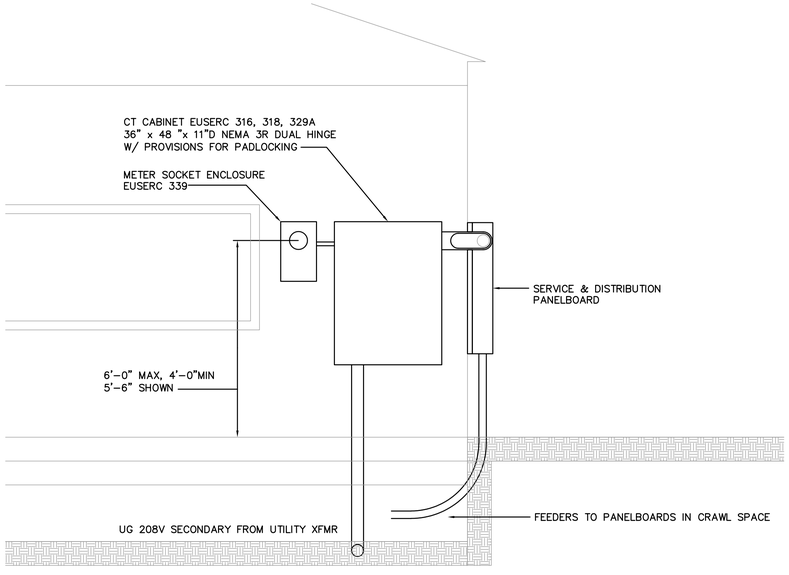
ELECTRICAL GENERAL NOTES

SEE DIVISION 26 SPECIFICATIONS FOR EXPANDED REQUIREMENTS.

1. WORK INCLUDES INSTALLATION OF ALL ELECTRICAL SYSTEMS COMPLETE AND OPERATIONAL TO THE SATISFACTION OF THE OWNER AS LIMITED BY THE CONTRACT DOCUMENTS.
2. ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2023 EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA 70) WITH OREGON AMENDMENTS (2023 OESC), NATIONAL ELECTRICAL SAFETY CODE (ANSI IEEE C2) AND ALL LOCAL RULES AND REGULATIONS.
3. CONFORM TO DIVISION 1 SPECIFICATIONS SECTIONS REGARDING PERMITS.
4. VISIT THE JOB SITE AND VERIFY ALL EXISTING CONDITIONS AND THE EXTENT OF REMOVAL, RELOCATION, RECONNECTION AND/OR NEW WORK PRIOR TO BIDDING. BID SUBMISSION SHALL BE CONSIDERED AS EVIDENCE OF SITE INSPECTION AND RESOLUTION OF ALL DISCREPANCIES AND QUESTIONS. NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK MADE NECESSARY BY FAILURE TO VISIT THE SITE.
5. SUBMIT SHOP DRAWINGS TO THE ARCHITECT FOR ALL LUMINAIRES, EQUIPMENT AND DEVICES COVERED BY THIS CONTRACT FOR APPROVAL PRIOR TO ORDERING. SHOP DRAWINGS SHALL BEAR THE CONTRACTOR'S STAMP AND SIGNATURE INDICATING THEY HAVE BEEN CHECKED AND ARE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS. SHOP DRAWINGS NOT BEARING CONTRACTOR APPROVAL WILL BE RETURNED WITHOUT REVIEW.
6. SHOP DRAWINGS ARE INTENDED TO SHOW UNDERSTANDING OF, AND COMPLIANCE WITH, THE CONTRACT DOCUMENTS. CAD FILES OF THE PROJECT DOCUMENTS WILL NOT BE AVAILABLE FOR USE AS SHOP DRAWINGS WITHOUT PRIOR CLEARANCE AND ACCEPTANCE OF ELECTRONIC MEDIA RELEASE FORM.
7. SHOULD PROJECT CONDITIONS, INCLUDING CONDITIONS UNCOVERED BY DEMOLITION OR CHANGES TO OTHER TRADES, REQUIRE REARRANGEMENT OF WORK, MARK SUCH CHANGES ON AS-BUILT DRAWINGS. IF PROJECT CONDITIONS REQUIRE UNSPECIFIED MATERIALS OR METHODS, SUBMIT REQUEST FOR INFORMATION (RFI) TO THE ARCHITECT WITH DRAWINGS SHOWING THE PROPOSED ALTERNATIVE MATERIALS OR METHODS. DO NOT PROCEED WITH THE WORK UNTIL APPROVAL IS OBTAINED. RFIs SUBMITTED WITHOUT PROPOSED SOLUTIONS WILL BE RETURNED WITHOUT REVIEW. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION BETWEEN TRADES SHALL NOT BE CONSIDERED REASON FOR EXTRA COST.
8. OBTAIN AND REVIEW PRODUCT DATA. SHOP DRAWINGS AND INSTALLATION INSTRUCTIONS FOR OWNER-FURNISHED EQUIPMENT, AND EQUIPMENT FURNISHED BY OTHER TRADES. VERIFY ELECTRICAL REQUIREMENTS OF EQUIPMENT ACTUALLY PROVIDED PRIOR TO ROUGH-IN.
9. PROVIDE RECORD DOCUMENTS AT THE CLOSE OF CONSTRUCTION. INCLUDE OPERATIONS AND MAINTENANCE MANUALS FOR ALL EQUIPMENT, AND COPIES OF WARRANTIES, TEST RECORDS AND CERTIFICATIONS. INCLUDE AS-BUILT DRAWINGS: SHOW ALL CHANGES MADE PER PROJECT CONDITIONS, LOCATIONS OF ALL DISTRIBUTION APPARATUS, PULL AND JUNCTION BOXES, AND ROUTING OF CONDUITS 2" AND LARGER.
10. ALL FEEDERS AND EXPOSED BRANCH CIRCUITS SHALL BE IN CONDUIT. ALL CONDUIT IN FINISHED AREAS SHALL BE CONCEALED; USE SURFACE METAL RACEWAY IN EXISTING FINISHED AREAS WHERE CONDUIT CANNOT BE CONCEALED. ALL CONDUIT IN UNFINISHED AREAS MAY BE EXPOSED. MINIMUM CONDUIT SIZE IS 0.5 INCH. EMT AND FLEXIBLE METAL CONDUIT SHALL BE USED FOR ALL INTERIOR APPLICATIONS. EMT AND RIGID GALVANIZED STEEL CONDUIT SHALL BE USED FOR ALL EXPOSED EXTERIOR LOCATIONS. CONDUIT IN OR UNDER THE SLAB SHALL BE SCHEDULE 40 PVC. ALL BURIED CONDUIT NOT UNDER A SLAB SHALL BE SCHEDULE 40 PVC.
11. FITTINGS FOR EMT CONDUIT SHALL BE STEEL SET SCREW OR COMPRESSION TYPE. DIE-CAST FITTINGS ARE PROHIBITED. FITTINGS FOR RGS CONDUIT SHALL BE GALVANIZED MALLEABLE IRON. FITTINGS FOR PVC CONDUIT SHALL BE SCHEDULE 40 PVC.
12. CONDUIT SIZES INDICATED ON THE DRAWINGS MAY BE PURPOSELY OVERSIZED FOR FUTURE CONDUCTORS OR TO AVOID EXCESS CONDUIT HEATING. CONDUIT SIZES NOT SHOWN ON THE DRAWINGS SHALL BE SIZED BY THE CONTRACTOR BASED ON THE NUMBER OF CONDUCTORS TO BE INSTALLED, IN ACCORDANCE WITH NFPA 70.
13. PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT INDICATED ON PLANS. SIZING OF BOXES SHALL BE PER NFPA 70.
14. ALL PENETRATIONS THROUGH FIRE RATED SLABS, FLOORS, WALLS AND CEILINGS SHALL BE SEALED TO MAINTAIN THE INTEGRITY OF THE FIRE RATING, USING A U.L. LISTED FIRE RATED SYSTEM.
15. OBTAIN APPROVAL FROM THE ARCHITECT BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS OR FIRE RATED WALLS OR CEILINGS.
16. ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER, 600 VOLT INSULATION TYPE XHHW. ALL CONDUCTORS SMALLER THAN #8 SHALL BE SOLID OR STRANDED COPPER, 600 VOLT INSULATION TYPE THHN/THWN.
17. PROVIDE A GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ALL FEEDERS AND BRANCH CIRCUITS, INCLUDING SWITCH LEGS. SIZE GROUNDING CONDUCTOR PER NFPA 70, TABLE 250-122.
18. ALL PANELBOARDS SHALL HAVE COPPER BUSSES INCLUDING GROUND BUS, AND BOLT-ON CIRCUIT BREAKERS. VOLTAGE, AMPERE AND MINIMUM A.I.C. RATINGS ARE SHOWN ON DIAGRAMS AND SCHEDULES.
MANUFACTURERS: SIEMENS-ITE, GENERAL ELECTRIC, CUTLER-HAMMER, SQUARE D.
19. PROVIDE TYPEWRITTEN CIRCUIT DIRECTORIES IN NEW PANELBOARDS TO ACCURATELY REFLECT THE CIRCUITING AS ACTUALLY INSTALLED. THE CIRCUIT DIRECTORIES SHALL IDENTIFY THE SOURCE OF POWER PER NEC 408.4(B).

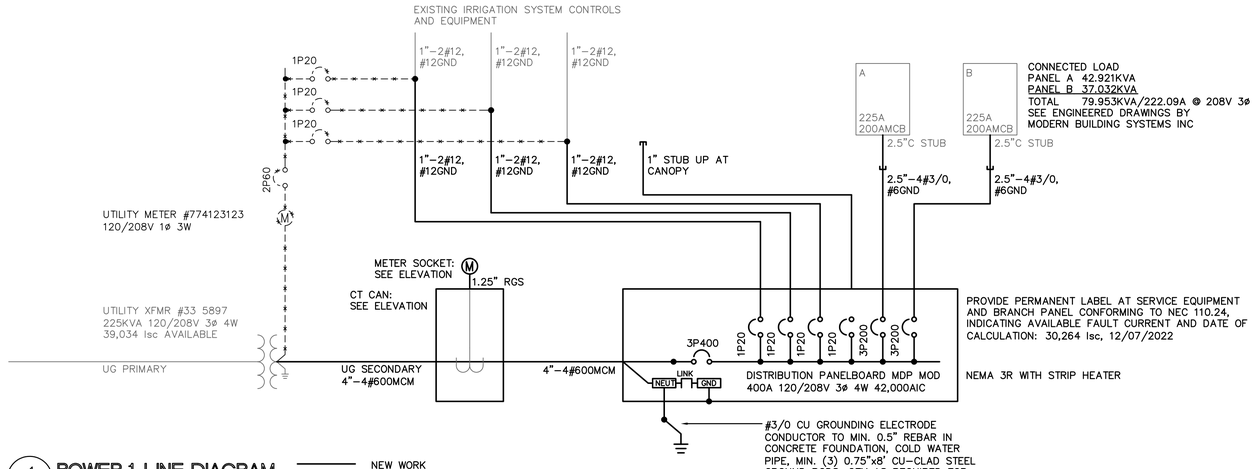
ELECTRICAL LEGEND

———	NEW WORK
———	EXISTING OR BY OTHERS
—*—*—	EXISTING TO BE REMOVED
	PANELBOARD, 120/208V 3ø 4 WIRE
(J)	JUNCTION BOX, SIZE PER N.E.C.
(E)	MAKE CONNECTION TO EQUIPMENT FURNISHED BY OWNER OR UNDER ANOTHER DIVISION: CONFORM TO SECTION 260575
C.O.	CONDUIT ONLY, WITH PULL WIRE
I.D.F.	INTERMEDIATE DISTRIBUTION FRAME
O.H.	OVERHEAD
P.B.B.	PRIMARY BONDING BUSBAR
R.B.B.	RACK BONDING BUSBAR
T.B.C.	TELECOMMUNICATIONS BONDING CONDUCTOR
T.E.B.C.	TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR
U.G.	UNDERGROUND
U.N.O.	UNLESS NOTED OTHERWISE
W.P.	WEATHERPROOF



2 E0.01 **METER ELEVATION** 1/2" = 1'-0"

1/2"=1'-0" scale 1' 0 1' 2' 3' 4' 5' feet



1 E0.01 **POWER 1-LINE DIAGRAM** SCHEMATIC

——— NEW WORK
——— EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
—*—*— EXISTING TO BE REMOVED

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and
architecture, llc.

426 a street
ashland, or 97520
tel.: 541.591.9988

Douglas Engineering Pacific Inc.
415 Williamson Way, Suite 7
Ashland OR 97520

541-482-3938
808-528-4228

www.douglasengineering.com

REGISTERED PROFESSIONAL ENGINEER 16 OREGON JULY 20, 1993 DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title

Electrical Legends and Notes

Drawing No.

E0.01

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Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2023\22-012 \ Table Rock Elementary School Modular Classroom\22-012 e legends and notes.dwg Mar 25, 2023 - 9:27am

FIRE ALARM NOTES

1 PROVIDE A NEW MANUAL AND AUTOMATIC FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72; CONNECT TO OR INTEGRATE AS A SUB-SYSTEM INTO THE EXISTING ADJACENT MANUAL AND AUTOMATIC FIRE ALARM SYSTEM. SEE SYSTEM INTEGRATION NOTES 5a, 5b, THIS SHEET. TEST FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72 AND LOCAL FIRE DEPARTMENT REQUIREMENTS.

2. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED ENGINEERED SYSTEMS DISTRIBUTOR FOR SPECIFIED SYSTEM WITH 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF PROJECT.

3. SUBMITTALS: PROVIDE PRODUCT DATA, CALCULATIONS, AND COMPLETE RISER DIAGRAM AND LAYOUT DRAWINGS SHOWING ALL INTERCONNECT WIRING AND EQUIPMENT.

4. PROVIDE BATTERY CAPACITY SUFFICIENT TO OPERATE SYSTEM IN SUPERVISORY MODE FOR 24 HRS FOLLOWED BY ALARM MODE FOR 5 MINUTES.

5. MANUFACTURER: SILENT KNIGHT

6. FIRE ALARM PANEL: MICROPROCESSOR-CONTROLLED, POWER-LIMITED, ELECTRONICALLY-SUPERVISED, ANALOG ADDRESSABLE WITH MULTIPLEXED DATA TRANSMISSION AND SUPERVISORY, ALARM, CONTROL AND ANNUNCIATOR FUNCTIONS, FIELD PROGRAMMABLE AND EXPANDABLE BY MODULES, LCD ALPHANUMERIC DISPLAY. SEE SYSTEM INTEGRATION NOTES 5a, 5b, THIS SHEET. INCLUDE DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT) UNDER OPTION B.

7. AUDIBLE-VISIBLE INDICATING APPLIANCE: HIGH PERFORMANCE HORN, 85DBA AT 10' WITH VISIBLE STROBE AND FLASHER, RED LETTERED "FIRE" ON WHITE LENS, SYNCHRONIZING TYPE. CANDELAS NOTED.

8. AUDIBLE INDICATING APPLIANCE: HIGH PERFORMANCE HORN, 85DBA AT 10' .

9. VISUAL INDICATING APPLIANCE: VISIBLE STROBE AND FLASHER, RED LETTERED "FIRE" ON WHITE LENS, CANDELAS NOTED, SYNCHRONIZING TYPE.

10. MANUAL PULL STATION: ADDRESSABLE DOUBLE ACTION TYPE WITH KEY RESET, SEMI-FLUSH MOUNTED.

11. SMOKE DETECTOR: ADDRESSABLE ANALOG PHOTOELECTRIC TYPE WITH TWO LED INDICATORS, TWIST-LOCK BASE.

12. HEAT DETECTOR: ADDRESSABLE COMBINATION FIXED TEMPERATURE/RATE OF RISE COMPENSATED TYPE WITH TWO LED INDICATORS, TWIST-LOCK BASE.

13. DUCT SMOKE DETECTOR: ADDRESSABLE ANALOG PHOTOELECTRIC TYPE WITH SAMPLING TUBES EXTENDING WIDTH OF DUCT, LED INDICATOR, DUCT-MOUNTED HOUSING.

14. MONITOR MODULE: ADDRESSABLE MODULE TO CONNECT A SUPERVISED SIGNALLING LINE CIRCUIT TO NORMALLY-OPEN CONTACTS ON CONVENTIONAL DEVICES; MOUNTS TO 4" SQUARE BOX.

15. CONTROL MODULE: ADDRESSABLE MODULE TO CONNECT A SUPERVISED SIGNALLING LINE CIRCUIT TO NORMALLY-OPEN CONTACTS ON CONVENTIONAL DEVICES; MOUNTS TO 4" SQUARE BOX.

16. LOCKDOWN/POLICE CALL BUTTON: STI #SS24A1LD-EN SERIES W/ LETTERS "POLICE", INCLUDE ADDRESSABLE MONITOR MODULE IN BACKBOX.

17. FIRE ALARM CABLE SHALL BE UL LISTED FOR USE WITH THE SYSTEM INSTALLED. ALL FIRE ALARM CABLE SHALL BE IN CONDUIT OR FREE IN ACCESSIBLE CEILING USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY NEEDED EXPOSED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

18. PROVIDE LINE-GROUND SURGE PROTECTION FOR SIGNALING LINE CIRCUITS ENTERING BUILDINGS FROM THE EXTERIOR. 20KA SURGE CURRENT RATING, 5A MAX CONTINUOUS CURRENT, 200kbps - 2Mbps DATA RATE. DITEK SURGE PROTECTION # DTK-2MHLPB SERIES W/ ACCESSORIES OR APPROVED EQUAL.

FIRE ALARM LEGEND

- (?) SMOKE DETECTOR, CEILING MOUNTED
- [P] MANUAL PULL STATION, MOUNTED +48" TO TOP
- [L] LOCKDOWN/POLICE CALL BUTTON, MOUNTED +48" TO TOP
- AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- VISIBLE INDICATING APPLIANCE, MOUNTED AT +80", OR AT 6" BELOW CEILING, WHICHEVER IS LOWER
- AUDIBLE & VISIBLE INDICATING APPLIANCE, MOUNTED AT +80", OR AT 6" BELOW CEILING, WHICHEVER IS LOWER
- AUDIBLE INDICATING APPLIANCE, CEILING MOUNTED
- VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- AUDIBLE & VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- [M] [C] MONITOR OR CONTROL MODULE

INTERCOM/PA SYSTEM NOTES

1. EXTEND THE EXISTING CAMPUS INTERCOM/PUBLIC ADDRESS SYSTEM IN ACCORDANCE WITH NFPA 70.
2. MANUFACTURER: BOGEN
3. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED DISTRIBUTOR FOR SPECIFIED SYSTEMS WITH MIN. 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF THE PROJECT.
4. SUBMITTALS: PROVIDE COMPLETE SYSTEM DESIGNS INCLUDING CERTIFICATIONS, PRODUCT DATA, PLANS, SCHEDULES, DETAILS, AND WIRING DIAGRAMS SHOWING ALL EQUIPMENT, DEVICES AND INTERCONNECT WIRING. INCLUDE A CABLE IDENTIFICATION SYSTEM.
5. INTERCOM/PA SYSTEM CABLE SHALL BE AS DETERMINED BY SYSTEM VENDOR. CABLE SHALL BE IN CONDUIT OR FREE IN ACCESIBLE CEILING SPACE USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

INTERCOM/PA SYSTEM LEGEND

- (S)ICF INTERCOM SPEAKER, FLUSH CEILING OR FLUSH WALL MOUNTED AT +84" U.N.O; PROVIDE (1) CABLE TO EQUIPMENT IN IDF.
- (S)ICS INTERCOM SPEAKER, SURFACE CEILING OR SURFACE WALL MOUNTED AT +84" U.N.O.; PROVIDE (1) CABLE TO EQUIPMENT IN IDF.
- (S)PF PAGING SPEAKER, FLUSH CEILING OR FLUSH WALL MOUNTED AT +84" U.N.O.; PROVIDE COMMON CABLE FOR ALL PAGING SPEAKERS TO EQUIPMENT IN IDF.
- (S)PS PAGING SPEAKER, SURFACE CEILING OR SURFACE WALL MOUNTED AT +84" U.N.O;. PROVIDE COMMON CABLE FOR ALL PAGING SPEAKERS TO EQUIPMENT IN IDF.
- (H) OUTDOOR HORN, SURFACE WALL MOUNTED AT +96"; PROVIDE COMMON CABLE FOR ALL OUTDOOR HORNS TO EQUIPMENT IN IDF ROOM.
- [B] IP CALL SWITCH, SURFACE WALL MOUNTED AT +48" U.N.O.; PROVIDE (1) CABLE TO INTERCOM SPEAKER IN SAME ROOM.

INTRUSION DETECTION NOTES

1. EXTEND THE EXISTING CAMPUS INTRUSION DETECTION AND VIDEO SURVEILLANCE SYSTEMS IN ACCORDANCE WITH NFPA 70.
2. SYSTEM MANUFACTURER: SONITROL.
3. SYSTEM SUPPLIER AND INSTALLER: AUTHORIZED DISTRIBUTOR FOR SPECIFIED SYSTEMS WITH MIN. 15 YEARS DOCUMENTED EXPERIENCE AND SERVICE FACILITIES WITHIN 150 MILES OF THE PROJECT.
4. SUBMITTALS: PROVIDE COMPLETE SYSTEM DESIGNS INCLUDING CERTIFICATIONS, PRODUCT DATA, PLANS, SCHEDULES, DETAILS, AND WIRING DIAGRAMS SHOWING ALL EQUIPMENT, DEVICES AND INTERCONNECT WIRING. INCLUDE A CABLE IDENTIFICATION SYSTEM.
5. INCLUDE ALL SOFTWARE, PROGRAMMING, TESTING, LICENSING FOR FUNCTIONING SYSTEMS
6. POWER & CONTROL CABLE: AS DETERMINED BY SYSTEM VENDOR.
7. NETWORK CABLE: AS DETERMINED BY SYSTEM VENDOR.
8. CABLE SHALL BE IN OR CONDUIT OR FREE IN ACCESSIBLE CEILING SPACE USING J-HOOKS. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

INTRUSION DETECTION LEGEND

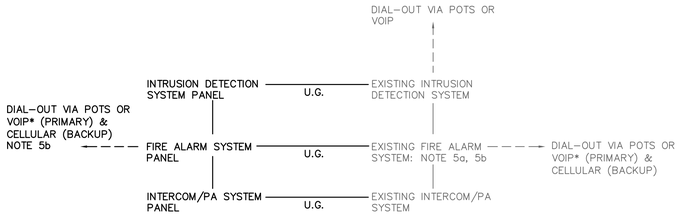
- (K) INTRUSION DETECTION KEYPAD, WALL MOUNTED AT +42" TO CENTER: PROVIDE CABLE TO INTRUSION DETECTION CONTROL PANEL.
- (M) MAGNETIC DOOR CONTACT (POSITION SENSOR): PROVIDE CABLE TO INTRUSION DETECTION CONTROL PANEL.

CCTV NOTES

1. VIDEO SURVEILANCE SYSTEM EQUIPMENT IS OWNER-FURNISHED, OWNER-INSTALLED.
2. SYSTEM MANUFACTURER: VERKADA.
3. CABLE SHALL BE IN OR CONDUIT OR FREE IN ACCESSIBLE CEILING SPACE USING J-HOOKS.MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. INSTALL CABLE AND ANY ADDITIONAL NEEDED CONDUIT PER APPROVED MANUFACTURER'S SHOP DRAWINGS.

CCTV LEGEND

- IP CAMERA, WALL OR CEILING MOUNTED W/ INDOOR OR OUTDOOR DOME AS REQUIRED: PROVIDE (1) CAT 6 CABLE TO EQUIPMENT IN IDF. MOUNT EXTERIOR CAMERAS AT +12'



INTEGRATION OF LOW VOLTAGE SYSTEMS

SCHEMATIC

* NFPA 72 NOW ALLOWS VOIP VS POTS FOR DIAL-OUT CONDITIONS: THE CABLED CONNECTION MUST BE TO A PUBLIC SWITCHED TELEPHONE NETWORK (PSTN) USING MANAGED FACILITIES-BASED VOICE NETWORKS (MFVN) OPERATED BY THE TELEPHONE SERVICE PROVIDER, FOR RELIABILITY. THE SERVICE PROVIDER FACILITIES MUST HAVE MINIMUM 8-HOUR STANDBY POWER.

1. INTERCOM/PA SYSTEM WILL ACCEPT INPUT FROM THE TELEPHONE SYSTEM.
2. INTERCOM/PA SYSTEM WILL BE USED FOR MASS NOTIFICATION DURING A LOCKDOWN EVENT.
3. FIRE ALARM SYSTEM WILL OVERRIDE THE INTERCOM/PA SYSTEM UNDER FIRE ALARM CONDITION.
4. FIRE ALARM SYSTEM WILL MONITOR THE INTRUSION DETECTION SYSTEM AS A SUPERVISORY CONDITION.

5a OPTION A) NETWORK THE NEW FIRE ALARM PANEL TO A NEW SILENT KNIGHT MULTIPLEXED ADDRESSABLE SYSTEM WITH NETWORK CAPABILITIES LOCATED IN THE MID-CAMPUS OFFICE BUILDING. SEE SITE PLAN DRAWINGS. USE THE EXISTING UNDERGROUND TELECOMMUNICATIONS CONDUITS LINKING BUILDINGS. THE NEW PANEL SHALL FUNCTION AS AN EXTENSION OF THE MAIN SYSTEM.

5b OPTION B) PROVIDE DACT AND DIAL-OUT. CONNECT THE NEW FIRE ALARM SUB-PANEL TO THE EXISTING SILENT KNIGHT 5808 MULTIPLEXED ADDRESSABLE SYSTEM LOCATED IN THE WEST CAMPUS MAIN ELECTRICAL ROOM, WITH MONITOR AND CONTROL CIRCUITS. SEE SITE PLAN DRAWINGS. USE THE EXISTING UNDERGROUND TELECOMMUNICATIONS CONDUITS LINKING BUILDINGS. THE SYSTEMS SHALL MONITOR EACH OTHER'S STATUS AS SUPERVISORY CONDITIONS.

TELECOMMUNICATIONS GROUNDING NOTES

1. GROUNDING: PROVIDE A COMPLETE TELECOMMUNICATIONS GROUNDING SYSTEM CONFORMING TO ANSI-J-STD-607-A.
2. PROVIDE A COPPER PRIMARY BONDING BUSBAR (PBB) AT THE IDF WITH A #3/0 COPPER TELECOMMUNICATIONS BONDING CONDUCTOR (TBC) TO THE BUILDING ELECTRICAL SERVICE GROUND. PROVIDE 3' COIL OF SPARE CONDUCTOR AT PBB
3. BOND THE EQUIPMENT RACK WITH A #2/0 COPPER TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR (TEBC) TO THE PBB.
3. BOND CABLE TRAY, AND RACEWAY ENTERING THE IDF, WITH A #6 COPPER TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR (TEBC) TO THE PBB.

TELEPHONE/LAN NOTES

1. INSTALL TELECOMMUNICATIONS CABLING SYSTEM IN ACCORDANCE WITH NFPA 70 AND APPLICABLE TIA/EIA AND UL GUIDELINES.
2. SYSTEM DESIGNER AND INSTALLER: LICENSED TELECOMMUNICATIONS CONTRACTOR WITH MINIMUM 15 YEARS EXPERIENCE, REGISTERED AS CABLING SYSTEM INSTALLERS, NICET TECHNICIAN LEVEL IV.
3. SUBMITTALS: PROVIDE PRODUCT DATA, CALCULATIONS, AND COMPLETE RISER DIAGRAM AND LAYOUT DRAWINGS SHOWING ALL INTERCONNECT WIRING AND EQUIPMENT. INCLUDE A CABLE IDENTIFICATION SYSTEM.
4. GROUNDING, RACKS, CABLE TRAY, DEVICES, CABLE AND PATCH PANELS ARE CONTRACTOR-FURNISHED, CONTRACTOR-INSTALLED INCLUDING CABLE TERMINATIONS.
5. TELEPHONE/LAN EQUIPMENT (SWITCHES, SERVERS, ROUTERS) IS OWNER-FURNISHED, OWNER-INSTALLED. CONNECTIONS FROM PATCH PANELS TO EQUIPMENT WILL BE BY OWNER.
6. POWER SUPPLIES, CONDUIT AND BACKBOXES ARE FURNISHED AND INSTALLED AS PART OF THE MODULAR BUILDING.
7. EQUIPMENT RACK: 2-POST RACK, FLOOR MOUNTED, 7'H x 19"W x 6"D, 45U. TRIPP LITE # SR2POST WITH # SRCABLERING VRT CABLE MANAGERS
8. CABLE LADDER IN IDF ROOM: 12" WIDE x 1,5" DEEP WITH CROSS MEMBERS AT 12" INTERVALS. TRIPP LITE # SRCABLELADDER WITH #SRLADDERATTACH
9. PROVIDE LIU AND PATCH PANELS IN THE EQUIPMENT RACK FOR TERMINATION OF FIBER OPTIC AND COPPER NETWORK CABLE.
9. PROVIDE 12-STRAND SINGLE MODE FIBER OPTIC CABLE FROM THE IDF IN THE ADJACENT GYM BUILDING TO THE NEW IDF. INSTALL FIBER OPTIC CABLE IN INNERDUCT.
10. PROVIDE INNERDUCT IN EACH UNDERGROUND BACKBONE CONDUIT.
11. TELEPHONE/LAN CABLE SHALL BE IN CONDUIT OR IN J-HOOKS IN ACCESSIBLE CEILING SPACE. MODULAR BUILDING INCLUDES CONDUIT CONCEALED IN WALLS. PROVIDE ADDITIONAL CONDUIT WHERE REQUIRED TO PROTECT WIRING.
12. PENETRATIONS THROUGH WALLS: USE GRS CONDUIT OR EMT, SIZE AND QUANTITY AS INDICATED ON PLANS.
13. CONDUIT PENETRATIONS THROUGH FIRE-RATED WALLS AND SLABS: SEAL TO MAINTAIN THE INTEGRITY OF THE FIRE RATING, USING A UL LISTED FIRE RATED SYSTEM.
14. CONDUIT PENETRATIONS THROUGH SEISMIC GAPS: TRANSITION FROM GRS CONDUIT OR EMT TO LIQUIDTIGHT FLEXIBLE CONDUIT; PROVIDE SUFFICIENT SLACK CONDUIT AND CABLE TO ALLOW FOR MOVEMENT.

TELEPHONE/LAN LEGEND

- ▽# TEL/DATA OUTLET AT +17" TO CENTERLINE U.N.O.: PROVIDE # OF RJ45-A JACKS AND CAT 6A CABLES TO IDF AS INDICATED
- ▽# TEL/DATA OUTLET, CEILING MOUNTED: PROVIDE # OF RJ45-A JACKS AND CAT 6A CABLES TO IDF AS INDICATED
- ▽ HDMI OUTLET AT +17" TO CENTERLINE U.N.O.: PROVIDE CLASS 2 CAT 3 8K 60Hz HDMI CABLE WITH TYPE A CONNECTORS BETWEEN OUTLETS IN EACH CLASSROOM AS INDICATED ON PLANS
- 2-POST RACK, FLOOR MOUNTED

TABLE ROCK ELEMENTARY SCHOOL

2830 Maple Court
White City, OR 97503

arkitek:
design and architecture, llc.
426 a street
ashland, or 97520
tel.: 541.591.9988

Douglas Engineering Pacific Inc.
415 Williamson Way, Suite 7
Ashland OR 97520
541-482-3938
808-528-4228
www.douglasengineering.com

REGISTERED PROFESSIONAL ENGINEER 16
OREGON
JULY 20, 1993
DOUGLAS A. BUHR
EXPIRES: 12-31-23

Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title

Electrical Legends and Notes

Drawing No.

E0.02

Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2022\22501 Table Rock Elementary School Modular Classroom\22501 e legends and notes.dwg Mar 25, 2023 - 9:28am

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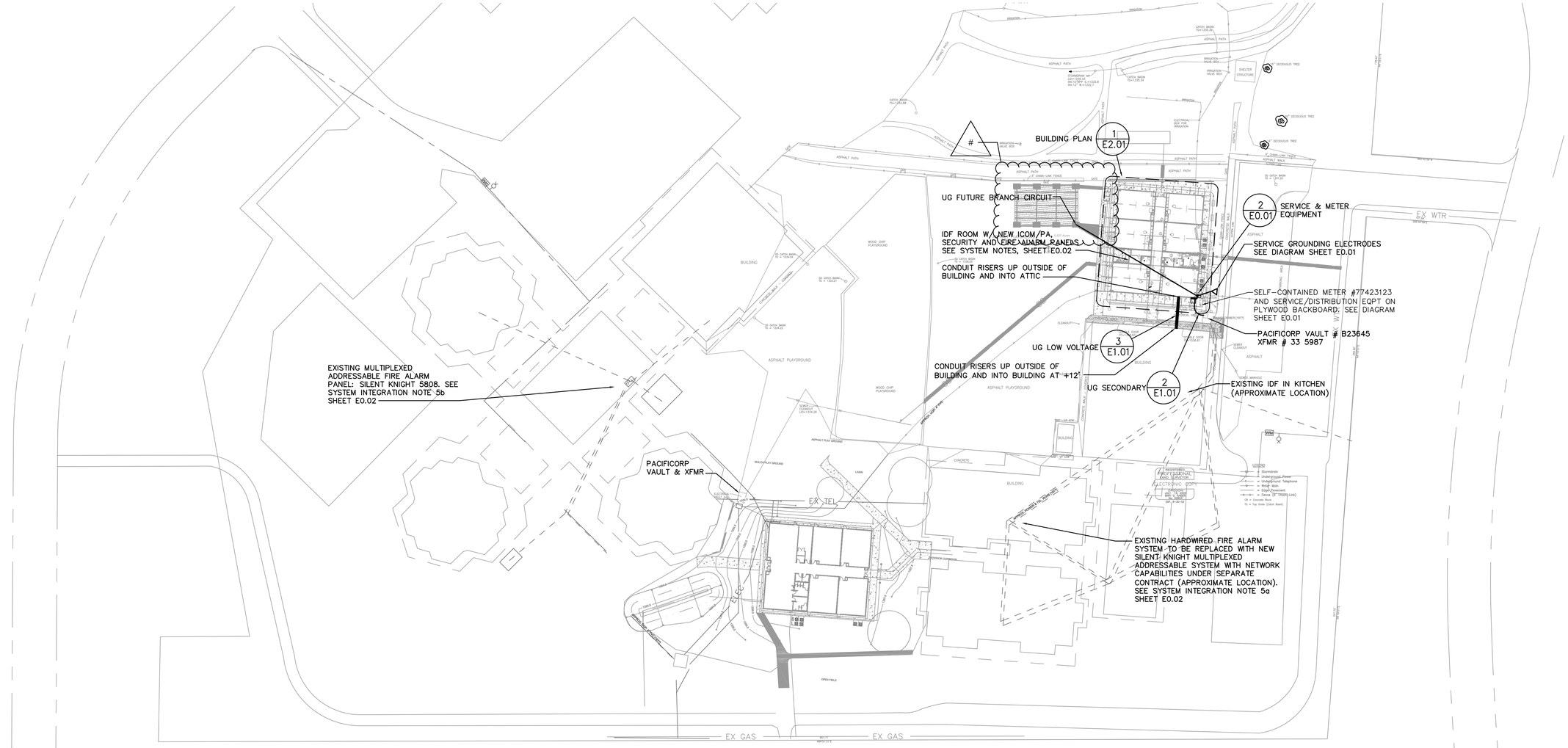
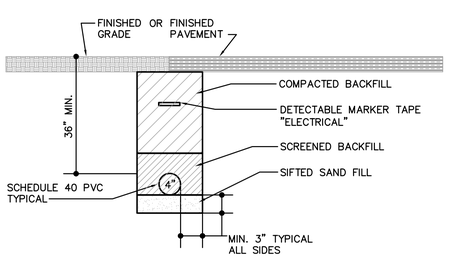


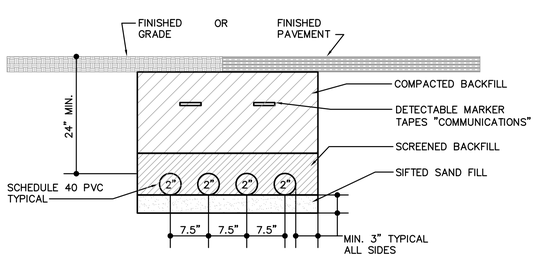
1 E1.01 **SITE PLAN - ELECTRICAL**
1" = 50'-0"

NEW WORK
EXISTING OR DESCRIBED ELSEWHERE IN THESE DOCUMENTS
EXISTING TO BE REMOVED

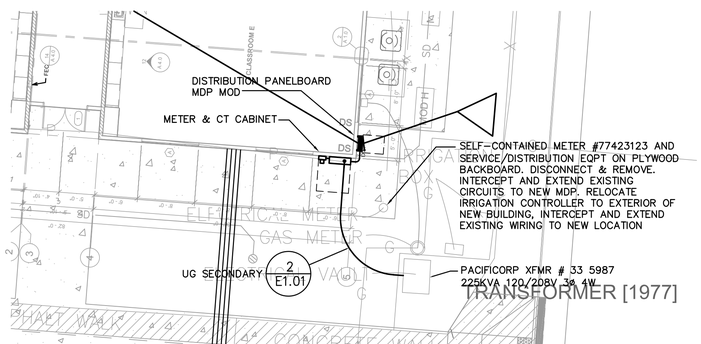
1"=50'-0" 50' 25' 0 50' 100' scale feet



2 E1.01 **SECONDARY POWER DUCT BANK SECTION**
NO SCALE



3 E1.01 **LOW VOLTAGE DUCT BANK SECTION**
NO SCALE OWNER IT, INTERCOM/PA, SECURITY, FIRE ALARM



4 E1.01 **ENLARGED SITE PLAN**
1" = 10'-0"

1"=10'-0" 10' 5' 0 10' 20' scale feet

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White City, OR 97503

arkitek:
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REGISTERED PROFESSIONAL ENGINEER
OREGON
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Revision	Date

Date	03/29/2023
Job	22-012
Drawn By	MKH
Checked By	DAB
Scale	As Noted

100% CD

Drawing Title
Site Plan - Electrical

Drawing No.
E1.01

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Drawing name: C:\Douglas Engineering Pacific, Inc\Projects - 2023\22001 Table Rock Elementary School Modular Classroom\22001e site.dwg Mar 23, 2023 9:30am

STRUCTURAL GENERAL NOTES

GENERAL REQUIREMENTS

1. Codes and Standards
   A. Design of new elements conforms to the 2019 State of Oregon Edition Structural Specialty Code (OSSC) based on the 2018 Edition International Building Code (IBC). All reference to other codes such as ACI, ASTM, etc. shall be the edition as adopted by the OSSC.

2. Contractor Responsibilities
   A. The General Contractor (GC) is responsible for carrying out the requirements of these documents through the use of their own efforts or that of sub-contractors.
      The GC is responsible for all construction methods, techniques, sequencing, and safety required to complete construction. All instructions contained in these documents are interpreted to be instructions to the GC and are the responsibility of the GC to fulfill.
   B. Verify existing conditions prior to proceeding with construction. Immediately bring discrepancies to the attention of the Engineer of Record (EOR).
   C. Measure dimensions of any existing structures associated with the work and coordinate with required dimensions for new construction. Drawing scales are indicated for reference to assist with clarifying the work and providing proportions that resemble actual conditions. Do not measure drawings for construction. Use text dimensions provided. Request unknown dimensions from the Architect or Engineer with sufficient lead time to prevent construction delay.
   D. Arrange for, and coordinate work by trades and suppliers. Facilitate required inspections, special inspections and tests specified by contract documents, Building Code and permit. Where coverings or work conceals items or areas to be inspected prior to satisfactory approval, the GC is responsible for removal and replacement of coverings or work as necessary without cost to the owner or Engineer.
   E. Shop drawings are required for the following items:

DRAWINGS REQ'D IF MARKED	ITEM	ENGINEERS STAMP REQ'D IF MARKED
[ ]	Reinforcing Steel	[ ]
[●]	Structural Steel	[●]

      1. Submit shop drawings for review, for each material indicated, prior to construction. Shop drawings do not replace or supercede the requirements of the structural drawings. Special inspection shall be based on the structural drawings. Any discrepancy between the shop drawings and structural drawings shall be reported to the EOR by the contractor and by the special inspector for items that require inspection.
   F. This structure must be fully braced for wind and seismic loads during construction (see item 2A above). Contractor provided bracing must remain in place until the permanent lateral force resisting system of the structure is completed.
   G. Where/if construction occurs around existing structures, protect existing footings from being undermined. Provide engineered shoring as necessary to protect existing structures. Repair damage, where caused by construction activity, to existing structures.
   H. Install items manufactured or supplied by others per the manufacturers specifications.
   I. Where details of construction are not explicitly shown, provide materials and construction of the same type and character as that of similar conditions used on the project. The actual details used shall be submitted to the Engineer for approval prior to ordering materials or beginning construction.
   J. Any conflict or discrepancy shall be brought to the attention of the Engineer of Record (EOR) for clarification and resolution prior to ordering materials or beginning construction.

3. General Contractor Warranty Requirements
   A. By acceptance of this project the General Contractor (GC) warrants that:
      1. The GC and subcontractors hired by the GC have carefully and thoroughly reviewed the drawings and structural notes and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
      2. The GC has carefully examined the work site and that from those investigations is satisfied as to the nature and location of the work, as to the character, quality, quantities of material, and difficulties to be encountered, as to the extent of equipment and other facilities as needed for the performance of the work, and as to the general and local conditions, and other items which may affect the work or its performance; further that
      3. The GC and all workers are experienced in the type of construction represented by the drawings and documents; further that
      4. Neither the GC or their employees, agents, intended suppliers, or subcontractors, have relied upon verbal representations allegedly authorized or unauthorized from the owner or their employees or agents, including the Engineer of Record.
   B. Bring discrepancies to the attention of the Engineer of Record at least 10 days prior to close of bid.
      1. The GC warrants that construction cost for items not brought to the attention of the Engineer of Record (EOR) prior to bid, but that require clarification or EOR assistance during construction, will be covered by the bid amount agreed to by the GC. See item 2I above.

4. Design Loads
   A. Roof Loads
      Total Dead Load = 7 psf
      Snow Load (Min Pg, Pf) = 20 psf
   B. Wind Load
      Basic Wind Speed = 96 mph (3-second gust)
      Exposure = C
   C. Seismic Load
      Importance Factor, Ie = 1.00
      Risk Category = II
      Mapped Spectral Response Accelerations:
      Ss = 0.611g, S1 = 0.352g
      Soil Site Class = D
      Spectral Response Coefficients:
      Sds = 0.554g
      Seismic Design Category (SDC) = D
      Seismic-force-resisting system(s): Cantilevered Steel Columns
      Response Modification Factor, R = 2.5
      Analysis Procedure Used: Equivalent Lateral Force

5. Equipment and Non-structural Components:
   A. Determine actual equipment and non-structural component weights, locations, and sizes supplied for this project. Notify Engineer if weights exceed allowances noted on structural plans and if equipment footprints are reduced from that shown on plans.
   B. For equipment and non-structural components weighing more than 400 lbs., prepare and submit seismic anchorage calculations and details sealed and signed by a professional Engineer registered in the State where this project is built.
   C. Coordinate between subcontactors to insure that:
      1. Additional secondary framing is provided as required. Design of equipment supports and secondary framing by the vendor's engineer shall conform to IBC requirements.
      2. Edges of decking are supported at all openings. Deck penetrations are made and reinforced to conform to deck vendors reinforcing recommendations.
      3. Openings, penetrations and accessories are located to avoid interference with structural elements.
      4. Pre-engineered elements are designed to support all weights and forces.
   D. Brace equipment and accessories per SMACNA Seismic Restraint Manual. Unusual ductwork, piping, or conduit configurations that fall outside of SMACNA minimum limits should be securely restrained to prevent movement.
   E. Brace suspended ceilings per ASTM E580 / E580M.

INSPECTION AND TESTING

1. Construction
   A. Construction will be inspected as required by the IBC as described in the Special Inspection Schedule. Special inspections and/or structural observations do not replace Building Code Section 110 inspections by the building inspector.
   B. Items noted as requiring special inspection in accordance with IBC Chapter 17 shall be performed by a qualified person who can demonstrate certification for the particular type of construction being inspected. The Special Inspection agency shall be independent from Contractors or Suppliers related to the job. The Engineer or Record retains the right to reject, for any reason, the agency chosen for the job.
   C. The Special Inspector shall not be hired by the Contractor. The Owner or an independent agent of the Owner shall hire the Special Inspector.
   D. Special Inspection is required per the Special Inspection Program, and/or as noted by design drawings, and shall be performed as required by Building Code Section 1704.
2. Site Preparation
   A. Remove vegetation, existing fill and any organic material until non-organic sub-grade soils are exposed. Remove material to a level at least eight inches below the existing grade. Roll three passes over the building area with a heavy vibratory roller. Extend rolled area at least five feet outside the perimeter footing line. Over-excavate any areas that the Geotechnical Engineer determines to exhibit excessive deflection. Place structural fill to replace removed material per the following section.
3. Structural Fill and Compaction
   A. Place structural fill and/or backfill after removal of forms, screeds, other wood debris and material subject to decay or corrosion. Use only materials approved by the Geotechnical Engineer for fill. Limit fill to clean, granular material, placed in loose 8 inch lifts and determined by ASTM D1557 compaction test procedure. Verification of compaction will be done by random field density tests per the Special Inspection Schedule. Use light-weight hand operated equipment to compact fill within 6 feet behind walls. For any site, follow the recommendations of the Geotechnical Report in place of requirements specified here.

FOUNDATIONS

1. Obtain and review the Geotechnical Investigation (Soils) Report, prepared by Applied Geotechnical Engineering (Geotechnical Engineer of Record), dated March 30, 2023, to determine site construction requirements. Prepare bids to reflect work required by the Soils Report.
2. Specified design parameters:
   a. Soil bearing
      Dead + Live 2500 psf
      Dead + Live + EQ/Wind 3300 psf
3. Contact Geotechnical Engineer for site visit after site excavation but prior to any foundation construction. Site visit is to verify adequacy of actual soil conditions and for special inspections required to satisfy IBC requirements related to soils, structural fill, and/or backfill.
4. Place footings & slabs on compacted fill as directed by the soils report or Geotechnical Engineer. Footings may be placed on fine original material as approved by the Geotechnical Engineer during a site visit.
5. Center footings on walls or columns above unless noted otherwise on plans or sections.
6. Place backfill behind walls after wall material attains its design strength and no sooner than 7 days after placement of concrete or grout. For retaining walls, use only backfill material that is free draining granular fill free of fines, silt or clay and approved by the Geotechnical Engineer. Install and compact backfill in conformance with the geotechnical report requirements. GC is responsible for bracing walls during backfill operations. Protect walls from movement or damage due to backfilling operations. At contractors expense, replace walls damaged or displaced by improper backfilling operations.

REINFORCED CONCRETE

1. Concrete
   A. The American Concrete Institute- ACI 318 "Building Code Requirements for Structural Concrete" governs concrete materials and construction for this project. Acceptance of concrete is based on this code.
   B. Use concrete with properties listed in the following table. All concrete strengths listed are the minimum strength. Submit statistical backup for mix designs along with mix design proportions for review. The Contractor is expected to know and follow standards of practice for formwork, mixing, placing, curing, cold and hot weather concreting and other relevant practices as described by ACI in the most current "ACI Manual of Concrete Practice".
   C. Take a minimum of 3 concrete test cylinders as required by the Special Inspection Program. Break one cylinder after 7 days and two cylinders after 28 days. Take additional cylinders as required by the Special Inspection Program. Hold additional cylinders to be broken if problems arise with test strength at 28 days.
   D. Do not place concrete on frozen ground.
   E. Do not place electrical, mechanical, plumbing or similar conduits in slabs, walls or columns, or within 6 inches of the bottom of slabs on grade without prior approval from the Engineer.
   F. Roughen all construction joints to a minimum amplitude of 1/4". Coarseness of amplitude shall be a 1/4" variation every 1 inch or less. Roughness may be applied when wet or dry by use of a bushing hammer or similar device.

Location	Minimum Strength (psi)	Maximum W/C Ratio [1]	Maximum Slump [2]	Largest Aggregate Size Req'd	Air Entrainment	Maximum Water Content
Footings & Stemwalls	3000	0.58	4"	3/4"	2%	N/A

Notes:
1. Water cementitious materials ratio (W/C) includes all cement, other cementitious products used.
2. Slump is the maximum allowed prior to the addition of water reducing or plasticizing agents.
3. Cost of mid-range and high-range water reducers shall be included in bid price to increase workability as required.

2. Non-shrink Grout
   A. Non-shrink grout shall be non-metallic, non-shrink grout conforming to requirements of ASTM C1107, Type B or C, with a compressive strength of 5000 psi in 7 days. Acceptable products are Masterflow 928, Sonogrout 10k and Five Star Instant Grout or approved alternative.

3. Reinforcing Steel (Rebar)
   A. Fabricate, detail, and place in accordance with Building Code (Note 1.A) supplemented by the following:
      ACI 318 Building Code Requirements for Structural Concrete.
      ANS D1.4 Structural Welding Code-Reinforcing Steel.
   B. Materials UNO
      Deformed bar reinforcement ASTM A615 GR 60
      Welded deformed bar reinforcement ASTM A706 GR 60
      Welded wire fabric (flat sheets) ASTM F 2453
   C. Field Bent Bars (#5 and smaller) ASTM A706. ASTM A615 reinforcing bars #5 and smaller may be field bent one time during construction. Bending a bar out of the way and back may be bent two times maximum. Field bending for #6 and larger requires specific approval by Engineer.
   D. Welding electrodes shall conform to matching filler metal requirements defined by ANS D1.4 Matching Filler Metals Requirements.
   E. Where welding of reinforcing is specified, bars shall conform to ASTM A706. Do not weld reinforcing steel unless specified by design or without authorization of the Engineer.
   F. Do not tack-weld reinforcing steel.
   G. Support reinforcement with approved chairs, spacers, or ties. All concrete slab reinforcing steel shall be supported at the required heights by approved bolsters. All reinforcement and embeds shall be securely tied in-place and shall be capable of supporting the weight of any worker without dislodging.
   H. All structural anchor bolts shall be secured in place and inspected prior to delivery of concrete. Insertion of embedded items into wet concrete (wet setting) is prohibited unless approved prior to construction.
   I. In walls and slabs, place (2)-#5 bars around all openings and recesses unless noted otherwise. Extend these bars at least 2'-0" beyond the corner of the openings unless noted otherwise. Where bars cannot be extended 2'-0" beyond the opening, extend as far as possible and terminate the bar with a standard hook.
   J. In walls and slabs, place (2) #5 x2'-0" diagonal bars at the corners of all openings.
   K. At walls and footing intersections and corners, place corner bars same size and spacing as horizontal bars and lap splice (Ls) to horizontal bars.
   L. See typical details for bends and hooks, hoops, ties and corner bar conditions.
4. Reinforcing Protection (cover)
   A. Concrete deposited against earth: 3 inches.
   B. Formed concrete surfaces exposed to ground and weather:
      #5 and smaller bar - 1-1/2 inches
      #6 and larger bar - 2 inches
   C. Concrete surfaces not exposed to weather or in contact with the ground: #11 and smaller bar - 3/4 inches

   Lap Splice Length (Ls)

Bar [1, 3]	Ls "Top bars" [2]			Ls All Other Bars		
	3000 psi	3500 psi	4000 psi	3000 psi	3500 psi	4000 psi
#3	28"	26"	24"	22"	20"	19"
#4	37"	35"	32"	29"	27"	25"
#5	47"	43"	40"	36"	33"	31"
#6	56"	52"	48"	43"	40"	37"

Notes:
1. Bar shall be spaced at least three bar diameters center to center and shall have concrete cover of at least one bar diameter.
2. "Top bars" are horizontal bars with more than 12" of fresh concrete below splice.
3. Where different bar sizes are lap spliced, the required lap length is the Ls for the smaller bar and the required development length is the Ls for the bigger bar.

5. Construction Joints (C-J)
   A. Construction joints shall be located where specified or as approved by the Engineer.
   B. Construction Joints shall be made to transfer shear across the construction joint by intentionally roughening the surface to full amplitude of approximately 1/4 inch in two directions. Intentional roughening may be made while the initial placement is still plastic.
   C. Keyed construction joints may be used only when explicitly detailed.
6. Placement and Curing
   A. Concrete conveying, depositing and consolidation shall be performed in accordance with ACI-301. Mechanical vibration shall be mandatory for all elements 12" and deeper and in all post-tension slabs.
   B. Cure concrete with nater for at least 14 days. Other curing methods may be submitted to the engineer for approval prior to concrete placement. Regardless of approved curing method, the GC retains responsibility for improperly cured concrete and agrees to repair or replace such concrete at the engineer or architects discretion.
   C. Concrete shall be maintained above 50 degrees F for at least the first 7 days after placement.
   D. Contractor shall protect curing concrete against hot or cold weather effects. When air temperatures exceed or are expected to exceed 85 degrees F, concrete shall be moist cured and kept continuously wet.

STRUCTURAL STEEL

1. Codes and Specifications
   Detail, fabricate and erect in accordance with the following as adopted by the IBC (Note 1.A):
   A. AISC 341 (2016 Edition) "Seismic Provisions for Structural Steel Buildings"
   B. AISC 360 (2016 Edition) "Specifications for Structural Steel Buildings"
   C. ANS D1.1 (2011 Edition) "Structural Welding Code- Steel"
2. Structural steel material (UNO):
   W shapes: ASTM A992 or ASTM 572 Grade 50
   HSS tubing: ASTM A500, Grade C
   Pipe: ASTM A53, Grade B
   Angles & other shapes: ASTM A36
   Plate & bar stock: ASTM A36
3. Bolts
   A. High strength bolts shall be ASTM A325N with threads not excluded from the shear plane. Heavy Hex Nuts shall be ASTM A563 with ASTM F436 hardened washers, grade and finish to match bolt.
   B. High strength bolts are bearing connections and should be at least "snug tight".
   C. F959 compressible-washer-type direct-tension indicators or alternative load indicator bolts equivalent in strength shall be used for all bolted joints noted as slip-critical (SC) or tension loaded.
   D. All other bolts not designated as high strength or specified to be machine bolts (MB) shall be
      ASTM A307, Grade A bolts
      ASTM A563, Grade A hex nuts
      ASTM F844 steel washers
   E. Exterior bolts exposed to weather shall be zinc coated in accordance with ASTM A153 Class C.
4. Welds
   A. Weld Procedure Specifications (WPS) shall be prepared and submitted in accordance with ANS D1.1 for all welding subjected to Special Inspection requirements.
   B. Welding electrodes shall conform to ANS D1.1 table defining prequalified base metal-filler metal combinations for matching strength. Weld filler metal shall be 70 ksi minimum.
   C. End return fillet welds 2x nominal weld size wherever practical, unless noted otherwise.
   D. Minimum fillet weld size: See AISC Table J2.4 reproduced below:

Material Thickness of Thicker Part Joined (in.)	Minimum Leg Size of Fillet Weld (in.) (a)
To 1/4 inclusive	1/8
Over 1/4 to 1/2	3/16
Over 1/2 to 3/4	1/4
Over 3/4	5/16

   Notes:
   a. Single pass welds must be used.

5. Welded Headed Studs (WHS) shall be cold drawn bar stock conforming to ASTM A108, Grades 1010 through 1020, Type B with a minimum yield of 50 ksi or approved equal (ANS D1.1 Table 7.1, Type B). Provide appropriate ferrules and required accessories to accomplish the required automatic weld. Specified length is the nominal after welded length (AWL). Studs shall be welded with automatically timed stud welding equipment per ANS D1.1 Section 7.5
   A. Stud qualification shall conform to ANS D1.1 Section 7.6.
   B. Stud production control testing shall conform to ANS D1.1 Section 7.7.

6. Coatings
   A. Steel work concealed by interior building finish, or in contact with concrete need not be painted unless specified otherwise. In such cases, welding slag, dirt, and/or oil shall be removed by wire bushing or equivalent methods. Unpainted steel shall not be stored outside or allowed to rust before or during construction.
   B. Do not paint or coat welds until quality control inspections are performed.
   C. Surface preparations shall be performed to a level of cleanliness appropriate to the specified coating and consistent with coating manufacturer requirements.
   D. Where shop applied primer is required, the following areas shall not be coated.
      1. Within 2" of field weld locations. Coat after quality control inspections are completed.
      2. Steel items to be galvanized.

7. Erection
   A. Erection methods, sequencing and temporary support and bracing of structural steel shall be the Contractor's responsibility.
   B. Erection shall conform to the AISC "Code of Standard Practice", Section 7. All steel frames shall be considered "non-self supporting" unless noted otherwise or verified by the contractor's/erector's engineer.
   C. Column base plates and anchor bolts (fasteners) are designed for loads required of the completed structure after grouting. Column base plates and anchor bolts are not designed to withstand wind or other lateral loads on a partially completed structure.
   D. Anchor bolts are designed for loading after specified nonshrink grout is place and cured. Anchor bolts are designed for shear and/or tension forces and have not been engineered for compression loads associated with the use of leveling nuts.

METAL DECKING

1. Codes and Specifications
   Fabricate, detail, and place in accordance with 1A. above and the following:
   - AISI, "North American Standard for Cold-Formed Steel Framing", 2016 Edition.
   - SDI standard specification applicable to the deck specified.
   - ANS D1.3 "Structural Welding Code - Sheet Steel".
2. Roof Decking
   A. 'Galvalume' structural metal roof panels with exposed fasteners.
   B. Panel gauge: Minimum 24 gauge thickness.
   C. Panel width: 3'-0".
   D. Panel Length: Precut to the length from the eave to the ridge; angles factory precut.
   E. Panel Orientation: Ribs shall run with the pitch of the roof for proper drainage.
   F. Trim: Provide matching roof trim and fasteners.
   G. Finish: Factory pre-finished with 'Kynar 500' paint system; color to be selected by Owner from standard color chart.
3. Welding
   A. Welding shall conform to ANS D1.3 with E60XX or E70XX welding electrodes in conformance with decking ICBO report.
   B. Arc spot (puddle welds) shall be 5/8 inch (1/2 inch effective) diameter unless noted otherwise.

SEE SHEET S0.2 FOR SPECIAL INSPECTION REQUIREMENTS

STRUCTURAL SHEET INDEX

SHEET NO.	SHEET TITLE
S0.1	STRUCTURAL GENERAL NOTES
S0.2	SPECIAL INSPECTION SCHEDULES
S3.1	FOUNDATION PLAN & DETAILS
S3.2	ROOF FRAMING PLAN & DETAILS

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STRUCTURAL SOLUTIONS, INC.
305A Shafer Lane
Jacksonville, Oregon 97530
P: 541-608-8117
www.StructuralSolutionsInc.net

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 58623 OREGON RENEWS: DEC. 31, 2025 JASON N. PRINS

EXPIRES: 12/31/24

TABLE ROCK ELEMENTARY SCHOOL
COVERED OUTDOOR SPACE

2830 MAPLE COURT
WHITE CITY, OREGON

STRUCTURAL GENERAL NOTES

		REVISIONS				
JOB NO.	035-23					
ISSUE DATE	08-29-23					
DRAWN	JNP					
CHECKED	JNP					
FILE NAME	S-GEN					

SHEET
S0.1
OF 4 SHEETS

STEEL SPECIAL INSPECTION PROGRAM

(As required by IBC Chapter 17, Table 1705.2, AISC 360-16, AWS D1.1 & D1.4)

VERIFICATION & INSPECTION ITEM	CONTINUOUS INSPECTION	PERIODIC INSPECTION	REFERENCED STANDARD	IBC REFERENCE
1. Material verification of high-strength bolts, nuts and washers:				
a. Identification markings to conform to ASTM standards and specified in the approved construction documents		X	AISC 360, A3.3 applicable ASTM referenced standards	1705.2
b. Manufacturer's certificate of compliance required		X	---	---
2. Inspection of high strength bolting:				
a. Snug-tight joints			AISC 360 Section M2.5	1705.2
b. Pretensioned and slip-critical joints using turn-of-the-nut method with matchmarking, twist-off bolt or direct tension indicator methods of installation				
c. Pretensioned and slip-critical joints using turn-of-the-nut method without matchmarking or calibrated wrench methods of installation				
3. Material verifications of structural steel:				
a. For structural steel, identification markings to conform to AISC 360		X	AISC 360 Section N2.1	1705.2.1
b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents		X	Applicable ASTM material standards	1705.2.1
c. Manufacturer's certified test reports		X	---	---
4. Material verification of cold-formed steel deck:				
a. Manufacturer's certified test reports			---	---
5. Material verification of weld filler materials:				
a. Identification markings to conform to AWS specification in the approved construction documents		X	AISC 360, Section A3.5 and applicable AWS A5 documents	1705.2
c. Manufacturer's certificate of compliance required		X	---	---
6. Inspection of welding:				
a. Structural steel and cold-formed steel deck:				
1) Complete and partial joint penetration groove welds	X		AWS D1.1	1705.2.1
2) Multipass fillet welds	X			
3) Single-pass fillet welds > 5/16"	X			
4) Plug and slot welds	X			
5) Single-pass fillet welds < 5/16"		X		
6) Floor and roof deck welds		X	AWS D1.3	1705.2.2
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A706		X	AWS D1.4 ACI 318 Section 4.2.2	1705.2.1
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement				
3) Shear reinforcement	X			
4) Other reinforcing steel		X		
7. Inspection of steel frame joint details for compliance:				
a. Details such as bracing and stiffening			---	---
b. Member location				
c. Application of joint details at each connection				

GEOTECHNICAL SPECIAL INSPECTION PROGRAM

(As required by IBC Chapter 17, Table 1705.6)

VERIFICATION & INSPECTION ITEM	CONTINUOUS INSPECTION	PERIODIC INSPECTION
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity		X
2. Verify excavations are extended to proper depth and have reached proper material		X
3. Perform classification and testing of compacted fill materials		X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	X	
5. Prior to placement of compacted fill, observe sub-grade and verify site has been prepared properly		X

ABBREVIATIONS (UNO)

above	ABV
alternate	ALT
anchor bolt	AB
architectural	ARCH'L
base plate	BASE PL
beam	BM
bearing	BRG
block	BLK
blocking	BLK'G
both sides	BS
bottom	BTTM
bottom of beam	BOB
bottom of footing	BOF
bottom of steel	BOS
bracing	BRC'G
building	BLD'G
cast in place	CIP
center	CTR
centerline	CL OR ℄
clear/clearance	CLR/CLRC
column	COL
concrete	CONC
concrete masonry unit	CMU
construction joint	CJ
continuous	CONT
dead load	DL
deep	DP
detail	DTL
diagonal	DIAG
diameter	DIA OR Φ
dimension	DIM
ditto, do over	-do-
double	DBL
drawing	DWG
each	EA
each face	EF
each side	EFS
each way	EW
equal	EQ
expansion	EXP
exterior	EXT
far side	FS
finish	FIN
finish floor	FF
flange	FLG
floor	FLR
foot/feet	FT
footing	FTG
foundation	FND
face of concrete	FOC
face of masonry	FOM
face of stem, stud	FOS
header	HDR
height	HT
horizontal	HORIZ OR H
include	INCL
inside diameter	ID
inside face	IF
interior	INT
joint	INT
kip(s)	JNT
kips per square inch	KSI
location, locate	LOC
long leg horizontal	LLH
long leg vertical	LLV
machine bolt (A307 quality UNO)	MB
material	MAT'L
maximum	MAX
mechanical	MECH'L
metal	MTL
mezzanine	MEZZ
minimum	MIN
miscellaneous	MISC
near side	NS
not to scale	NTS
not in contract	NIC
on center	OC
opening	OPN'G
opposite	OPP
outside diameter	OD
outside face	OF
precast/precast panel	PC/PCP
panel	PNL
places	PLCS
plate	PL OR ℙ
pounds per square foot	PSF
pounds per square inch	PSI
pressure treated	PT
quantity	QTY
reference	REF
reinforce, -ed, -ing, -ment	REINF
required	REQ'D
revise/revision	REV
rough opening	RO
sawcut contraction joint	SCJ
schedule	SCHED
section	SECT
sheet	SHT
similar	SIM
slab on grade	SOG
spacing	SPC'G
special concentric braced frame	SCBF
specification	SPEC
square	SQ
staggered	STAG
standard	STD
steel	STL
structural	STRUCT'L
top and bottom	T&B
top of beam elevation	TOB
top of concrete	TOC
top of footing	TOF
top of steel	TOS
typical	TYP
top of masonry	TOM
top of wall	TOW
unless noted otherwise	UNO
vertical	VERT OR V
welded wire fabric	WWF
welded headed studs	WHS
welded threaded studs	WTS
with	W/
without	W/O
working point	WP

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RENEWS: DEC. 31, 2025
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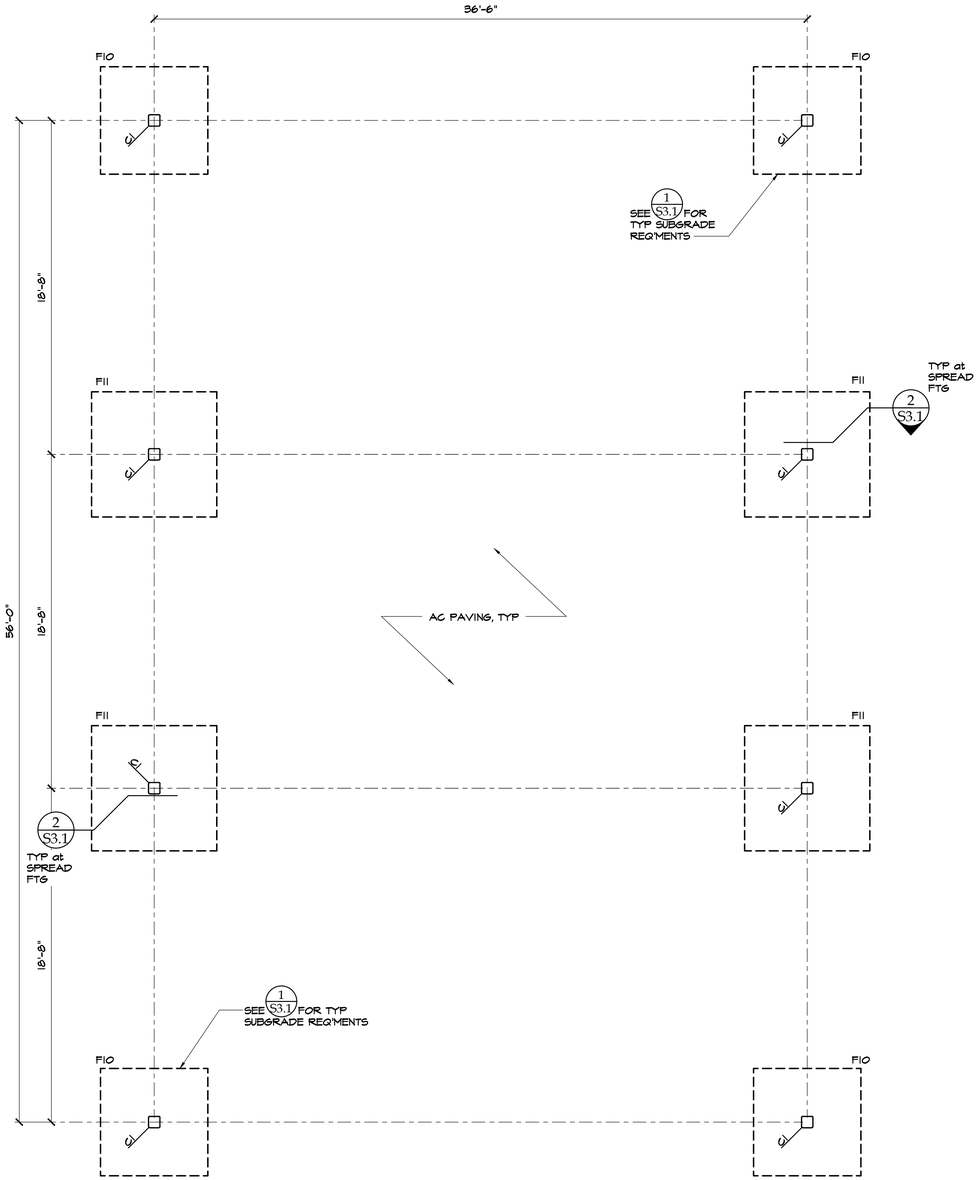
TABLE ROCK ELEMENTARY SCHOOL
COVERED OUTDOOR SPACE

2830 MAPLE COURT
WHITE CITY, OREGON

SPECIAL INSPECTION SCHEDULES

		REVISIONS
JOB NO.	035-23	
ISSUE DATE	03-29-23	
DRAWN	JNP	
CHECKED	JNP	
FILE NAME	S-GEN	

SHEET
S0.2
OF 4 SHEETS



NORTH

FOUNDATION PLAN

SCALE: 1/4"=1'-0"

GENERAL NOTES
1. SEE S0.1 FOR GENERAL NOTES.
2. SEE SITE PLAN FOR ADD'L DIMENSIONS.

FOOTING SCHEDULE:

MARK	WIDTH	LENGTH	DEPTH	REINFORCEMENT
F10	6'-0"	6'-0"	24"	(7) #6 EA WAY
F11	7'-0"	7'-0"	24"	(8) #6 EA WAY

COLUMN SCHEDULE:

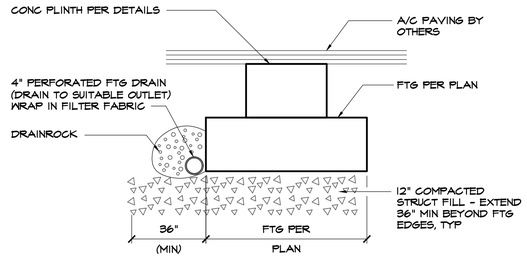
MARK	SIZE
C1	HSS 8x 8x 5/16

LEGEND

C1 — HSS STEEL COLUMN ABOVE

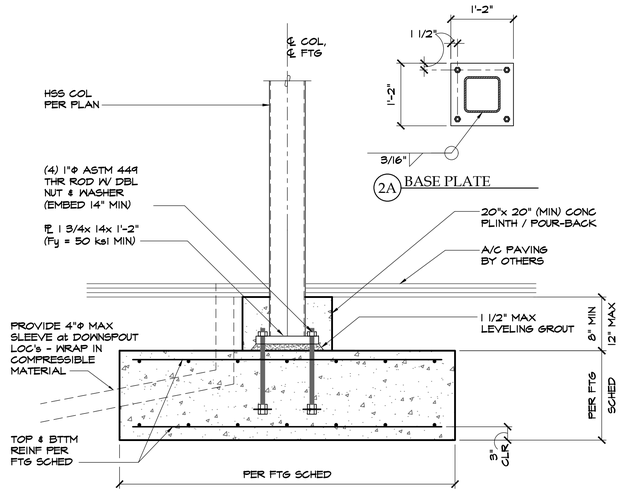
– – – – – CONC FOOTING

GEOTECHNICAL ENGINEER TO VERIFY ADEQUACY OF NATIVE SUBGRADE SOILS TO ACCEPT CONSTRUCTION DETAILS & STRUCTURAL FILL REQMENTS SHOWN PRIOR TO FNDN CONSTRUCTION



1 SUBGRADE at FOOTINGS

SCALE: 3/4" = 1'-0"



2 DETAIL

SCALE: 3/4" = 1'-0"

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FOUNDATION PLAN & DETAILS

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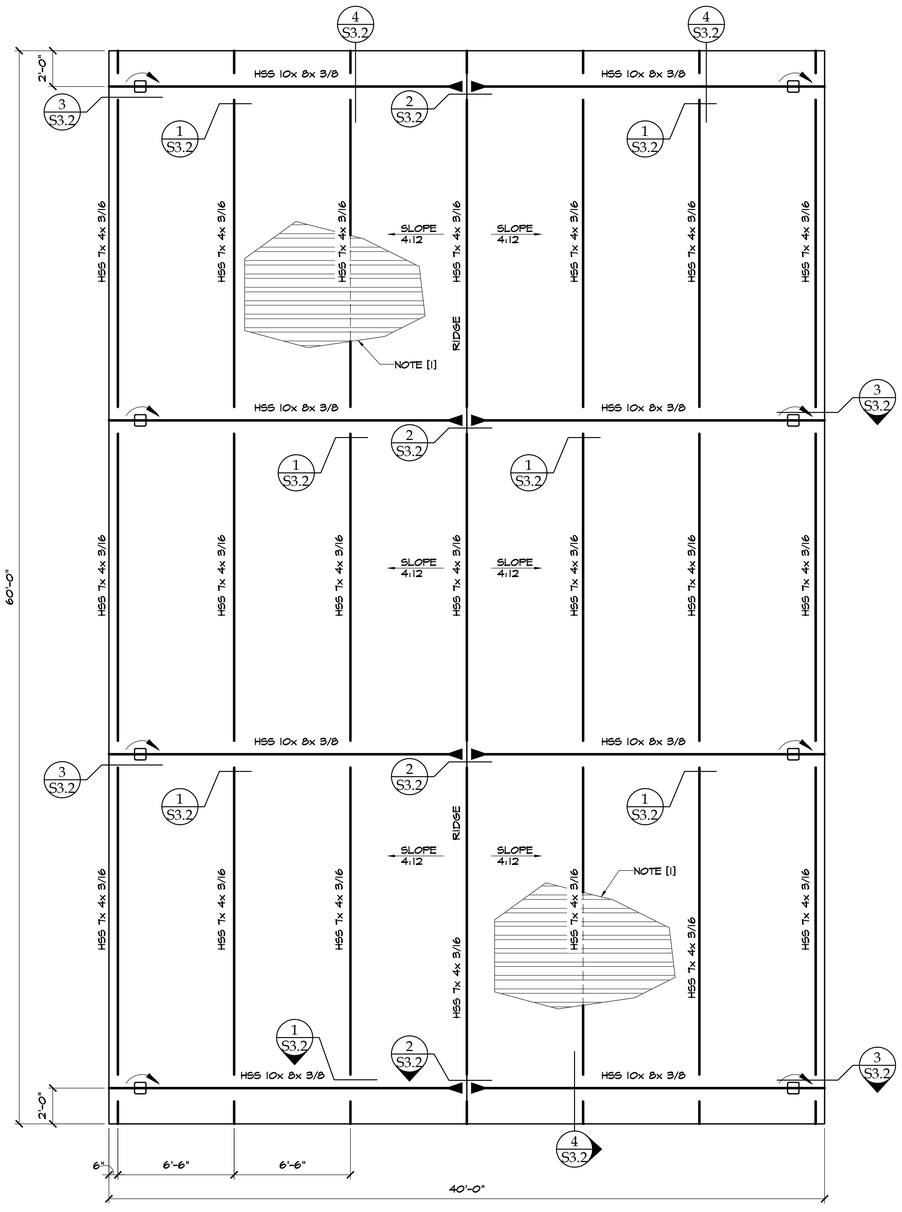
CHECKED	JNP
FILE NAME	S-PEND

REVISIONS

SHEET

S3.1

OF 4 SHEETS



NORTH

ROOF FRAMING PLAN

SCALE: 1/4"=1'-0"

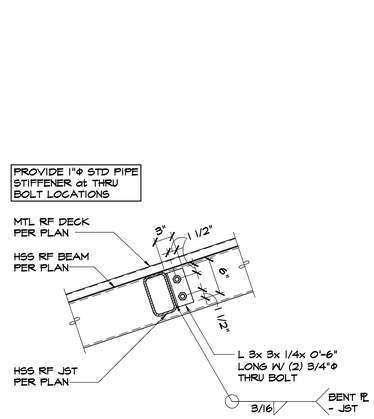
GENERAL NOTES
1. SEE SO.1 FOR GENERAL NOTES.
2. SEE SITE PLAN FOR ADD'L DIMENSIONS.
3. SEE SITE PLAN FOR DOWNSPOUT LOCATIONS.

LEGEND

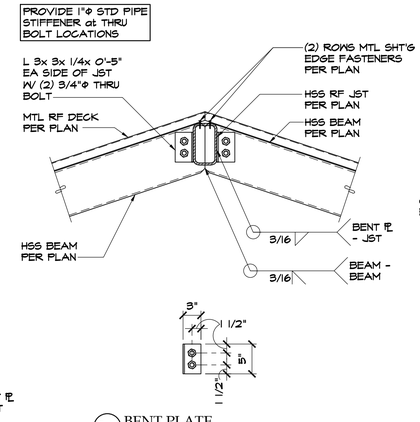
- HSS STEEL COLUMN BELOW
- BEAM CONT OVER SUPPORT
- STEEL MOMENT CONNECTION

KEYED NOTES

[1] 1 1/2" x 24 GA. 'GALVALUME' ROOFING PANELS, 2-SPAN CONT, MIN. ATTACH TO PERP SUPPORTS W/ (4) HILTI 'X-EDNK22' FASTENERS PER 36" WIDE SHEET. ATTACH TO ALL PARALLEL SUPPORTS W/ HILTI 'X-EDNK22' FASTENERS @ 12" OC. FASTEN SIDE LAPS W/ #10 SMS @ 24" OC (TYP). USE RUBBER WASHERS at FASTENERS, TYP. SEE 'METAL DECKING' SECTION OF GENERAL NOTES (SHEET SO.1) FOR FURTHER REQUIREMENTS.

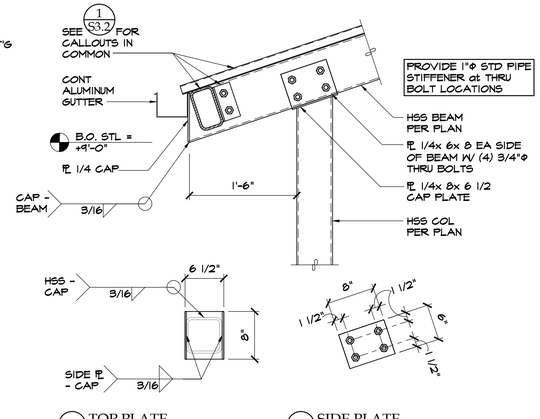


1 DETAIL
SCALE: 1" = 1'-0"



2A BENT PLATE

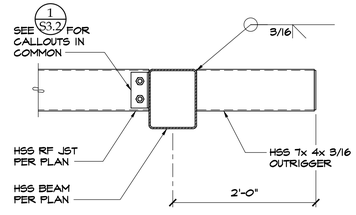
2 DETAIL
SCALE: 1" = 1'-0"



3A TOP PLATE

3B SIDE PLATE

3 DETAIL
SCALE: 1" = 1'-0"



4 DETAIL
SCALE: 1" = 1'-0"

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CHECKED	JNP
FILE NAME	S-PROOF

REVISIONS

SHEET
S3.2
OF 4 SHEETS

ATTACHMENT 3

Oregon Bureau of Labor and Industries

Prevailing Wage Rates for Public Works Contracts

Christina E. Stephenson
Labor Commissioner
Rates Effective January 5, 2023

CHRISTINA E. STEPHENSON
Labor Commissioner

In this rate book are the new prevailing wage rates for Oregon non-residential public works projects, effective January 5, 2023.

Prevailing wage rates are the minimum hourly wages that must be paid to all workers employed on all public works projects. Thank you for your engagement in the process and commitment to Oregon law.

Our team is ready to help support you with any questions you have. We also offer regular, free, informational seminars and webinars for contractors and public agencies. Contact us at PWR.Email@boli.oregon.gov or (971) 353-2416.

Christina E. Stephenson
Labor Commissioner

More information about prevailing wage rates:

The Oregon Bureau of Labor & Industries publishes the prevailing wage rates (PWR) that are required to be paid to workers on non-residential public works projects in Oregon.

A separate document, *Definitions of Covered Occupations for Public Works Contracts in Oregon,* provides occupational definitions used to classify the duties performed on public works projects. These definitions are used to find the correct prevailing wage rate.

The rate book and definition publications are available online at https://www.oregon.gov/boli, as well as additional information, supporting documents, and forms.

Please contact us at PWR.Email@boli.oregon.gov or (971) 353-2416, for additional information such as:

- Applicable prevailing wage rates for projects (Generally, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project.)
- Federal Davis-Bacon rates (In cases where projects are subject to both state PWR and federal Davis-Bacon rates, the higher wage must be paid.)
- Required PWR provisions for specifications and contracts
- Apprentice rates

TABLE OF CONTENTS

JANUARY 5, 2023

Required Postings for Contractors and Subcontractors **1**

Public Works Bonds **2**

Finding the Correct Prevailing Wage Rate **3**

Prevailing Wage Rates by Occupations **5**

List of Ineligible Contractors **28**

Forms necessary to comply with ORS 279C.800 through ORS 279C.870 can be found on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

All of the information in this booklet can be accessed and printed from the Internet at: www.oregon.gov/BOLI

Pursuant to ORS 279C.800 to ORS 279C.870, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon.

Required Postings for Prevailing Wage Contractors and Subcontractors

PREVAILING WAGE RATES

Every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in an obvious place on the worksite so workers have ready access to the information.

DETAILS OF FRINGE BENEFIT PROGRAMS

When a contractor or subcontractor provides or contributes to a health and welfare plan or a pension plan, or both, for employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the worksite.

The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in an obvious place on the work site in the same location as the prevailing wage rates.

WORK SCHEDULE

Contractors and subcontractors must give workers the regular work schedule (days of the week and number of hours per day) in writing before beginning work on the project.

Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information.

If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements.

ORS 279C.840(4); OAR 839-025-0033(1). ORS 279C.840(5); OAR 839-025-0033(2). ORS 279C.540(2); OAR 839-025-0034.

PUBLIC WORKS BONDS

Every contractor and subcontractor who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a $30,000 **"PUBLIC WORKS BOND"** with the Construction Contractors' Board (CCB). This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

The key elements of ORS 279C.830(2) and ORS 279C.836 specify that:

- Specifications for every contract for public works must contain language stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.
- Every contract awarded by a contracting agency must contain language requiring the contractor:
  - To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt; and
  - To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt
- Every subcontract that a contractor or subcontractor awards in connection with a public works contract between a contractor and a public agency must require any subcontractor to have a public works bond filed with the CCB before starting work on the public works project, unless otherwise exempt.
- Before permitting a subcontractor to start work on a public works project, contractors must first verify their subcontractors either have filed the bond, or have elected not to file a public works bond due to a bona fide exemption.
- The PWR bond is to be used exclusively for unpaid wages determined to be due by the Bureau of Labor & Industries.
- The bond is in effect continuously (you do not have to have one per project).
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

Exemptions:

- Allowed for a disadvantaged business enterprise, a minority-owned business, woman-owned business, a business that a service-disabled veteran owns or an emerging small business certified under ORS 200.055, for the first FOUR years of certification;
  - Exempt contractor must still file written verification of certification with the CCB, and give the CCB written notice that they elect not to file a bond.
  - The prime contractor must give written notice to the public agency that they elect not to file a public works bond.
  - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
- For projects with a total project cost of $100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
- Emergency projects, as defined in ORS 279A.010(f).

PREVAILING WAGE RATES

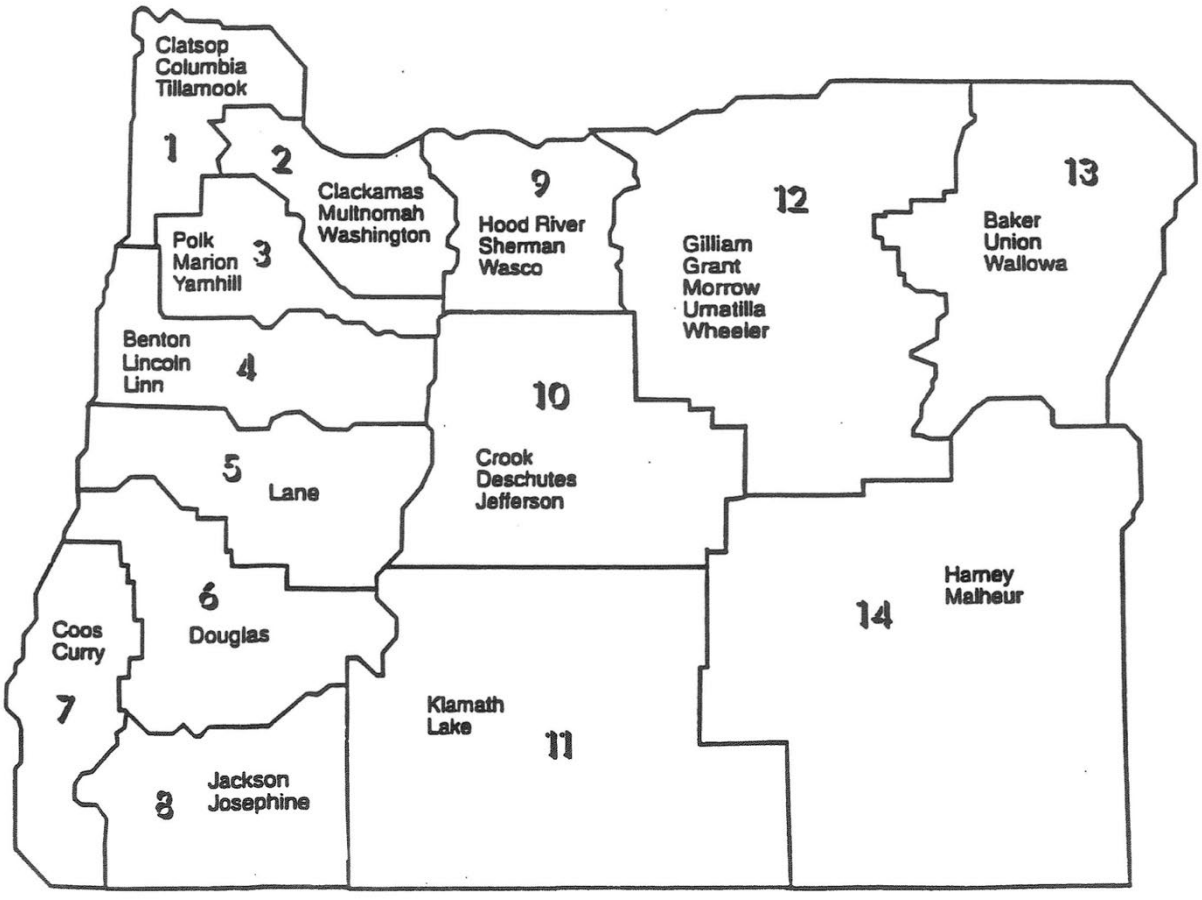
FINDING THE CORRECT PREVAILING WAGE RATE

To find the correct rate(s) required on your public works project, you will need:

- the date the project was first advertised for bid
- the county your project is in
- the duties of workers on the job

Generally, the rate you should look for is based on the date the project was first advertised for bid. (See OAR 839-025-0020(8) for information about projects that contract through a CM/GC, or contract manager/general contractor.)

The Labor Commissioner must establish the prevailing rate of wage for each region as defined in law. (See ORS 279C.800.) Each region is comprised of one to five counties. See below instructions on locating the correct prevailing wage rate for your public works project.



To find the correct rate in this rate book:

1. *Determine the duties that are being performed by each worker.* Use the booklet *Definitions of Covered Occupations* to find the definition that most closely matches the actual work performed by the worker. You can find this publication online at https://www.oregon.gov/boli/employers/Pages/occupational-definitions.aspx.

2. *Find the correct occupation in the "Prevailing Wage Rate for Public Works Contracts" below.* The prevailing wage rate is made up of an hourly base rate and an hourly fringe rate. The combination of these two amounts must be paid to each worker. Watch for possible zone differential, shift differential, and/or hazard pay. If the occupation lists different rates for different Areas of the state, locate the Area that includes the county where the project is located.

Apprentices must be paid consistent with their registered apprenticeship program standard. You can find apprenticeship rates on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx. You may also contact the agency to confirm the correct apprenticeship rate.

The "Prevailing Wage Rate Laws" handbook provides specific information and answers questions regarding prevailing wage laws and is available on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx.

If you have any questions about any of this information, please contact the Bureau of Labor & Industries at PWR.Email@boli.oregon.gov or (971) 353-2416.

January 5, 2023

Prevailing Wage Rates by Occupations—Table of Contents

Using the booklet, Definitions of Covered Occupations, find the definition and group number, if applicable, that most closely matches the actual work being performed by the worker.

Asbestos Worker/Insulator 6
Boilermaker 6
Bricklayer/Stonemason 6
Bridge and Highway Carpenter (See Carpenter Group 5) 6
Carpenter 6
Cement Mason 7
Diver 8
Diver Tender 8
Dredger 9
Drywall, Lather, Acoustical Carpenter & Ceiling Installer 10
Drywall Taper (See Painter & Drywall Taper) 18
Electrician 10
Elevator Constructor, Installer and Mechanic 14
Fence Constructor (Non-Metal)… 14
Fence Erector (Metal)… 14
Flagger (Laborer Group 3)… 15
Glazier 14
Hazardous Materials Handler 14
Highway/Parking Striper 15
Ironworker 15
Laborer 15
Landscape Laborer/Technician 16
Limited Energy Electrician 16
Line Constructor 17
Marble Setter 17
Millwright Group 1 (See Carpenter Group 3) 6
Painter & Drywall Taper 17
Piledriver (See Carpenter Group 6) 6
Plasterer and Stucco Mason 18
Plumber/Pipefitter/Steamfitter 19
Power Equipment Operator 20
Roofer 22
Sheet Metal Worker 23
Soft Floor Layer 24
Sprinkler Fitter 25
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier) 25
Tender to Plasterer and Stucco Mason 25
Testing and Balancing (TAB) Technician 26
Tile Setter/Terrazzo Worker: Hard Tile Setter 26
Tile, Terrazzo, and Marble Finisher 26
Truck Driver 26

ASBESTOS WORKER/INSULATOR	**57.17**	**22.27**
Firestop Containment	**42.38**	**16.19**
BOILERMAKER	**40.40**	**31.90**
BRICKLAYER/STONEMASON	**43.00**	**24.25**

This trade is tended by "Tenders to Mason Trades."

Add $1.00 per hour to base rate for refractory repair work.

CARPENTER

Zone A (Base Rate)

Group 1	**44.80**	**19.21**
Group 2	**44.97**	**19.21**
Group 3	**50.24**	**19.21**
Group 4	**Eliminated**	
Group 5	**45.40**	**19.21**
Group 6	**45.74**	**19.21**

Zone Differential for Carpenters
Add to Zone A Base Rate

Zone B	**1.25** per hour
Zone C	**1.70** per hour
Zone D	**2.00** per hour
Zone E	**3.00** per hour
Zone F	**5.00** per hour
Zone G	**10.00** per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed. Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities for Group 1 and 2 Carpenters

Albany	Goldendale	Madras	Roseburg
Astoria	Grants Pass	Medford	Salem
Baker City	Hermiston	Newport	The Dalles
Bend	Hood River	Ontario	Tillamook
Brookings	Klamath Falls	Pendleton	Vancouver
Burns	La Grande	Portland	
Coos Bay	Lakeview	Port Orford	
Eugene	Longview	Reedsport	

See more Reference Cities for Zone Differential on page 7

CARPENTER (continued)

Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

Zones for **Group 6** Carpenter are determined by the distance between the project site and **either**

1) The worker's residence; ***or***

2) City Hall of a reference city listed, whichever is closer.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Group 2, 5 and 6:
Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1 and 3:
When working with toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:
When working with creosote and other toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 6:
When working in sheet pile coffer dams or cells up to the external water level, workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

CEMENT MASON
This trade is tended by "Concrete Laborer."

Group 1	**39.97**	**23.00**
Group 2	**40.81**	**23.00**
Group 3	**40.81**	**23.00**
Group 4	**41.64**	**23.00**

Zone Differential for Cement Mason
Add to Basic Hourly Rate

Zone A	**3.00** per hour
Zone B	**5.00** per hour
Zone C	**10.00** per hour

Zone A: Projects located 60-79 miles of the respective city hall of the Reference Cities listed below.
Zone B: Projects located 80-99 miles of the respective city hall of the Reference Cities listed below.
Zone C: Projects located 100 or more miles of the respective city hall of the Reference Cities listed below (Page 8).

CEMENT MASON (continued)

Reference Cities for Cement Mason

Bend	Eugene	Pendleton	Salem	Vancouver
Corvallis	Medford	Portland	The Dalles	

When a contractor takes current employees to a project that is located more than 59 miles from the city hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the city hall of the identified Reference City and the project site.

Note: All miles are to be determined on the basis of road miles using the normal route (shortest time – best road), from the city hall of the Reference City closest to the contractor's place of business and the project.

DIVER & DIVER TENDER

Zone 1 (Base Rate)

DIVER	**95.32**	**19.21**
DIVER TENDER	**51.32**	**19.21**

1) For those workers who reside within a reference city below, their zone pay shall be computed from the city hall of the city wherein they reside.

2) For those workers who reside nearer to a project than is the city hall of any reference city below, the mileage from their residence may be used in computing their zone pay differential.

3) The zone pay for all other projects shall be computed from the city hall of the nearest reference city listed below.

Zone Differential for Diver/Diver Tender
Add to Zone 1 Base Rate

Zone 2	**1.25** per hour
Zone 3	**1.70** per hour
Zone 4	**2.00** per hour
Zone 5	**3.00** per hour
Zone 6	**5.00** per hour
Zone 7	**10.00** per hour

Zone 1: Projects located within 30 miles of city hall of the reference cities listed.
Zone 2: More than 30 miles, but less than 40 miles.
Zone 3: More than 40 miles, but less than 50 miles.
Zone 4: More than 50 miles, but less than 60 miles.
Zone 5: More than 60 miles, but less than 70 miles.
Zone 6: More than 70 miles, but less than 100 miles.
Zone 7: More than 100 miles.

Reference Cities for Diver/Diver Tender

Bend	Longview	North Bend
Eugene	Medford	Portland

See more information on Zone Pay calculation and Diver Depth/Enclosure Pay on Page 9.

DIVER & DIVER TENDER (continued)

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Diver Depth Pay:

Depth Below Water Surface (FSW)	Daily Depth Pay
50-100 ft.	$2.00 per foot over 50 feet
101-150 ft.	$3.00 per foot over 100 feet
151-220 ft.	$4.00 per foot over 150 feet
Over 220 ft.	$5.00 per foot over 220 feet

The actual depth in FSW shall be used in determining depth premium.

Diver Enclosure Pay (working without vertical escape):

Distance Traveled in the Enclosure	Daily Enclosure Pay
0 – 25ft.	N/C
25 – 300 ft.	$1.00 per foot from the entrance
300 – 600 ft.	$1.50 per foot beginning at 300 ft.
Over 600 ft.	$2.00 per foot beginning at 600 ft.

DREDGER

Zone A (Base Rate)

Leverman (Hydraulic & Clamshell)	**53.94**	**16.45**
Assistant Engineer (Watch Engineer, Mechanic Machinist)	**50.78**	**16.45**
Tenderman (Boatman Attending Dredge Plant), Fireman	**49.29**	**16.45**
Fill Equipment Operator	**48.12**	**16.45**
Assistant Mate	**45.42**	**16.45**

Zone Differential for Dredgers
Add to Zone A Base Rate

Zone B **3.00** per hour
Zone C **6.00** per hour

Zone mileage based on road miles:

Zone A: Center of jobsite to no more than 30 miles from the city hall of Portland.
Zone B: More than 30 miles but not more than 60 miles.
Zone C: Over 60 miles.

DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER

Zone 1 (Base Rate)

1. DRYWALL INSTALLER	**44.74**	**18.91**
2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER	**44.74**	**18.91**

Zone Differential for Lather, Acoustical Carpenter & Ceiling Installer

Zone mileage based on road miles:

Zone B	61-80 miles	**6.00** per hour
Zone C	81-100 miles	**9.00** per hour
Zone D	101 or more	**12.00** per hour

The correct transportation allowance shall be based on AAA road mileage from the City Hall of the transportation reference cities herein listed.

Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Certified welders shall receive 5% over the base wage rate, with an eight (8) hour minimum.

ELECTRICIAN

Area 1 (Region 14)

Electrician	**43.97**	**19.26**
Lighting Maintenance and Material Handler	**21.55**	**10.30**

Reference County

Malheur

Shift Differential*****

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 12:30am	8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 8:00am	8 hours pay for 8 hours work plus 15% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

See more information on Premium Pay on Page 11.

ELECTRICIAN (continued)

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground	Add 1 ½ x the base rate
90+ feet to the ground	Add 2 x the base rate

Pursuant to ORS 279C.815(2)(b), the Electrician Area 6 rate is the highest rate of wage among the collective bargaining agreements for Electrician Areas 1 and 6.

Area 2 (Regions 12 and 13)

Electrician	**51.75**	**24.18**
Cable Splicer	**54.34**	**24.26**
Certified Welder	**56.93**	**24.34**
Material Handler	**31.05**	**13.06**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Add 50% of the base rate when workers are required to work under the following conditions:

1) Under compressed air with atmospheric pressure exceeding normal pressure by at least 10%.

2) From trusses, swing scaffolds, bosun's chairs, open platforms, unguarded scaffolds, open ladders, frames, tanks, stacks, silos and towers where the workman is subject to a direct fall of (a) more than 60 feet or (b) into turbulent water under bridges, powerhouses or spillway faces of dams.

Area 3 (Regions 4, 5, 6 and 7)

Electrician	**48.58**	**23.20**

Reference Counties

Coos	Curry	Douglas

Lane – **See Area 4** Lincoln – **See Area 4**

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 31% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

See more information on Premium Pay on Page 12.

ELECTRICIAN (continued)

When workers are required to work under compressed air or where gas masks are required, or to work from trusses, all scaffolds including mobile elevated platforms, any temporary structure, bosun's chair or on frames, stacks, towers, tanks, within 15' of the leading edges of any building at a distance of:

50 – 75 feet to the ground	Add 1 ½ x the base rate
75+ feet to the ground	Add 2 x the base rate

High Time is not required to be paid on any permanent structure with permanent adequate safeguards (handrails, mid-rails, and toe guards). Any vehicle equipped with outriggers are exempted from this section.

Area 4 (Regions 3, 4, 5, and 10)

Electrician	**51.67**	**20.58**
Cable Splicer	**56.84**	**20.74**
Lighting Maintenance/Material Handler	**24.29**	**10.38**

Reference Counties for Area 4

Benton	Deschutes	Lane	Lincoln
Crook	Jefferson	Linn	

Marion – **See Area 5 rate** Polk – **See Area 5 rate** Yamhill – **See Area 5 rate**

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 31.4% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Area 5 (Regions 1, 2, 3 and 9)

Electrician	**57.35**	**28.94**
Electrical Welder	**63.09**	**29.11**
Material Handler/Lighting Maintenance	**32.69**	**19.45**

Reference Counties

Clackamas	Hood River	Polk	Wasco
Clatsop	Marion	Sherman	Washington
Columbia	Multnomah	Tillamook	Yamhill

See more information on Shift Differentials and Zone Pay on Page 13.

ELECTRICIAN (continued)

Shift Differential*****

1st Shift "day"	Between the hours of 7:00am and 5:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 3:00am	8 hours pay for 8 hours work plus 17.3% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 11:00am	8 hours pay for 8 hours work plus 31.4% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Zone Pay for Area 5 – **Electrician and Electrical Welder**
Add to Basic Hourly Rate

Zone mileage based on air miles:

Zone 1	31-50 miles	**1.50** per hour
Zone 2	51-70 miles	**3.50** per hour
Zone 3	71-90 miles	**5.50** per hour
Zone 4	Beyond 90	**9.00** per hour

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

Area 6 (Regions 6, 8, 11 and 14)

Electrician	**43.97**	**19.26**
Lighting Maintenance and Material Handler	**21.55**	**10.30**

Reference Counties

Harney	Josephine	Lake
Jackson	Klamath	Malheur

Douglas – **See Area 3 rate**

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	8 hours pay for 8 hours work plus 15% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

ELECTRICIAN (continued)

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground	Add 1 ½ x the base rate
90+ feet to the ground	Add 2 x the base rate

ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC

Area 1 (Regions 12 and 13)

Mechanic	**62.25**	**42.32**

Reference Counties

Baker Union Wallowa

Umatilla – **See Area 2 rate**

Area 2 (Regions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 14)

Mechanic	**62.51**	**42.34**

Reference Counties

Benton	Douglas	Klamath	Multnomah	Deschutes
Clackamas	Gilliam	Lake	Polk	Josephine
Clatsop	Grant	Lane	Sherman	Morrow
Columbia	Harney	Lincoln	Tillamook	Wheeler
Coos	Hood River	Linn	Umatilla	Yamhill
Crook	Jackson	Malheur	Wasco	
Curry	Jefferson	Marion	Washington	

FENCE CONSTRUCTOR (NON-METAL)	**34.98**	**16.55**
FENCE ERECTOR (METAL)	**34.98**	**16.55**
GLAZIER	**45.82**	**25.40**

Add $1.00 to base rate when employee works from a swing stage, scaffold, suspended contrivance or mechanical apparatus from the third floor up or thirty feet of free fall (whichever is less), and employee is required to wear a safety belt.

Add twenty percent (20%) to base rate when employee works from a bosun chair (non-motorized single-man apparatus), regardless of height.

Certified welders shall receive twenty percent (20%) above the base rate for actual time spent performing welding duties.

HAZARDOUS MATERIALS HANDLER	**29.03**	**15.18**

HIGHWAY/PARKING STRIPER **38.18** **15.08**

Shift Differential
Add $1.85/hour to base rate for shifts that start between 3:00pm and 4:00am.

IRONWORKER

Zone 1 (Base Rate): **42.27** **32.53**

Zone Differential for Ironworker
Add to Basic Hourly Rate

Zone 2 **6.88/**hr. or $55.00 maximum per day
Zone 3 **10.00**/hr. or $80.00 maximum per day
Zone 4 **12.50/**hr. or $100.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.
Zone 2: More than 46 miles, but less than 60 miles.
Zone 3: More than 61 miles, but less than 100 miles.
Zone 4: More than 100 miles.

Note: Zone pay for Ironworkers shall be determined using the quickest route per Google Maps and computed from the city hall or dispatch center of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

Reference Cities and Dispatch Center

Medford Portland

LABORER

Zone A (Base Rate):

Group 1	**34.98**	**16.55**
Group 2	**36.25**	**16.55**
Group 3 (Flagger)	**30.38**	**16.55**
Group 4 (Landscape Laborer)	**24.17**	**16.55**

Zone Differential for Laborers
Add to Zone A Base Rate

Zone B **.85** per hour
Zone C **1.25** per hour
Zone D **2.00** per hour
Zone E **4.00** per hour
Zone F **5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles but less than 100 miles.
Zone F: More than 100 miles.

See Reference Cities for Zone Differentials on Page 16.

LABORER (continued)

Reference Cities for Laborer

Albany	Burns	Hermiston	Roseburg
Astoria	Coos Bay	Klamath Falls	Salem
Baker City	Eugene	Medford	The Dalles
Bend	Grants Pass	Portland	

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Any Laborer working in Live Sewers shall receive forty dollars ($40) per day in addition to their regular pay.

LANDSCAPE LABORER/TECHNICIAN (Laborer Group 4) **24.17** **16.55**

LIMITED ENERGY ELECTRICIAN

Area 1 (Region 14) **33.76** **17.24**

Reference County

Malheur

Pursuant to ORS 279C.815(2)(b), the Limited Energy Electrician Area 6 rate is the highest rate of wage among the collective bargaining agreements for Limited Energy Electrician Areas 1 and 6.

Area 2 (Regions 12 and 13) **34.51** **16.04**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Area 3 (Regions 4, 5, 6 and 7) **38.86** **20.81**

Reference Counties

Benton	Curry	Lane	Linn
Coos	Douglas	Lincoln	

Area 4 (Regions 3, 4, 5 and 10) **38.44** **17.62**

Reference Counties

Deschutes	Jefferson
Crook	

Benton – **See Area 3 rate**	Linn – **See Area 3 rate**	Polk – **See Area 5 rate**
Lane – **See Area 3 rate**	Marion – **See Area 5 rate**	Yamhill – **See Area 5 rate**

LIMITED ENERGY ELECTRICIAN (continued)

Area 5 (Regions 1, 2, 3 and 9)	**47.66**	**22.97**

Reference Counties

Clackamas	Hood River	Polk	Wasco
Clatsop	Marion	Sherman	Washington
Columbia	Multnomah	Tillamook	Yamhill

Area 6 (Regions 6, 8, 11 and 14)	**33.76**	**17.24**

Reference Counties

Harney	Josephine	Lake
Jackson	Klamath	Malheur

Douglas – **See Area 3 rate**

LINE CONSTRUCTOR

Area 1 (All Regions)

Group 1	**64.58**	**24.31**
Group 2	**57.66**	**23.99**
Group 3	**35.58**	**15.44**
Group 4	**49.59**	**20.43**
Group 5	**43.25**	**17.50**
Group 6	**35.75**	**17.16**
Group 7	**20.71**	**12.56**

Reference Counties

All counties

Pursuant to ORS 279C.815(2)(b), the Line Constructor Area 1 rate is the highest rate of wage among the collective bargaining agreements for Line Constructor Area 1 and Area 2.

MARBLE SETTER	**44.00**	**24.25**

This trade is tendered by “Tile, Terrazzo, & Marble Finishers.”

Add $1.00 per hour to base rate for refractory repair work.

PAINTER & DRYWALL TAPER

COMMERCIAL PAINTING	**30.72**	**14.18**
INDUSTRIAL PAINTING	**32.52**	**14.18**
BRIDGE PAINTING	**38.19**	**14.18**

Shift Differential for Painter
Add $2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

PAINTER & DRYWALL TAPER (continued)

DRYWALL TAPER

Zone A (Base Rate	**42.52**	**19.13**

Zone Differential for Drywall Taper Add to Zone A Base Rate

Zone B **6.00** per hour
Zone C **9.00** per hour
Zone D **12.00** per hour

Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Zone A: Projects located less than 61 miles of the respective city hall of the dispatch cities listed.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

Note: Zone pay is based on AAA Road Mileage.

PLASTERER AND STUCCO MASON

This trade is tended by "Tenders to Plasterers."

Zone A (Base Rate)	**41.16**	**19.23**

Zone Differential for Plasterer and Stucco Mason
Add to Zone A Base Rate

Zone B **6.00** per hour
Zone C **9.00** per hour
Zone D **12.00** per hour

Zone A: Projects located less than 61 miles of the respective city hall of the reference cities listed below.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

Reference Cities for Plasterer & Stucco Mason

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $1.00 to base rate for swinging scaffold work.

Add $2.00 to base rate for nozzle technicians on plastering machines.

PLUMBER/PIPEFITTER/STEAMFITTER

Area 1 (Regions 13 and 14) **34.00** **17.07**

Reference Counties

Harney Malheur

Baker – **See Area 2 rates**

Zone Differential for Area 1
Add to Base Rate

Zone 1	**2.50** per hour
Zone 2	**3.50** per hour
Zone 3	**5.00** per hour

Zone mileage based on road miles:
Zone 1: Forty (40) to fifty five (55) miles from City Hall in Boise, Idaho.
Zone 2: Fifty five (55) to one hundred (100) miles from City Hall in Boise, Idaho.
Zone 3: Over one hundred (100) miles from City Hall in Boise, Idaho.

Add $2.21 to base rate if it is possible for worker to fall 30 ft. or more, or if required to wear a fresh-air mask or similar equipment for 2 hours or more.

Area 2 (Regions 12 and 13) **54.00** **34.11**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Zone Differential for Area 2
Add to Base Rate

Zone 2 **10.62/**hr. not to exceed $80.00 day.

Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

Zone mileage based on road miles:

Add $1.00 to base rate in one-hour minimum increments if it is possible for worker to fall 35 ft. or more.

Add $1.00 to base rate in one-hour minimum increments if worker is required to wear a mask in hazardous areas.

Area 3 (Regions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) **50.68** **35.00**

Reference Counties

Benton	Deschutes	Lake	Sherman
Clackamas	Douglas	Lane	Tillamook
Clatsop	Hood River	Lincoln	Wasco
Columbia	Jackson	Linn	Washington
Coos	Jefferson	Marion	Yamhill
Crook	Josephine	Multnomah	
Curry	Klamath	Polk	

Gilliam – **See Area 2 rate** Wheeler – **See Area 2 rate**

POWER EQUIPMENT OPERATOR

Zone 1 (Base Rate)		
Group 1	**54.13**	**18.15**
Group 1A	**56.29**	**18.15**
Group 1B	**58.45**	**18.15**
Group 2	**52.22**	**18.15**
Group 3	**51.07**	**18.15**
Group 4	**47.74**	**18.15**
Group 5	**46.50**	**18.15**
Group 6	**43.28**	**18.15**

POWER EQUIPMENT OPERATOR MAP

Zone Pay Differential for Power Equipment Operator
Add to Zone 1 Base Rate

Zone 2 **3.00** per hour
Zone 3 **6.00** per hour

For projects in the following metropolitan counties:

Clackamas	Marion	Washington
Columbia	Multnomah	Yamhill

POWER EQUIPMENT OPERATOR (continued)

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from the Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Add $10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add $0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment.

Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add $0.50 to the base rate for employees who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 353-2416.

Shift Differential

Two-Shift Operations:

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

See more information on Shift Differentials on Page 22.

POWER EQUIPMENT OPERATOR (continued)

Three-Shift Operations:

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

ROOFER

Area 1 (Regions 1, 2, 9, 10, 12 and 13)	**38.78**	**20.48**

Reference Counties

Baker	Deschutes	Morrow	Union
Clackamas	Gilliam	Multnomah	Wasco
Clatsop	Grant	Sherman	Wallowa
Columbia	Hood River	Tillamook	Washington
Crook	Jefferson	Umatilla	Wheeler

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

Area 2 (Regions 3, 4, 5, 6, 7, 8, 10, 11 and 14)	**32.55**	**18.65**

Reference Counties

Benton	Harney	Lake	Malheur
Coos	Jackson	Lane	Marion
Curry	Josephine	Lincoln	Polk
Douglas	Klamath	Linn	Yamhill

Crook – **See Area 1 rates** Deschutes – **See Area 1 rates**

Add $2.00 to the base rate for handling coal tar products.

Add $1.50 to the base rate for handling fiberglass insulation.

Area 4 (Regions 12 and 13)	**38.78**	**20.48**

Reference Counties

Umatilla	Union	Wallowa

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

ROOFER (Continued)

Area 5 (Region 12) **38.78** **20.48**

Reference County

Morrow

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

SHEET METAL WORKER

Area 1 (Regions 1, 2, 3, 4, 9 and 12) **45.80** **25.46**

Reference Counties

Benton	Grant	Morrow	Umatilla
Clackamas	Hood River	Multnomah	Wasco
Clatsop	Lincoln	Polk	Washington
Columbia	Linn	Sherman	Wheeler
Gilliam	Marion	Tillamook	Yamhill

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid.

Area 2 (Regions 13 and 14) -------- --------

Reference Counties

Baker – **See Area 3 rate** Malheur – **See Area 6 rate**

Area 3 (Regions 12 and 13) **44.09** **25.28**

Reference Counties

Baker Union Wallowa

Morrow – **See Area 1 rate** Umatilla – **See Area 1 rate**

Add $.45 to base rate for work performed on any swinging stage, swinging scaffold or boson chair in excess of thirty (30) feet above the ground.

Add $1.00 to base rate for work where it is necessary to wear a chemically activated type face mask.

SHEET METAL WORKER (continued)

Area 4 (Regions 5 and 6) **37.78** **22.72**

Reference Counties

Douglas Lane

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid.

Area 5 (Region 7) **38.14** **23.76**

Reference Counties

Coos Curry

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid.

Area 6 (Regions 7, 8, 11 and 14) **32.12** **21.39**

Reference Counties

Harney	Josephine	Lake
Jackson	Klamath	Malheur

Curry – **See Area 5 rate**

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid.

Area 7 (Region 10) **35.36** **21.31**

Reference Counties

Crook Deschutes Jefferson

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work where a worker is exposed to resins, chemicals or acid.

SOFT FLOOR LAYER **37.23** **18.17**

SPRINKLER FITTER

Area 1 (Regions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 14)	**44.13**	**25.84**

Reference Counties

Benton	Douglas	Klamath	Multnomah
Clackamas	Gilliam	Lake	Polk
Clatsop	Grant	Lane	Sherman
Columbia	Harney	Lincoln	Tillamook
Coos	Hood River	Linn	Umatilla
Crook	Jackson	Malheur	Wasco
Curry	Jefferson	Marion	Washington
Deschutes	Josephine	Morrow	Wheeler
			Yamhill

Area 2 (Regions 12, 13, 14)	**37.81**	**25.84**

Reference Counties

Baker	Union	Wallowa

Gilliam – **See Area 1 rate** Malheur – **See Area 1 rate** Umatilla – **See Area 1 rate**
Grant – **See Area 1 rate** Morrow – **See Area 1 rate**

TENDER TO MASON TRADES (Brick and Stonemason, Mortar Mixer, Hod Carrier)	**38.79**	**16.55**

Add $0.50 to base rate for refractory repair work.

TENDER TO PLASTERER AND STUCCO MASON

Zone A (Base Rate)	**37.62**	**16.55**

Zone Differential for Tender to Plasterer and Stucco Mason
Add to Zone A Base Rate

Zone B **6.00** per hour
Zone C **9.00** per hour
Zone D **12.00** per hour

Zone A: Projects located within 60 miles of city hall in the reference cities listed.
Zone B: More than 61 miles but less than 80 miles.
Zone C: More than 81 miles but less than 100 miles.
Zone D: More than 101 miles

Reference Cities

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $0.50 to base rate for refractory repair work.

TESTING AND BALANCING (TAB) TECHNICIAN

For work performed under the Sheet Metal classification, including Air-Handling Equipment, Ductwork

See SHEET METAL WORKER RATE

For work performed under the Plumber/Pipefitter/Steamfitter classification, including Water Distribution Systems

See PLUMBER/PIPEFITTER/STEAMFITTER RATE

TILE SETTER/TERRAZZO WORKER: Hard Tile Setter	**37.65**	**20.83**

This trade is tended by "Tile, Terrazzo, & Marble Finisher."

Add $1.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

TILE, TERRAZZO, AND MARBLE FINISHER

1. TILE, TERRAZZO FINISHER	**28.29**	**15.30**

Add $1.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

2. BRICK & MARBLE FINISHER	**28.29**	**15.43**

Add $1.00 per hour to base rate for refractory repair work.

TRUCK DRIVER

Zone A (Base Rate)

Group 1	**30.09**	**16.73**
Group 2	**30.23**	**16.73**
Group 3	**30.37**	**16.73**
Group 4	**30.67**	**16.73**
Group 5	**30.91**	**16.73**
Group 6	**31.10**	**16.73**
Group 7	**31.32**	**16.73**

Zone differential for Truck Drivers
Add to Zone A Base Rate

Zone B	**.65** per hour
Zone C	**1.15** per hour
Zone D	**1.70** per hour
Zone E	**2.75** per hour

See more information on Zone Differentials on Page 27.

TRUCK DRIVER (Continued)

Zone A: Projects within 30 miles of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles.

Reference Cities

Albany	Burns	Hermiston	Madras	Oregon City	Roseburg
Astoria	Coos Bay	Hood River	Medford	Pendleton	Salem
Baker	Corvallis	Klamath Falls	McMinnville	Portland	The Dalles
Bend	Eugene	La Grande	Newport	Port Orford	Tillamook
Bingen	Goldendale	Lakeview	Ontario	Reedsport	Vancouver
Brookings	Grants Pass	Longview			

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 5, 2023

To: All Oregon Contracting Agencies

Pursuant to ORS 279C.860, contractors on this list are ineligible to receive public works contracts subject to the Prevailing Wage Rate Law. These contractors and subcontractors, as well as any firm, corporation, partnership or association in which the contractor or subcontractor has a financial interest are ineligible to receive public works contracts until removed from this list. You can find the most current and up to date list of contractors ineligible to receive public works contracts on our website at https://www.oregon.gov/boli/employers/Pages/pwr-ineligible-contractors.aspx.

If you have questions regarding the list or for the most current information regarding persons ineligible to receive prevailing wage contracts, please contact the Prevailing Wage Rate Coordinator in Portland at (971) 353-2416.

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
1.	**A1 Dumptruck Services LLC** 703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	February 24, 2020	February 23, 2027
2.	**Advanced Flagging & Pilot Car Inc.** 16400 NE Las Brisas Ct., Apt. 43 Portland, OR 97230 650 NE Holladay St. Portland, OR 97232 16400 NE Las Brisas Ct. Portland, OR 97230	February 5, 2021	February 4, 2024
3.	**Barker, Michael** 32966 Tennessee Road Lebanon, OR 97355	January 5, 2021	January 4, 2024
4.	**Bell-Eddy, Kimberly** 8535 Woodard Ave. SE Salem, OR 97317	January 12, 2016	January 11, 2023
5.	**Cameron Creations** **Steven Cameron** **Nancy Cameron** PO Box 2 Lowell, OR 97452	May 25, 2000	Not to be Removed
6.	**Canell's Flagging LLC** 731 N Hayden Meadows Dr., Ste 107 Portland, OR 97217	November 24, 2020	November 23, 2023
7.	**Canell, Angela** 2416 NE 11th Avenue Portland, OR 97212 529 SE Grand #307 Portland, OR 97214	November 24, 2020	November 23, 2023
8.	**CJ Construction, Inc.** 2969 Ferguson St NW Salem, OR 97304 846 55th Ave. Salem, OR 97304	December 11, 2020	November 6, 2023

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 5, 2023

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
9.	**Covington, Timothy** **aka Tim York** 16055 NE Stanton St. Portland, OR 97230 2933 NE 11th Ave. Portland, OR 97212 12231 NE Stanton St. Portland, OR 97230	April 13, 2021	April 12, 2024
10.	**Diversified Masonry LLC** PO Box 144 Ranchester, WY 82839	January 5, 2021	January 4, 2024
11.	**Friedman, Jennifer** 2526 Ellen Lane NW Salem, OR 97304 4400 Shaw St NW Salem, OR 97304 4400 Salem-Dallas Hwy Salem, OR 97304 PO Box 5172 Salem, OR 97304	December 11, 2020	October 10, 2023
12.	**Friedman, Scott** 2969 Ferguson St NW Salem, OR 97304 4400 Dallas Hwy Salem, OR 97304 PO Box 5172 Salem, OR 97304	December 11, 2020	October 10, 2023
13.	**Graeme, Eugene** 169 SE Cody Lane Madras, OR 97741	July 3, 2017	July 2, 2027
14.	**Green Thumb Landscape and Maintenance, Inc.,** **aka Green Thumb Landscaping,** **aka GT General Contracting** 4400 Dallas Hwy Salem, OR 97304 PO Box 5172 Salem, OR 97304	December 11, 2020	October 10, 2023
15.	**Green Thumb LLC, aka Green Thumb Contracting** 4400 Salem-Dallas Hwy Salem, OR 97304 4400 Shaw St NW Salem, OR 97304 PO Box 5172 Salem, OR 97304	December 11, 2020	October 10, 2023
16.	**High-N-Shine Concrete Floors** 9024 Silver Star Ave. Vancouver, WA 98664	February 3, 2020	February 2, 2023

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
17.	**Hoang, Lisa** **aka Kim Lien Hoang,** **aka Lien Kim Hoang,** **aka Kim Hope,** **aka Lisa K Ryan,** **aka Ryan Lien Hoang,** **aka Kim L Hoang,** **aka Lien Hoang Ryan,** **aka Lien K Hoang-Ryan,** **aka Hoang K Lien,** **aka Lisa Hall,** **aka Lisa Kim Ryan,** **aka Lien Ryan,** **aka Lien Hoang Ryan,** **aka Kim Hoang Lien,** **aka K Lisa Hoang** 703 N Hayden Meadows Dr, #206 Portland, OR 97213 731 N Hayden Meadows Dr, #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	February 24, 2020	February 23, 2027
18.	**Ingram, Christina** 2676 Copeland Road Harper, Oregon 97906	May 6, 2022	May 5, 2025
19.	**Ingram, Tyrell** 2676 Copeland Road Harper, Oregon 97906	May 6, 2022	May 5, 2025
20.	**Kim Bell Flagging, Inc.** 8535 Woodard Ave. SE Salem, OR 97317	January 12, 2016	January 11, 2023
21.	**Miller, David** 731 NW Naito Parkway, #215 Portland, OR 97209	June 17, 2020	Not to be Removed
22.	**Nam, Sang In** **dba Cornerstone Janitorial Services** 130 NE Danbury Ave. Hillsboro, OR 97124	September 20, 2016	Not to be Removed
23.	**Nguyen, Hai T.** 9024 Silver Star Ave. Vancouver, WA 98664	February 3, 2020	February 2, 2023
24.	**NW Flagging LLC** 703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	February 24, 2020	February 23, 2027

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 5, 2023

	CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
25.	**Oregon Building & Landscaping Services LLC** 703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	February 24, 2020	February 23, 2027
26.	**Pacific NW Drywall & Acoustics LLC** **aka Pacific NW Drywall& Acoustics LLC** 731 NW Naito Parkway #215 Portland, OR 97209	June 17, 2020	Not to be Removed
27.	**Polson, Pacharee** 9024 Silver Star Ave. Vancouver, WA 98664	February 3, 2020	February 2, 2023
28.	**Regional Traffic Management LLC** 703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	February 24, 2020	February 23, 2027
29.	**Snake River Construction and Excavation LLC** 2676 Copeland Road Harper, Oregon 97906	May 6, 2022	May 5, 2025
30.	**Tatom, Alan** 168 Clearwater Avenue NE Salem, OR 97301	July 10, 2015	July 9, 2025
31.	**Thomas, Antonio** 16400 NE Las Brisas Ct., Apt. 43 Portland, OR 97230 650 NE Holladay St. Portland, OR 97232 16400 NE Las Brisas Ct. Portland, OR 97230	February 5, 2021	February 4, 2024
32.	**Walker, Phillip** 580 Market Street NE Salem, OR 97301	July 10, 2015	July 9, 2025
33.	**WCI Construction LLC** 169 SE Cody Lane Madras, OR 97741	July 3, 2017	July 2, 2027
34.	**WWJD Traffic Control, Inc.** 168 Clearwater Avenue NE Salem, OR 97301	July 10, 2015	July 9, 2025

CHRISTINA E. STEPHENSON, COMMISSIONER
BUREAU OF LABOR AND INDUSTRIES

Prevailing Wage Rate Laws Handbook

The 2022 edition of the ***Prevailing Wage Rate Laws Handbook*** is now available on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx.

In addition to providing this and other PWR publications, Oregon BOLI Labor & Industries' PWR Unit regularly offers free, informational seminars for both public agencies and contractors. The current schedule is available online at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-seminars.aspx.

If you are interested in being included on our mailing lists for future seminar notifications, please contact us at PWR.Email@boli.oregon.gov or (971) 353-2416.

Occupation and Premium/Differential Pay	Base Rate	Fringe Rate

POWER EQUIPMENT OPERATOR

Zone 1 (Base Rate)		
Group 1	**54.13**	**16.65**
Group 1A	**56.29**	**16.65**
Group 1B	**58.45**	**16.65**
Group 2	**52.22**	**16.65**
Group 3	**51.07**	**16.65**
Group 4	**47.74**	**16.65**
Group 5	**46.50**	**16.65**
Group 6	**43.28**	**16.65**

POWER EQUIPMENT OPERATOR MAP

Zone Pay Differential for Power Equipment Operator

Add to Zone 1 Base Rate:

Zone 2 **3.00** per hour
Zone 3 **6.00** per hour

Occupation and Premium/Differential Pay **Base Rate / Fringe Rate**

For projects in the following metropolitan counties:

Clackamas	Marion	Washington
Columbia	Multnomah	Yamhill

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from the Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Add $10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add $0.40 to the base rate for any and all work performed underground, including operating, servicing, and repairing of equipment.

Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add $0.50 to the base rate for employees who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 353-2416.

Shift Differential

Two-Shift Operations:

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

Three-Shift Operations:

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.